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India's Recent Macroeconomic Performance: An Assessment and Way Forward

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India's Recent Macroeconomic Performance: An Assessment and Way Forward¹

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Abstract

The macroeconomic policy response in India after the North Atlantic financial crisis (NAFC) was rapid. The overshooting of the stimulus and its gradual withdrawal sowed seeds for inflationary and BoP pressures and growth slowdown, then exacerbated by domestic policy bottlenecks and volatility in international financial markets during mid-2013. Appropriate domestic oil prices and fiscal consolidation will contribute to the recovery of private sector investment. Fiscal consolidation would also facilitate a reduction in inflation, which would moderate gold imports and favorably impact real exchange rate and current account deficit.

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I. INTRODUCTION

The Indian economy recorded robust annual growth of 9 percent plus during 2004-08 and this high growth phase was also accompanied by consolidation of key macroeconomic indicators. However, this process suffered a setback with the onset of the North Atlantic financial crisis (NAFC) in 2008. Growth rebounded initially in response to large monetary and fiscal stimuli but has slowed down significantly subsequently; moreover, a substantial widening of the current account and fiscal deficits occurred from 2008-09, along with inflation climbing to an elevated level. With the observed decline in domestic saving and investment rates, there are concerns that India's potential growth rate has now fallen significantly (IMF, 2013; Mishra, 2013). Furthermore, given the large twin deficits, concerns were expressed about the possible emergence of a balance of payments crisis (for example, Acharya, 2013; Mody and Walton, 2013; Tarapore, 2013b). These concerns came to the forefront during June-August 2013 following the mention of tapering by the US Federal Reserve from the accommodative monetary policy and the concomitant volatility in the global and domestic financial markets. These concerns have receded somewhat now along with the significant correction in the current account deficit (CAD) that has taken place since the second quarter of 2013-14. There is also a view that the high growth phase of 2004-09 was a debt-led cyclical boom, supported by unprecedented capital inflows, coinciding with an exceptional growth phase in the world economy (Nagaraj, 2013).

Can India be placed on a sustained high growth path again so that it grows consistently over the next couple of decades and beyond? To what extent have domestic economic policies contributed to the slowdown that might have been expected in any case, as a result of the headwinds emanating from the NAFC?

Against this backdrop, this paper begins with an evaluation of India's recent growth experience in a cross-country perspective (Section II). This is followed by an assessment of the role of domestic macroeconomic policies in the growth slowdown; this section also examines as to whether oil demand is responsive to price movements and as to how much of the recent growth slowdown can be explained through conventional determinants (Section III). Section IV then assesses the factors that have led to the widening of the CAD and explores: (i) the role of income and price elasticities in external trade; and (ii) the determinants of demand for gold imports in order to understand the widening of the CAD. Section V focuses on some key issues in macroeconomic management going forward and concluding observations are in Section VI.

II. RECENT MACROECONOMIC TRENDS: INDIA IN A GLOBAL PERSPECTIVE

After the NAFC in 2008-09, India's real GDP growth rebounded sharply during 2009-11, but this rebound was short-lived and growth decelerated significantly in the following three years (Table 1). This deceleration in growth was accompanied by a number of disconcerting macroeconomic developments since 2008-09. First, the noteworthy fiscal consolidation process witnessed during 2003-08 suffered a setback and, despite some renewed correction, the fiscal deficit in 2013-14 was still well-above that of the pre-crisis year. Second, the CAD, which was relatively moderate and averaged less than 1 percent of GDP during 1992-2008, widened significantly to just under 5 percent in 2012-13 (but has since more than halved to 2.3 percent in the first three quarters of 2013-14 in response to policy actions). Third, headline inflation,

especially consumer inflation, has remained persistently high in the post-crisis period. Fourth, private corporate investment has declined significantly.

Table 1: Key Macroeconomic Indicators: 2003-14

(Percent)

Year	Real GDP Growth (factor cost)	Real GDP Growth (market prices)	GFD/GDP (Centre)	CAB/GDP	Non-oil CAB/GDP	WPI Inflation	CPI Inflation	REER Index @	Real Policy Rate #
2003-04	8.0	7.9	4.3	2.3	5.0	5.5	3.9	96.8	-0.4
2004-05	7.1	7.9	3.9	-0.3	2.8	6.5	3.8	99.9	-0.6
2005-06	9.5	9.3	4.0	-1.2	2.7	4.4	4.4	102.7	1.7
2006-07	9.6	9.3	3.3	-1.0	3.0	6.6	6.7	101.0	3.1
2007-08	9.3	9.8	2.5	-1.3	2.9	4.7	6.2	108.6	2.2
2008-09	6.7	3.9	6.0	-2.3	3.1	8.1	9.1	97.8	0.9
2009-10	8.6	8.5	6.5	-2.8	1.5	3.8	12.2	95.3	1.5
2010-11	8.9	10.3	4.8	-2.7	1.1	9.6	10.5	103.5	2.0
2011-12	6.7	6.6	5.7	-4.2	1.1	8.9	8.4	100.7	1.0
2012-13	4.5	4.7	4.9	-4.7	1.1	7.4	10.4	96.3	1.9
2013-14	4.9	4.6	4.6	-2.3 &					

Note:

@: 36-currency real effective exchange rate index (2004-5=100).

#: Nominal effective policy rate less 12-month moving average of non-manufactured products WPI inflation.

&: April-December.

Source: Reserve Bank of India; Central Statistical Organization.

Part of the domestic slowdown is obviously the outcome of a sluggish global recovery. Global growth fell from an annual average of 4.8 percent during 2003-07 to an average of 2.9 percent during the subsequent 5-year period (2008-12) and the slowdown is visible across all regions, including in emerging markets (Table 2). Clearly, global demand has fallen as a result of the NAFC and there has been some rebalancing of current account balance/GDP ratios across G20 countries. The advanced economies – the US, the UK, and Germany - have recorded improvement in their current account positions. These were mostly associated with real currency depreciations and weak domestic demand. Interestingly, in the aftermath of the NAFC, it is the advanced economies that generally recorded real depreciation of their currencies, while the EME currencies appreciated – the consequence of accommodative monetary policies in the advanced economies. Many EMEs have correspondingly exhibited high CADs. Thus, the slowdown in global growth and demand has had some adverse impact on demand and growth in India, along with other EMEs, while also contributing to the widening of CAD.

The slowdown in India's growth or widening of its CAD is thus not surprising in a cross-country perspective. However, what is of concern is the extent of slow down and

magnitude of key imbalances in India. In 2012, amongst the G-20 economies, India had the third largest CAD after Turkey and South Africa; and, India's fiscal deficit was the second largest after Japan. Compared to India, fiscal deficits in Turkey and South Africa have been more modest, while Japan has a surplus on its current account. Thus, the concern in the Indian context is the high level of twin deficits, which as the crisis literature shows can be a source of future vulnerability. Advanced economies with debt/GDP ratios above 80 percent of GDP and persistent CADs are vulnerable to rapid fiscal deterioration: government borrowing costs increase much more quickly at higher debt levels, especially for countries also running CADs (Greenlaw et al., 2013). Debt thresholds are, however, typically lower for emerging economies (Reinhart and Rogoff, 2009). External vulnerabilities (large current account deficits) and domestic credit booms explain the ongoing NAFC, like the previous crises in emerging markets (Lane and Milesi-Ferretti, 2010). Vulnerabilities of EMEs arising from large CADs were again in evidence during the June-August 2013 episode.

Table 2: Key Macroeconomic Indicators: Variation between 2008-12 and 2003-07

	(Percent)							
				Non-oil	Variation in	Revenues/	Expenditure	Structural
	GDP Growth	CPI	CAB/GDP	CAB/GDP	REER @	GDP	/GDP	fiscal
								balance/Pot
								ential GDP
Argentina	-3.3	-0.4	-2.4	0.8	-13.5	7.3	7.7	-0.6
Australia	-1.0	0.1	2.2	1.3	17.1	-3.3	1.9	-5.1
Brazil	-0.8	-1.7	-3.1	-1.2	13.1	2.1	1.1	0.5
Canada	-1.4	-0.4	-4.1	-4.5	2.1	-2.2	2.5	-3.2
China	-2.4	0.7	-1.4	2.0	22.0	3.7	4.4	-0.8
France	-2.0	-0.1	-1.6	-2.1	-7.4	0.3	2.7	-0.7
Germany	-0.9	0.0	1.3	4.6	-9.5	0.8	-0.2	1.5
India	-1.8	5.0	-3.0	-1.6	-5.9	-0.4	0.9	-1.9
Indonesia	0.4	-2.7	-2.0	-1.9	2.3	-1.3	-0.7	-0.8
Italy	-2.7	0.1	-1.4	-1.0	-4.8	1.9	2.4	1.5
Japan	-1.9	-0.2	-1.3	0.8	21.1	1.0	4.9	-2.6
Korea	-1.4	0.4	0.1	4.0	-22.9	0.9	0.7	0.4
Malaysia	-1.7	0.3	-1.7	1.2	1.4	0.6	1.7	-0.7
Mexico	-1.7	0.3	0.1	1.0	-11.1	2.5	4.5	-1.3
Russia	-5.6	-2.0	-4.1	-6.6	12.2	-2.0	4.5	-5.4
Saudi Arabia	0.3	2.5	-3.6	-2.6	14.5	-1.0	3.0	n.a.
South Africa	-2.5	2.2	-0.8	-1.7	0.6	0.9	4.8	-3.7
Thailand	-2.7	-0.3	1.3	4.0	1.6	-0.1	2.7	-2.7
Turkey	-3.7	-4.0	-1.4	-1.6	-4.3	1.5	0.7	1.1
UK	-3.6	1.4	0.3	1.2	-17.6	-0.3	5.1	-2.5
US	-2.1	-0.8	2.1	2.4	-7.5	-1.1	5.3	-3.7
<i>Average</i>	<i>-2.0</i>	<i>0.0</i>	<i>-1.2</i>	<i>-0.1</i>	<i>0.2</i>	<i>0.6</i>	<i>2.9</i>	<i>-1.5</i>
<i>Median</i>	<i>-1.9</i>	<i>0.0</i>	<i>-1.4</i>	<i>0.8</i>	<i>0.6</i>	<i>0.6</i>	<i>2.7</i>	<i>-1.1</i>
World	-1.9	0.4	<i>n.a</i>	<i>n.a</i>	<i>n.a</i>	<i>n.a</i>	<i>n.a</i>	<i>n.a</i>
Advanced ec	-2.2	-0.2	0.6			-0.3	3.8	-2.3
Euro area	-2.4	-0.1	-0.1			0.3	2.7	-0.7
EDEs	-2.1	0.5	-1.4			<i>n.a</i>	<i>n.a</i>	<i>n.a</i>

Source: World Economic Outlook Database (April 2013), IMF.

There is also a view that global growth in the pre-NAFC period was well-above potential and the post-NAFC slowdown is a return to the underlying potential growth path, which itself is now seen as below the pre-crisis potential growth rates. Potential growth of developing countries was 6.3 percent during 2005-07, whereas the actual growth during this period averaged two percentage points higher at 8.3 percent; the output gap which was close to zero in 2005 reached 3.5 percent in 2007 (World Bank, 2013). Going forward, the World Bank estimates that potential growth for developing countries will be lower at 5.5 percent for 2012-2015. Thus, the ongoing slowdown in the Indian economy can also be viewed as a part of the worldwide phenomenon of slower potential growth in the post-crisis period.

While the growth slowdown, the widening of the CAD and the widening of the fiscal deficit in India are directionally in line with global trends, the domestic inflation outturn depicts a different picture. Inflation moderated or was largely unchanged in many economies on the back of weak demand in the post-2008 period. In India, however, it has been substantially higher in the post-2008 period (Table 2). Thus, the Indian slowdown and high CAD are not an aberration from these global trends, *but what is striking is the extent of the slowdown and the deterioration*. This suggests that domestic factors have added to headwinds from the global economy.

We now turn to the role of domestic macroeconomic factors and policies. At the same time, it is worth noting that the domestic financial sector exhibited striking resilience to the NAFC, reflecting India's prudent approach to domestic and external financial liberalization (Mohan 2011).

III. DOMESTIC MACROECONOMIC POLICIES AND GROWTH SLOWDOWN

Part of the growth slowdown in the Indian context during 2011-14 vis-à-vis the immediate post-crisis years (2008-09 and 2009-10) could be attributed to the withdrawal of the large monetary and fiscal stimulus that was administered immediately after the crisis (Rajan, 2013). Following the collapse of Lehman Brothers in October 2008 and the intensification of the NAFC, there were large capital outflows from India reflecting sales by foreign institutional investors in the domestic stock market. There was, however, no direct impact of the Lehman collapse on the Indian banking system due to its limited exposure to toxic assets, in turn reflecting the prudent regulatory framework in India with regard to banks. Indian financial markets also worked normally in the aftermath of the Lehman collapse, albeit with elevated volatility (Mohan, 2011c). Notwithstanding these relatively positive domestic developments, there was a sharp slowdown in the domestic economy in the second half of 2008-09; there was a perception that the global developments would have a serious sustained adverse impact on the real economy, given the relatively high degree of openness of the Indian economy by that time. Here, it is relevant to note that the Reserve Bank of India was in a tightening mode as late as July/August 2008 in response to the then prevailing domestic macroeconomic conditions. Nonetheless, given the sharp downturn in the global economy and the perceptions of these developments having a serious knock-on effect on the domestic economy, India, like many other EMEs, took both monetary and fiscal measures. In response to these stimulus measures, the Indian economy was among the first to recover from the NAFC, with growth during 2009-11 being almost the same as during the pre-NAFC high growth phase (2003-08), but this turned out to be temporary for a variety of reasons discussed later.

On the monetary side, the effective policy rate was cut sharply from 9.00 percent in September 2008 to 3.25 percent by April 2009; the cash reserve ratio was reduced from 9.0 percent to 5.0 percent over the same period. In addition, a number of other monetary and liquidity measures were instituted, which collectively had the potential to release liquidity of more than 10 percent of GDP (Mohan, 2011c). On the fiscal side, the Government, inter alia, cut the CENVAT (the main Central indirect tax in the form of a VAT) rate from 14 percent to 8 percent between December 2008 and February 2009 and also increased plan expenditure. These measures were in addition to the stimulus already in the pipeline from the implementation of the Pay Commission award and the agriculture debt waiver. Reflecting these actions as well as others, the Central government's headline gross fiscal deficit (GFD) increased from 2.5 percent of GDP in 2007-08 to 6.0 percent in 2008-09. Including bonds issued in lieu of cash subsidies with regard to oil, fertilizer and food sectors, the GFD/GDP ratio recorded an even sharper increase from 3.1 percent to an all-time high of 8.2 percent, which provides a better indicator of the boost to domestic demand from the fisc. Thus, both monetary policy and fiscal policy provided strong support – excessive with hindsight - to the domestic economy in 2008-09.

Monetary Policy

In contrast to the prevailing pessimistic outlook in the global economy, real GDP growth in India in 2009-10 and 2010-11 turned out to be much stronger (Table 3). Stronger growth started getting mirrored in high inflation, initially in food inflation (by end-2009) and in underlying inflation by April 2010. Elevated international commodity prices and domestic structural imbalances in the availability of select domestic food items (pulses and other protein items) added to the inflationary pressures. Monetary accommodation was, however, continued till early 2010. The subsequent withdrawal was done in a phased and gradual manner during 2010-11 and 2011-12 reflecting a number of factors: the high degree of uncertainty about the global as well as domestic outlook; the perception that the initial phase of high inflation was due to food prices; and the real-time data on domestic economic activity under-estimating the strength of domestic demand at that time (Subbarao, 2011). This gradual pace was in contrast to the earlier noted rapid monetary and liquidity stimulus between September 2008 and April 2009. The quantum and the pace of the monetary stimulus in that period was greater than in most major emerging markets (Table 4), despite the fact that no Indian financial institution had been substantially affected by the NAFC.

While inflationary pressures since 2010 are the outcome of factors noted above, did these also reflect the lagged impact of the high growth in monetary and credit aggregates in the pre-NAFC period? In the face of large and increasing capital flows – from 2.7 percent of GDP in 2003-04 to 8.6 percent in 2007-08 – the Reserve Bank had deployed a range of instruments to manage these capital flows, including sterilized interventions. Nonetheless, growth in broad money averaged more than 21 percent per annum during 2005-08, with growth in non-food credit averaging 28 percent and real GDP growth averaging 9.5 percent during this 3-year period. Actual growth in monetary and credit aggregates was also above the indicative projections set out by the Reserve Bank at the beginning of each of these financial years. All these indicators would suggest signs of overheating in the pre-NAFC period; indeed, inflation indicators did start increasing in 2007-08, but were compounded by the increasing oil prices at that time. Thus, the stimulus measures adopted after the NAFC added to the incipient inflationary pressures already emerging in the economy.

Table 3: Real GDP Growth: Forecast and Actual

Year	Institution	<i>(Percent)</i>					
		Overall GDP		Industry		Services	
		Forecast/ Projection	Latest Estimate	Forecast/ Projection	Latest Estimate	Forecast/ Projection	Latest Estimate
2008-09	Professional Forecasters @	8.1	6.7	8.1	4.1	9.7	9.4
	PMEAC	8.5					
	RBI	8.0-8.5					
2009-10	Professional Forecasters @	5.7	8.6	4.1	10.2	7.5	10.0
	PMEAC	7.0-7.5					
	RBI	6.0					
2010-11	Professional Forecasters @	8.2	8.9	9.0	8.3	9.0	9.2
	PMEAC	8.2		8.7		8.8	
	RBI	8.0					
2011-12	Professional Forecasters @	8.2	6.7	8.2	6.7	9.6	7.1
	PMEAC	9.0		9.2		10.3	
	RBI	8.0					
2012-13	Professional Forecasters @	7.2	4.5	6.0	0.9	8.8	6.2
	PMEAC	7.6		7.0		9.1	
	RBI	7.3					

@: Forecast made in the last quarter of the preceding fiscal year (taken from the April/May issue of MMD) (for example, forecast made in the quarter ended March 2008 for the fiscal year 2008-09 and so on).

Source: Macroeconomic and Monetary Developments (various issues), RBI; Economic Review (various issues), PMEAC; Central Statistical Organization.

Table 4: Policy Rates in Select Emerging Markets

Month	<i>(Percent)</i>											
	Brazil	Chile	China	India	Indonesia	Israel	Korea	Malaysia	Mexico	Russia	S.Africa	Thailand
Dec-2007	11.25	6.00	7.47	7.75	8.00	4.00	5.00	3.50		10.00	11.00	3.25
Jun-2008	12.25	6.75	7.47	8.50	8.50	3.50	5.00	3.50	7.75	10.75	12.00	3.25
Sep-2008	13.75	8.25	7.20	9.00	9.25	4.25	5.25	3.50	8.25	11.00	12.00	3.75
Dec-2008	13.75	8.25	5.31	5.00	9.25	2.50	3.00	3.25	8.25	13.00	11.50	2.75
Mar-2009	11.25	2.25	5.31	3.50	7.75	0.75	2.00	2.00	6.75	13.00	9.50	1.50
Jun-2009	9.25	0.75	5.31	3.25	7.00	0.50	2.00	2.00	4.75	11.50	7.50	1.25
Dec-2009	8.75	0.50	5.31	3.25	6.50	1.00	2.00	2.00	4.50	8.75	7.00	1.25
Jun-2010	10.25	1.00	5.31	3.75	6.50	1.50	2.00	2.50	4.50	7.75	6.50	1.25
Dec-2010	10.75	3.25	5.81	6.25	6.50	2.00	2.50	2.75	4.50	7.75	5.50	2.00
Jun-2011	12.25	5.25	6.31	7.50	6.75	3.25	3.25	3.00	4.50	8.25	5.50	3.00
Dec-2011	11.00	5.25	6.56	8.50	6.00	2.75	3.25	3.00	4.50	8.00	5.50	3.25
Jun-2012	8.50	5.00	6.31	8.00	5.75	2.50	3.25	3.00	4.50	8.00	5.50	3.00
Dec-2012	7.25	5.00	6.00	8.00	5.75	2.00	2.75	3.00	4.50	8.25	5.00	2.75
May-2013	8.00	5.00	6.00	7.25	5.75	1.50	2.50	3.00	4.00	8.25	5.00	2.50

Source: Haver Analytics.

It is also contended by some that higher food inflation during this period is entirely the outcome of the minimum support prices (MSP) policy (Bhalla, 2013b). Although a large increase in the MSP for the various crops has taken place during recent years, especially since

2008-09, the causation is arguable. For example, there was a large increase in the actual prices (as measured by the wholesale price index (WPI)) of pulses during 2005-06 and 2006-07, but only a moderate increase in the MSP of these items. The MSP was then increased in 2007-08 and especially substantially in 2008-09, but even then the cumulative variation in the MSP between March 2005 and March 2010 was trailing the cumulative variation in actual prices for the three major pulses (arhar, moong and urad) and also wheat, although the situation has reversed since then (Table 5). Why did the prices of pulses increase substantially beginning 2005-06? Strong domestic growth from 2003-04 onwards, amidst near plateauing of domestic production of pulses, is one plausible factor. The shift in dietary pattern shifted in favor of protein-rich items on the back of higher incomes is another factor. This trend then seems to have got support from the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) scheme. The increases in the MSP could then be viewed as an attempt by the government to incentivize farmers to increase the domestic production of pulses to meet the rising demand.

Here, it is also relevant to note that the Reserve Bank of India had pointed to the possibility of overheating² as early as 2006, but there was a substantial amount of skepticism of this assessment at that time. No doubt, there is a two-way feedback between actual prices and the MSP, but the above analysis suggests that the higher order of initial increases in the MSP was perhaps also necessitated by higher food demand on the back of high growth and rising incomes. The MSP story focuses on relative inflation. Similarly, the view that the MGNREGA has led to wage pressures stresses the cost-push view of inflation. But, high relative inflation cannot lead to persistent high overall inflation, unless it is generalized and accommodated. For example, non-food non-fuel CPI inflation (rural and urban combined based on the new CPI series) has been around 8 percent since June 2012 (it was higher at around 10 percent during January-May 2012), which is suggestive of generalized pressures. In the face of persistently high food inflation, monetary policy can keep overall inflation within its comfort zone, but this would involve excessive tightening and large output costs for the other sectors of the economy. The MGNREGA may have contributed to the bargaining power of rural workers, but it accounts for only a small fraction of the rural wage increase and the effect is also waning (Rajan, 2014). Thus, productivity gains in food production provide a more durable solution to increase the food production in a non-inflationary manner.

Finally, the higher outlays on the MGNREGA and the higher food subsidy bill are ultimately reflected in the revenue deficits, which then add to domestic demand. If the revenue deficits had been contained through adjustments in other expenditures/higher revenues, then

² The RBI in its mid-term review in October 2006 had noted: “Recent developments, in particular, the combination of high growth and consumer inflation coupled with escalating asset prices and tightening infrastructural bottlenecks underscore the need to reckon with dangers of overheating and the implications for the timing and direction of monetary policy setting. While there is no conclusive evidence of overheating in the Indian economy at the current juncture, the criticality of monitoring all available indications that point to excess aggregate demand is perhaps more relevant now than ever before” (RBI, 2006, page 25).

there might have been more merit in the cost-push argument – but only for explaining the short-term increase in inflation, not its persistence.

Table 5: Minimum Support Prices and Wholesale Price Index (2003=100)

Item		Mar-03	Mar-04	Mar-05	Mar-06	Mar-07	Mar-08	Mar-09	Mar-10	Mar-11	Mar-12	Mar-13
Rice	WPI	100.0	97.7	101.1	104.0	113.4	129.7	149.7	161.7	165.4	173.7	204.2
	MSP	100.0	103.8	105.7	107.5	109.4	121.7	169.8	188.7	188.7	203.8	235.8
	Gap	0.0	6.2	4.5	3.4	-3.5	-6.1	13.5	16.7	14.1	17.3	15.5
Wheat	WPI	100.0	104.8	104.1	120.5	132.8	144.4	155.6	178.4	178.7	177.7	212.0
	MSP	100.0	101.6	103.2	104.8	121.0	161.3	174.2	177.4	188.7	207.3	217.7
	Gap	0.0	-3.1	-0.8	-13.0	-8.9	11.7	12.0	-0.5	5.6	16.7	2.7
Gram	WPI	100.0	96.4	95.6	124.9	145.8	151.5	145.0	140.7	152.7	217.0	233.4
	MSP	100.0	114.8	116.8	117.6	118.4	131.1	141.8	144.3	172.1	229.5	245.9
	Gap	0.0	19.0	22.2	-5.8	-18.8	-13.5	-2.2	2.5	12.7	5.8	5.4
Arhar	WPI	100.0	106.9	98.9	107.8	129.0	152.2	174.8	246.0	222.8	197.2	231.0
	MSP	100.0	103.0	105.3	106.1	106.8	117.4	151.5	174.2	265.2	280.3	291.7
	Gap	0.0	-3.6	6.5	-1.6	-17.2	-22.8	-13.3	-29.2	19.0	42.1	26.3
Moong	WPI	100.0	89.3	91.2	128.2	143.7	117.6	140.3	266.5	222.8	211.0	247.0
	MSP	100.0	103.0	106.0	114.3	114.3	127.8	189.5	207.5	275.9	300.8	330.8
	Gap	0.0	15.4	16.2	-10.9	-20.5	8.7	35.0	-22.1	23.8	42.5	33.9
Urad	WPI	100.0	97.1	94.5	141.1	166.5	136.1	157.8	236.5	232.9	202.9	214.1
	MSP	100.0	103.0	106.0	114.3	114.3	127.8	189.5	189.5	255.6	285.7	323.3
	Gap	0.0	6.1	12.2	-19.0	-31.4	-6.1	20.0	-19.9	9.8	40.8	51.0

Note: MSP = Minimum Support Prices; WPI = Wholesale Price Index.

The row 'Gap' gives difference (percent) of MSP over WPI.

Source: Database on the Indian Economy, Reserve Bank of India.

Real Interest Rates: Borrowers

The extent of monetary accommodation can be better gauged through movements in real interest rates, although these are beset with a number of conceptual issues in regard to the measure of inflation expectations. The relevant measure of inflation and inflation expectations could differ for the various economic agents/groups in the country: while consumer inflation may be more relevant for households, manufactured products WPI inflation could be more appropriate for the industrial sector³ (Mohan, 2002). Accordingly, in this paper, real lending rates are assessed both in terms of headline WPI inflation and non-food manufactured products (NFMP) WPI inflation. Real deposit rates are analyzed in relation to consumer inflation and also in relation to the inflation expectations of households. Apart from the issue of the appropriate inflation rate, a related issue is: are inflation expectations better captured by the year-on-year (y-o-y) inflation rate or some sort of average inflation rate? If inflation expectations are relatively well-anchored, it is likely that the y-o-y inflation matters less and the more appropriate yardstick would be some sort of average inflation rate. Indeed, the empirical

³ For manufacturers, although CPI is an important input in their costs (for example, wage costs), their input and output prices and profitability aspects are best captured by the movements in wholesale prices.

exercise carried out later on in the paper favors a real rate using a 12-month moving average of y-o-y inflation. Accordingly, the real policy interest rate is also analyzed presented using this indicator of inflation.

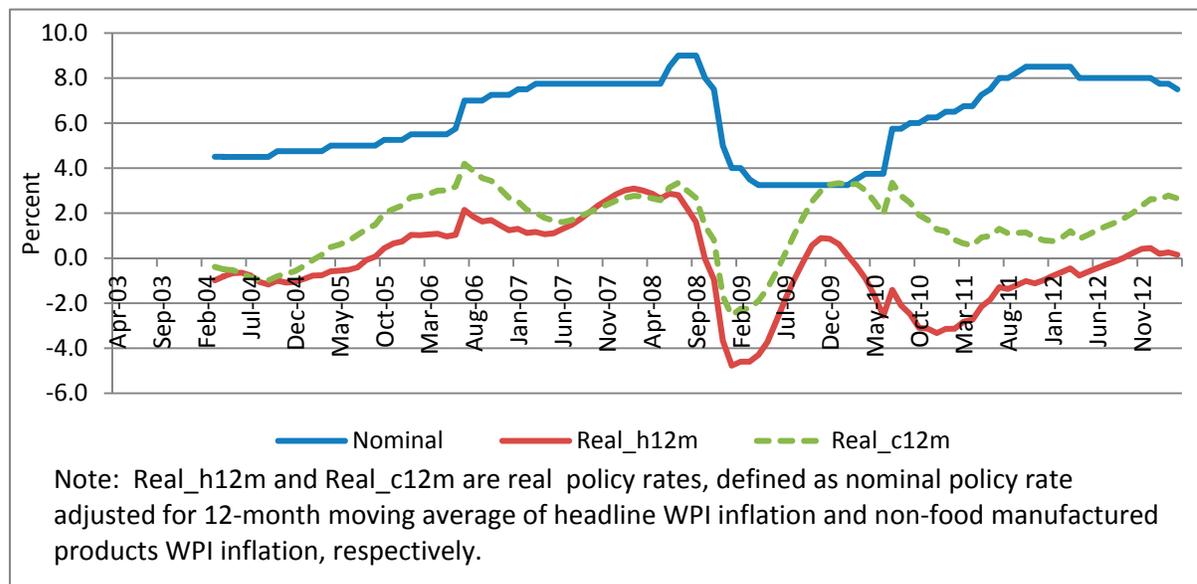
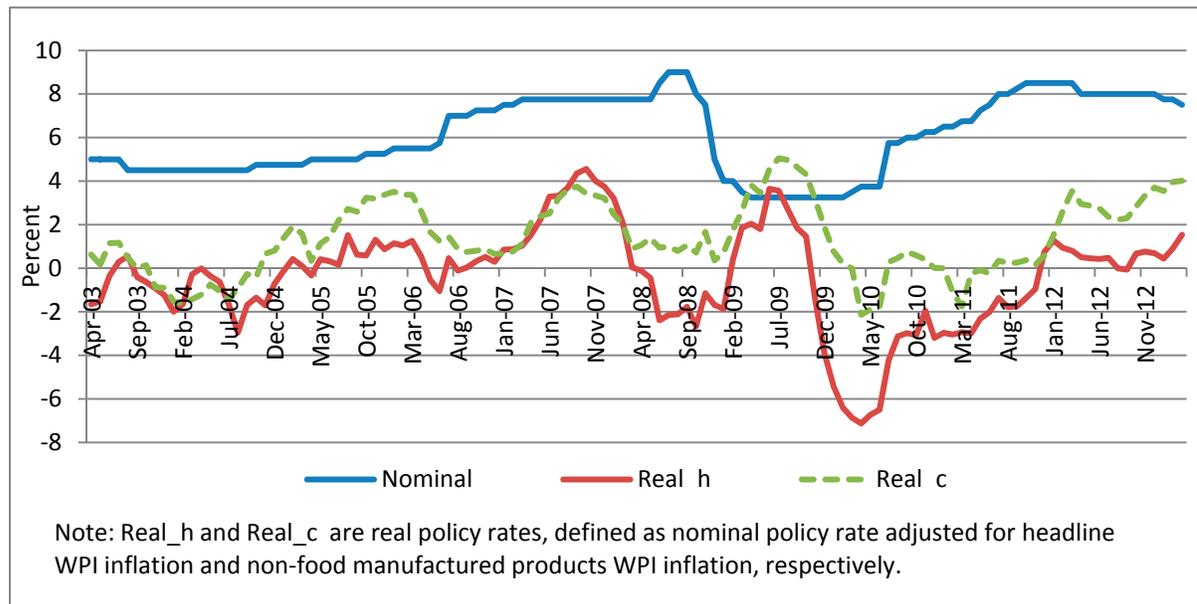
While the nominal policy rate was being increased gradually during 2010 and 2011, the real policy rate was highly negative (with respect to y-o-y headline WPI inflation) and marginally negative (with respect to y-o-y NFMP inflation). Thus, arguably, monetary policy was still in an accommodative mode over this phase, although most commentators characterized it as being too tight. Real policy rates moved from negative territory during 2010 and 2011 to positive territory in 2012, especially when the core inflation indicator is used (Chart 1). The real interest rate trajectory is broadly similar in terms of the 12-month moving average of inflation, and, as can be expected, smoother. According to this measure, and using NFMP inflation, the real policy rate initially fell from an average of 2.2 percent in 2007-08 to 0.9 percent in 2008-09, but then edged up to 2.0 per cent in 2010-11. It fell back to an average of 1.0 percent in 2011-12 (reflecting the more than expected increase in NFMP inflation), but again edged higher to 1.9 percent in 2012-13 (on the back of higher policy rate and some moderation in NFMP inflation). The real policy rate in terms of CPI inflation has been generally negative since mid-2008 (RBI, 2014).

Bank lending rates and market rates broadly mirror the policy rates both in terms of nominal and real rates. Real commercial paper rates increased during the course of 2012 and were higher than in the pre-crisis period, especially in terms of core inflation (Chart 2). As regards commercial bank lending rates, the assessment is somewhat complicated by the move of the banking system from the benchmark prime lending rate system to the base rate system in July 2010, but the directional movement is broadly similar to that emanating from trends in the commercial paper rates (Chart 3).

Higher nominal interest rates also had an adverse impact on corporate profitability and hence corporate savings and investment during this period (Chart 4). Corporate savings fell from 9.4 percent of GDP in 2007-08 to 7.1 percent in 2012-13, while corporate investment fell even more from 17.3 percent of GDP to 9.2 percent (Table 6). What explains the larger decline in corporate investment vis-à-vis corporate savings since 2007-08? First, policy bottlenecks - such as obtaining environmental permissions, fuel linkages, or carrying out land acquisition - led to stalling of a number of large projects, which may in turn have discouraged new investment (Government of India, 2013a). Second, the large increase in fiscal deficit and the near trebling of government borrowing requirements appears to have led to some crowding out of the private sector.

Third, there is a perception that the decline in domestic corporate investment since the NAFC is due to more outward foreign direct investment (FDI) on the back of domestic rigidities that impede domestic investment. This perception is, however, not borne out by data. Outward FDI by the Indian corporates indeed increased substantially in the pre-NAFC phase from 0.3 percent of GDP in 2003-04 to 1.5 percent in 2007-08, but during this period domestic investment had also increased significantly. Since then, outward FDI has fallen to its 2003-04 levels (it was 0.4 percent of GDP in 2012-13) in tandem with the declining trend in domestic investment (see Table 9). The decline in domestic investment since 2007-08, therefore, cannot be attributed to greater investment abroad.

Chart 1: Real Policy Rate



Thus, as nominal as well as real lending rates tightened, especially beginning early 2012, the pace of investment activity and economic activity slowed down as expected. While monetary policy supported growth during 2009-11, it contributed to the slowdown in the subsequent phase. Econometric evidence for India and elsewhere suggests that a 100 bps increase in the policy interest rate is associated, on average, with a growth slowdown of 25-50 bps, and the actual impact on growth during each monetary cycle of easing/tightening depends, inter alia, on the extent of transmission to market rates (Kapur and Behera, 2012; RBI, 2013c). The scale of the slowdown in the recent period is much greater than suggested by these estimates and we revisit this issue a little later.

Chart 2: Commercial Paper Rate

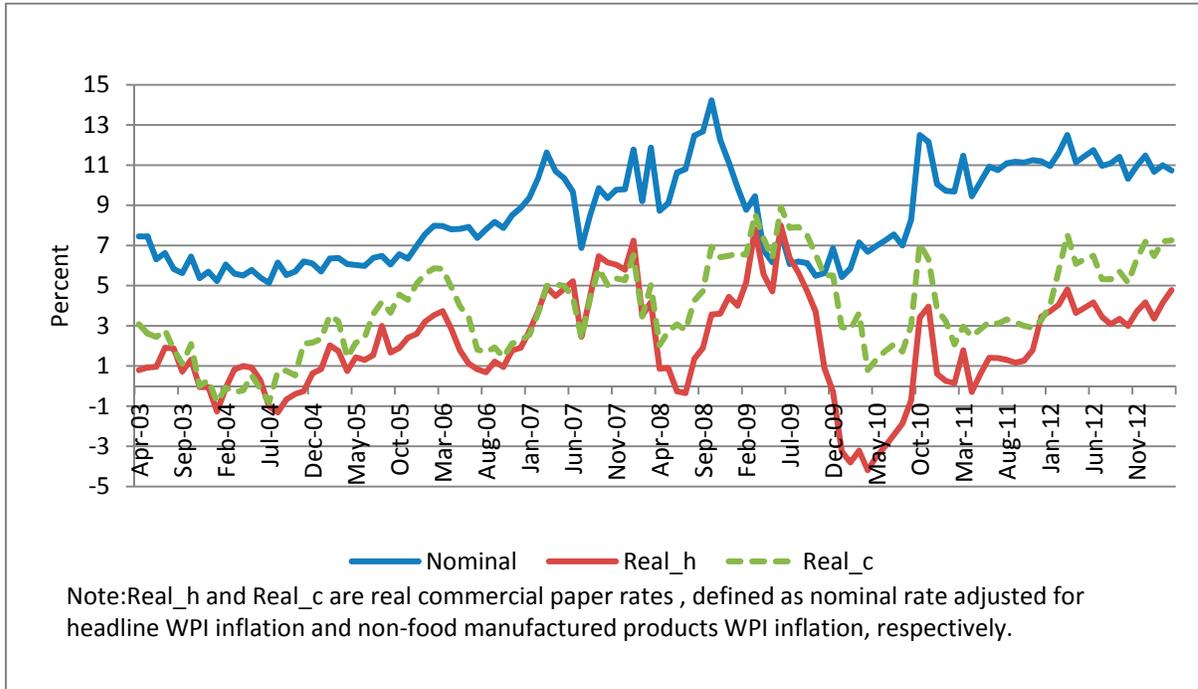


Chart 3: Base Rate

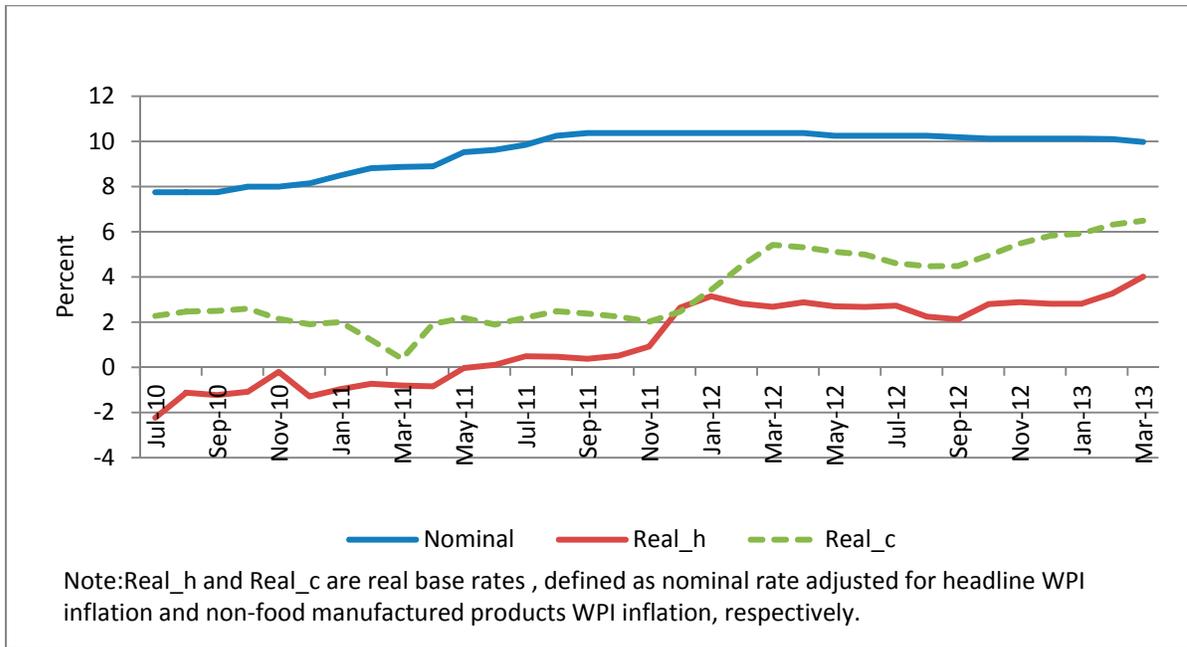


Chart 4: Corporate Performance

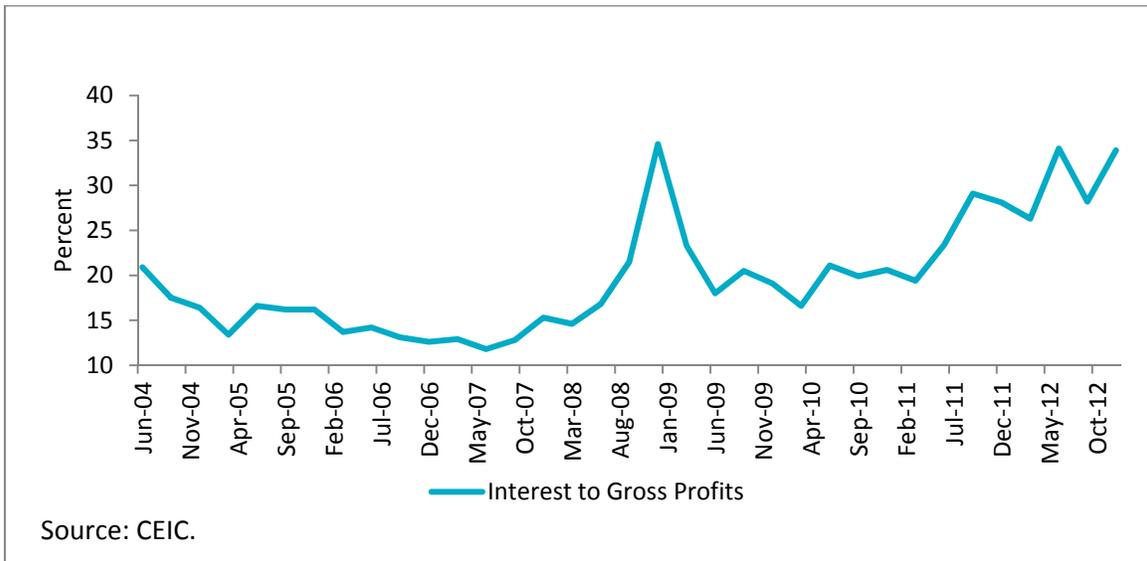
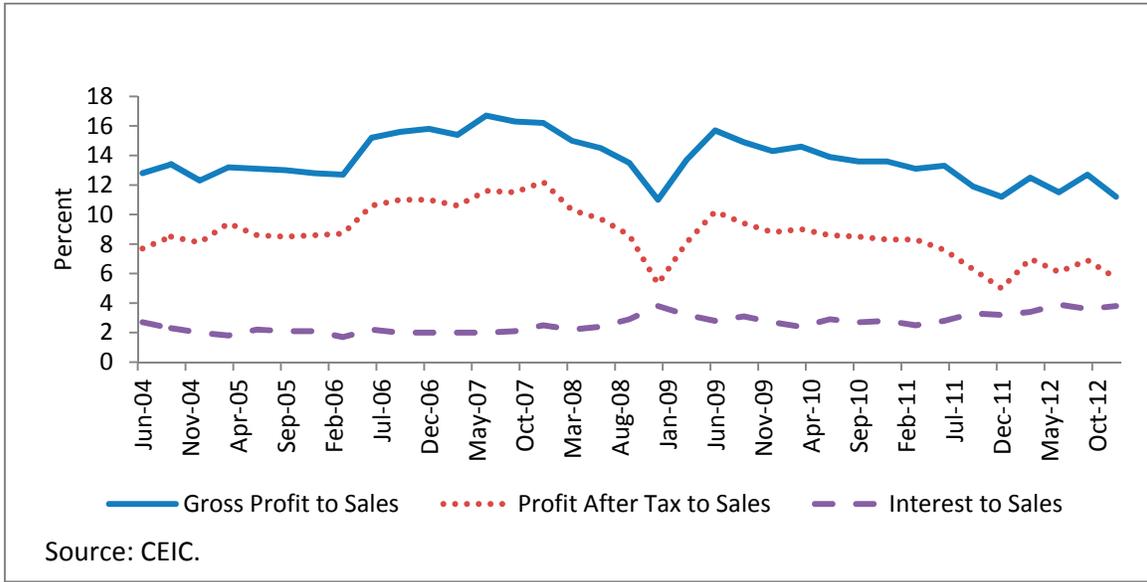


Table 6: Savings and Investment

(Percent to GDP)

Item	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1 Household sector	23.1	23.6	23.5	23.2	22.4	23.6	25.2	23.1	22.8	21.9
a. Financial saving	11.0	10.1	11.9	11.3	11.6	10.1	12.0	9.9	7.0	7.1
Financial assets	13.7	13.8	15.8	17.8	15.5	12.9	15.3	13.9	10.6	10.8
of which: Bank deposits	5.5	5.4	7.2	10.0	7.8	7.4	6.1	7.0	5.9	5.9
Financial liabilities	2.5	3.7	5.0	6.6	3.8	2.9	3.1	3.6	3.1	3.2
b. Saving in physical assets	12.1	13.4	11.7	11.9	10.8	13.5	13.2	13.2	15.8	14.8
2 Private corporate sector	4.6	6.6	7.5	7.9	9.4	7.4	8.4	8.0	7.3	7.1
3 Public sector	1.3	2.3	2.4	3.6	5.0	1.0	0.2	2.6	1.2	1.2
of which: Government administration and quasi government bodies	-3.3	-2.3	-2.1	-1.0	0.5	-2.8	-3.1	-0.5	-2.0	-1.9
4 Total domestic savings (1+2+3)	29.0	32.4	33.4	34.6	36.8	32.0	33.7	33.7	31.3	30.1
5 Gross capital formation	26.1	32.5	34.3	35.9	38.0	35.5	36.3	36.5	36.4	34.7
a. Public sector	6.6	7.4	7.9	8.3	8.9	9.4	9.2	8.4	7.7	8.1
b. Private corporate sector	6.5	10.3	13.6	14.5	17.3	11.3	12.1	12.8	10.1	9.2
c. Household sector	12.1	13.4	11.7	11.9	10.8	13.5	13.2	13.2	15.8	14.8
d. Valuables	0.9	1.3	1.1	1.2	1.1	1.3	1.8	2.1	2.7	2.6
6 Gross fixed capital formation	24.5	28.7	30.3	31.3	32.9	32.3	31.7	30.9	31.8	30.4
7 Change in stocks	0.7	2.5	2.8	3.4	4.0	1.9	2.8	3.5	1.9	1.7
8 Errors & omissions	0.7	0.4	0.4	0.2	0.1	-1.2	0.2	0.0	-0.9	0.1
9 Total investment (5+8 = 6+7+8+5d)	26.8	32.8	34.7	35.7	38.1	34.3	36.5	36.5	35.5	34.8
<i>Memo:</i>										
10 Saving-Investment Balance, net (4-9)	2.2	-0.4	-1.2	-1.1	-1.3	-2.3	-2.8	-2.8	-4.2	-4.7
a. Household financial savings, net	11.0	10.1	11.9	11.3	11.6	10.1	12.0	9.9	7.0	7.1
b. Private corporate sector, net	-1.9	-3.8	-6.1	-6.6	-7.9	-3.9	-3.8	-4.8	-2.8	-2.1
c. Public sector, net	-5.3	-5.1	-5.5	-4.7	-3.9	-8.5	-9.0	-5.8	-6.5	-6.9
11 Household financial savings (net) available for private corporate sector (10a + 10c)	5.7	5.0	6.3	6.5	7.8	1.7	3.0	4.1	0.5	0.2

Source: Central Statistical Organization; Reserve Bank of India.

On the extent of the slowdown, some caution is, however, warranted in reaching definitive conclusions, given the large revisions to GDP data in the recent past. There is divergence between industrial growth indicated by the data on the index of industrial production (IIP) and the Annual Survey of Industries, with IIP growth rates being significantly lower than the ASI growth rates in most of the years (PMEAC, 2013). During 2003-12, IIP growth averaged almost 4 percentage points lower than the real growth of gross value added from ASI data, with the difference being pronounced in 2011-12, the latest year for which the ASI data are available (Table 7). Given that the IIP data are available at a high frequency (monthly) and provide a critical input for macroeconomic policy formulation, substantial revisions in IIP data can lead to incorrect policy inferences and actions. Accordingly, it is important to understand and reconcile the differences between the two sets of industrial data. Since it is the ASI data that determine the final GDP estimates, the problems in collecting IIP data should be corrected on a priority basis so that more accurate information is available for short-term policymaking process.

Table 7: Industrial Growth

(Percent)

Year	Index of Industrial Production		Annual Survey of Industries @			GDP at constant prices	
	Manufacturing	General	Output	Net Value Added	Gross Value Added	Manufacturing	Industry #
2000-01	5.4	4.9	-0.1	-10.3	-8.4	7.3	6.0
2001-02	2.9	2.8	2.0	-1.3	0.9	2.3	2.6
2002-03	6.0	5.8	14.4	16.3	13.9	6.9	7.2
2003-04	7.4	7.0	7.8	11.5	9.5	6.3	7.3
2004-05	13.2	11.7	22.3	20.6	17.7	7.4	9.8
2005-06	10.3	8.6	11.4	17.2	15.0	10.1	9.7
2006-07	15.0	12.9	19.4	20.1	19.4	14.3	12.2
2007-08	18.4	15.5	10.0	16.1	14.6	10.3	9.7
2008-09	2.5	2.5	11.1	3.2	4.2	4.3	4.4
2009-10	4.8	5.3	11.6	9.7	11.5	11.3	9.2
2010-11	9.0	8.2	18.5	12.6	12.0	8.9	7.6
2011-12	3.0	2.9	15.3	10.7	10.4	7.4	7.8
2012-13	1.2	1.0	n.a	n.a	n.a	1.1	1.0
Averages							
1980s	7.4	7.6	8.1	7.3	7.9	6.2	5.8
1990s	6.5	6.3	7.3	6.8	6.9	5.8	5.7
2000s	8.6	7.7	11.0	10.3	9.8	8.0	7.8
2003-08	12.8	11.1	14.2	17.1	15.2	9.7	9.7
2008-12	4.8	4.7	14.1	9.1	9.5	8.0	7.2

@: Growth rates are based on ASI data deflated by WPI-Manufactured Products index.

#: including construction.

Source: Central Statistical Organization.

Real Interest Rates: Depositors

Turning to deposit rates, the real rate in terms of consumer inflation has been broadly negative since 2008-09 reflecting the persistently elevated level of consumer inflation on the back of high food inflation. Thus, even as nominal deposit rates increased from the pre-2008 levels, real rates fell from an average of (+) 1.5 percent during 2003-08 to (-) 1.9 percent during 2008-13. Real deposit rates turn out to be more negative, if data on inflation expectations of households are used, which are available from 2006 onwards. According to these data, during 2008-13, the real deposit rate averaged (-) 2.1 percent using households' "current" inflation expectations and (-) 3.3 percent using households' "one-year ahead" inflation expectations

(Chart 5). Administered interest rates on small savings have also been negative in real terms in the recent years and growth in small savings has been low or negative in this period.

Negative real deposit rates, along with the growth slowdown, seem to have contributed to the decline in household financial savings accompanied by a switch towards savings in physical assets (gold and property). Financial savings (gross) of households fell from 15.5 percent of GDP in 2007-08 to 10.8 percent in 2012-13, reflecting decline in the major constituents – bank deposits, life insurance funds, and shares and debentures (Table 6). The recent decline has taken gross financial savings to below its 1997-98 levels (10.9 percent of GDP) and just close to its levels in the early 1990s (10.4 percent in 1992-93). Financial savings (net) of households declined by 4.5 percentage points of GDP between 2007-08 and 2012-13, while physical savings went up by an almost similar magnitude. Households' physical investments in gold increased from an average of 1.1 percent of GDP during 2003-08 to 2.6 percent by 2012-13. The overall household savings at 21.9 percent of GDP in 2012-13 were almost the same as in 2007-08 (Table 6). The stability of the overall household savings rate is remarkable in the face of the significant deceleration in economic activity. Thus, rather than smoothing consumption, households appear to have focused on maintaining their overall savings propensities, perhaps a reflection of the elevated uncertainty in the economic environment. At the same time, the significant deterioration in public finances has not been countered by households through higher savings, which would indicate non-Ricardian behavior and also presents indirect evidence of some role for countercyclical fiscal policy. However, the significant decline in financial savings, if not reversed quickly, has adverse implications for medium-term growth prospects as well as external sustainability.

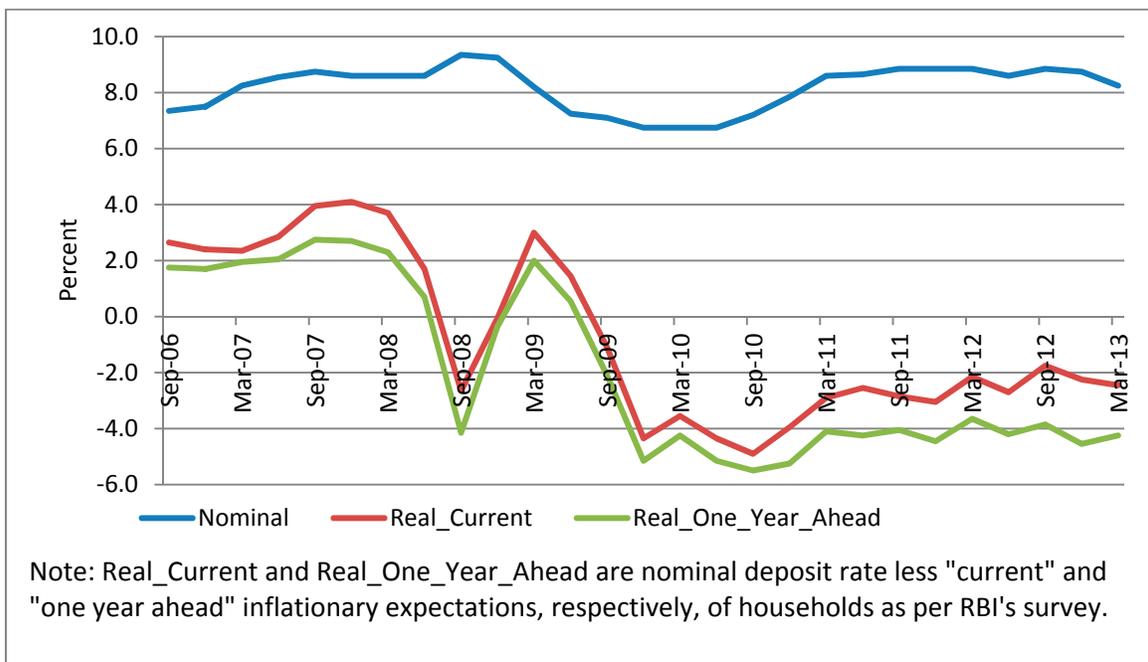
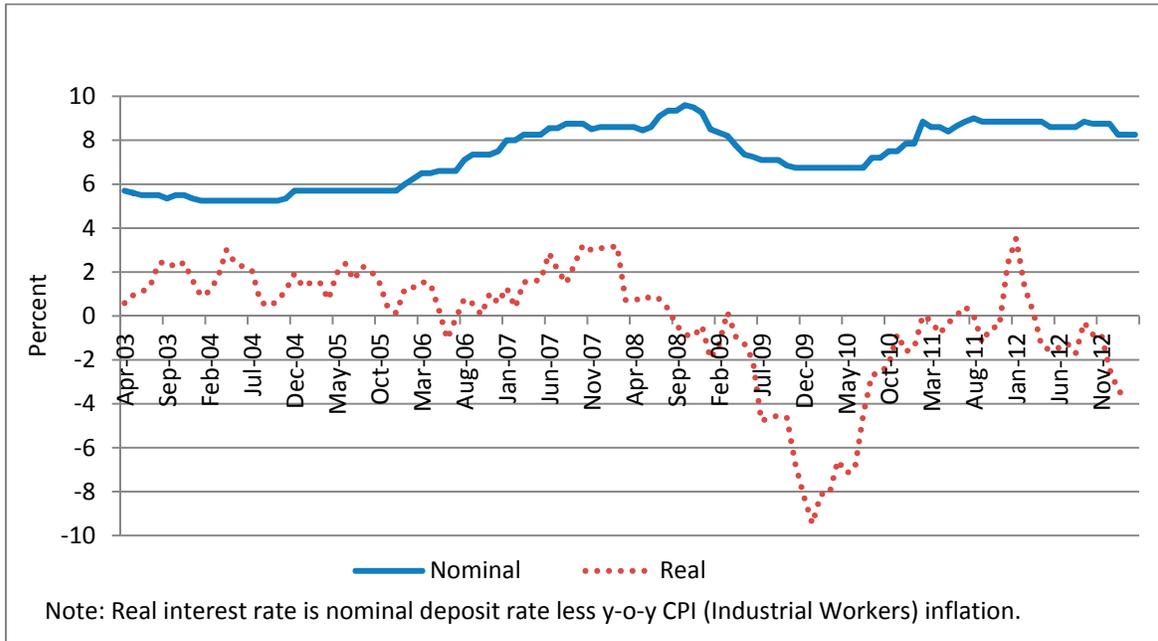
Does the relationship between real deposit rates and savings hold in other periods? Household savings, for example, increased between 1997-98 (18 percent of GDP) and 2003-04 (23 percent), even as nominal deposit rates recorded a substantial decline (from around 11 percent to around 5-6 percent). But, this period was also marked by a significant fall in inflation. Real deposit interest rates during the early part of this period were almost unchanged and highly positive (4-5 percent till 2001-02, and 2-3 percent during 2002-03 and 2003-04; these were negative in one year only, 1998-99). Thus, the decline in nominal deposit rates tracked the inflation movements – or perhaps trailed the decline in inflation, given the fact that it takes some time for economic agents to revise their inflation expectations. The downward movement in banks' nominal deposit rates was also facilitated by the downward adjustment in the administered interest rates on small savings during this period. The available evidence, therefore, suggests that real deposit rates do matter for household savings.

Fiscal Policy

As noted earlier, reflecting the fiscal stimulus measures in response to the NAFC as well as the impact of growth slowdown on revenues, the Centre's headline fiscal deficit/GDP ratio more than doubled to 6.0 percent in 2008-09 (Table 8). The deficit, including the impact of bonds issued in lieu of cash subsidies for oil and others, recorded an even higher order of increase from 3.1 percent of GDP in 2007-08 to 8.2 percent in 2008-09, but then moderated somewhat to 6.6 percent in 2009-10. In nominal terms, the Centre's fiscal deficit increased from Rs.1,269 billion in 2007-08 to Rs.3,370 billion in 2008-09 (vis-à-vis the budgeted amount of Rs.

1,333 billion) and Rs. 4,185 billion in 2009-10, an increase of 230 percent in just 2 years. Despite this substantial increase in its borrowing requirements, the borrowing costs declined - the weighted average yield on Central government's dated securities fell from 8.12 percent in 2007-08 to 7.23 percent in 2009-10 – benefiting from the accommodative monetary policy stance during this period and large open market operations of the Reserve Bank.

Chart 5: Deposit Rate



The fiscal stimulus began to be withdrawn in 2011-12 and 2012-13. The quality of fiscal stimulus provided in the aftermath of the NAFC also seems to have exacerbated the slowdown in 2011-13. Revenue expenditure of the central government increased from 11.9 percent of GDP in 2007-08 to 14.1 percent in 2008-09 (and maintained at this level in 2009-10). This increase was partly on account of subsidies, which increased from 1.4 percent of GDP during 2007-08 to 2.3 percent in 2008-09 and remained around this level till 2012-13. The increase in subsidies was initially due to fertilizers and then due to the incomplete and delayed pass-through of high international crude oil prices to domestic prices (Table 8). Oil subsidies increased from 0.1 percent of GDP during 2003-08 to 1.0 percent in 2012-13. However, these data represent only the actual cash outgo on subsidies and exclude the expenditure covered through the issuance of bonds during 2005-09, especially in 2008-09. Bonds issued in lieu of subsidies to oil companies, fertilizer companies and Food Corporation of India increased from 0.5 percent of GDP in 2005-06 to 1.7 percent in 2008-09.

Table 8: Fiscal Position of the Centre

Item	<i>(Percent to GDP)</i>											
	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	
1 Gross fiscal deficit (GFD)	4.3	3.9	4.0	3.3	2.5	6.0	6.5	4.8	5.7	4.9	4.6	
			(4.7)	(4.3)	(3.1)	(8.2)	(6.6)					
2 Gross primary deficit	0.0	0.0	0.4	-0.2	-0.9	2.6	3.2	1.8	2.7	1.8	1.3	
3 Revenue deficit	3.5	2.4	2.5	1.9	1.1	4.5	5.2	3.2	4.4	3.6	3.3	
4 Revenue receipts	9.3	9.4	9.4	10.1	10.9	9.6	8.8	10.1	8.3	8.7	9.1	
a) Gross Tax	9.0	9.4	9.9	11.0	11.9	10.8	9.6	10.2	9.9	10.2	10.2	
i) Corporation tax	2.2	2.6	2.7	3.4	3.9	3.8	3.8	3.8	3.6	3.5	3.5	
ii) Income tax	1.5	1.5	1.6	1.7	2.1	1.9	1.9	1.8	1.8	1.9	2.1	
iii) Customs duties	1.7	1.8	1.8	2.0	2.1	1.8	1.3	1.7	1.7	1.6	1.5	
iv) Union excise	3.2	3.1	3.0	2.7	2.5	1.9	1.6	1.8	1.6	1.7	1.6	
v) Service tax	0.3	0.4	0.6	0.9	1.0	1.1	0.9	0.9	1.1	1.3	1.5	
b) Non-tax revenue	2.7	2.5	2.1	1.9	2.1	1.7	1.8	2.8	1.4	1.4	1.7	
5 Capital receipts	7.4	6.2	4.9	3.5	3.4	6.1	7.0	5.3	6.3	5.8	4.8	
a) Market borrowings (net)	3.1	1.6	2.9	2.7	2.6	4.4	6.1	4.2	5.4	5.0	3.8	
b) Disinvestment receipts	0.6	0.1	0.0	0.0	0.8	0.0	0.4	0.3	0.2	0.3	0.2	
6 Total receipts	16.7	15.6	14.3	13.5	14.3	15.7	15.8	15.4	14.7	14.4	13.9	
7 Revenue expenditure	12.7	11.9	11.9	12.0	11.9	14.1	14.1	13.4	12.7	12.3	12.4	
a) Interest payments	4.4	3.9	3.6	3.5	3.4	3.4	3.3	3.0	3.0	3.1	3.4	
b) Subsidies (I to iv)	1.6	1.4	1.3	1.3	1.4	2.3	2.2	2.2	2.4	2.5	2.3	
(i) Food	0.9	0.8	0.6	0.6	0.6	0.8	0.9	0.8	0.8	0.8	0.8	
(ii) Fertilizers	0.4	0.5	0.5	0.6	0.7	1.4	0.9	0.8	0.8	0.6	0.6	
(iii) Petroleum	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.5	0.8	1.0	0.8	
(iv) Others	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
8 Capital expenditure	3.8	3.5	1.8	1.6	2.4	1.6	1.7	2.0	1.8	1.6	1.7	
a) Capital outlay	1.2	1.6	1.5	1.4	2.1	1.4	1.5	1.7	1.5	1.4	1.5	
9 Total expenditure	16.6	15.4	13.7	13.6	14.3	15.7	15.8	15.4	14.5	13.9	14.0	
Memo:												
Combined (Centre and States) Finances												
10 Gross fiscal deficit	8.3	7.2	6.5	5.1	4.0	8.3	9.3	6.9	7.6	7.5	6.9	
11 Gross primary deficit	2.0	1.3	1.0	-0.3	-1.2	3.3	4.5	2.4	3.2	2.9	2.2	
12 Revenue deficit	5.6	3.5	2.7	1.3	0.2	4.3	5.7	3.2	4.1	3.7	2.9	

Note: Data on Central government finances for 2013-14 pertain to revised estimates.

Data on combined government finances for 2012-13 and 2013-14 pertain to revised and budget estimates, respectively.

Figures in parentheses are GFD including off-budget liabilities.

Source: Reserve Bank of India; Union Budget documents; and, Economic Advisory Council to the Prime Minister.

The demand for oil is generally adjudged to be relatively price inelastic. In the Indian context, the problem has been compounded by the relatively sticky administered prices. However, estimates in this paper show that demand for oil in India does respond to prices in a significant manner (Annex 1 and Annex Table 1). The estimated price elasticity of demand for petrol is (-) 0.66, for diesel is (-) 0.36 and for kerosene oil is (-) 0.54. The price elasticity estimates for India in this paper are comparable to those of other countries: according to the four literature surveys covered in Hamilton (2008), the long-run price elasticity of demand for gasoline is (-) 0.6 to (-) 0.9. Given the estimated elasticities for India, and also the significant amount of under-recoveries, it is evident that if domestic prices had reflected movements in international prices, there would have been some demand response, along with some expenditure switching leading to suppressed demand for other commodities. Furthermore, there would have been a beneficial impact on the fiscal balance, and lower crowding out of the private sector. Moreover, lower oil consumption demand would have led to lower oil imports and hence some containment of the CAD. We can use the estimated price elasticity to illustrate the likely impact on the CAD by focusing on diesel, which accounts for almost 45 percent of domestic petroleum consumption. During 2011-12 and 2012-13, the under-recoveries in case of diesel are estimated to be around Rs.11 per liter⁴ (around 25 percent of the actual prevailing prices). If the diesel prices had been raised to eliminate the under-recoveries, then the estimated price elasticity of 0.36 suggests that diesel consumption would have been around 9 percent lower. This would have, *ceteris paribus*, lowered overall imports and the current account deficit by around 0.5 percent of GDP each in 2011-12 and 2012-13, a sizable impact.

In contrast to the upward trend in revenue expenditure, capital outlays of the centre were broadly stagnant over this period at around 1.5 percent of GDP (Table 8). Empirical evidence indicates that fiscal multipliers for government capital outlays exceed government consumption expenditure in India in the long-run as in many other countries (Jain and Kumar, 2013). According to Tapsoba (2013), the fiscal multiplier for government consumption is unity in the first year, but then turns negative and the long-run impact is also negative; in contrast, the first-year as well as the long-run multipliers for government investment are more than unity. These multiplier estimates, in conjunction with the actual stimulus nature, would suggest that higher revenue expenditures provided only short-lived boost to activity, while higher capital outlays would have had a more durable impact on economic activity. Thus, the quality of the fiscal stimulus in the aftermath of the NAFC imparted volatility to the growth path. Had ample fiscal buffers been there prior to the crisis, capital outlays could have been increased significantly, providing a more durable support to the economy.

On the revenue side, gross tax collections have declined, as could be expected given the weakness in growth. Interestingly, the ratio of direct taxes – both income tax and corporate tax – to GDP has been broadly unchanged from 2007-08, but the pre-crisis upward trend has been halted. The decline in tax/GDP ratio is, therefore, on account of indirect taxes, especially excise collections, reflecting initially the drastic reduction in tax rates as part of stimulus measures, and

⁴ Total domestic consumption of diesel was 65 million tonnes (MT) in 2011-12 and 69 MT in 2012-13, and the corresponding under-recoveries were Rs.812 billion and Rs.921 billion (Petroleum Planning and Analysis Cell, <http://ppac.org.in/>). Thus, the under-recovery was around Rs.13 per kg or Rs. 11 per liter.

later, the sharp slowdown of the manufacturing sector. While the CENVAT rate was increased to 10 per cent in the Union Budget 2010–11 (February 2011) and further to 12 percent in the Union Budget 2011-12 (March 2012), it was still below the pre-NAFC level of 14 percent.

Given the actual growth outturn, it is apparent that stimulus measures were higher than necessary, and the need for the second and the third packages is debatable, as the Finance Minister Chidambaram himself noted in April 2013⁵. Similarly, as PMEAC (2013) observed, the recovery in growth was grossly underestimated initially, which had an adverse impact on adjustments in the monetary and fiscal stance in 2009-10 and 2010-11 and on inflation: “In retrospect, we could have tightened monetary conditions much earlier, and rolled back the tax incentives at least one full year earlier” (PMEAC, p. 3). Moreover, the quality of the fiscal stimulus, with its focus on revenue expenditure/tax cuts and stagnant capital outlays, added to demand pressures. These demand pressures were mirrored in high inflation; and, negative real deposit rates, on the back of high inflation, contributed to higher gold imports and higher CAD. Similarly, the incomplete pass-through of high international crude prices to domestic petroleum prices dampened the expenditure adjustment effect, which could have reduced oil imports and hence reduce the pressure on the CAD – an issue which we discuss in Section IV.

Saving-Investment Balance: Private Sector Crowding Out?

The worsening of fiscal balances was mirrored in the deterioration in public savings from 5 percent of GDP in 2007-08 to 1.2 percent in 2012-13, largely on account of government administration. Thus, with decline in both public and private corporate savings, the overall savings rate fell from 36.8 percent to 30.1 percent, with the large chunk of decline occurring in 2011-13 (Table 6). On the investment side, public and private corporate investment fell by almost 9 percentage points between 2007-08 and 2012-13, but the strong increase in household investment (mirroring the increase in physical savings in gold and property) buffeted the decline in overall investment rate from 38.1 percent to 34.8 percent. The overall decline in the investment rate during 2008-13 at 3.3 percent of GDP was, thus, less than that of 6.7 percent in domestic savings, in turn mirrored in the significant widening of current account deficit.

Since households are net savers, while the private corporate sector and the public sector are net users of financial savings, a more analytical way of looking at the saving and investment (S-I) trends is to examine the trends in net balances of these three sectors. The household sector’s net financial savings fell from 11.6 percent of GDP in 2007-08 to 7.1 percent in 2012-13; the public sector’s net S-I deficit increased from (-) 3.9 percent to (-) 6.9 percent over this period. *Thus, the net financial savings of the household sector that could have become available to the private corporate sector (after taking into account the draft of the resources by the public sector) fell from an average of 6.3 percent of GDP during 2003-08 to just 1.9 percent during 2008-13; these numbers suggest significant crowding out of the private sector in the post-NAFC period, which then had an adverse impact on investment activity.* Arguably, the higher fiscal stimulus directly did crowd out the private corporate sector. Furthermore, the stimulus added to

⁵ Remarks at the Peterson Institute for International Economics in Washington DC on April 19, 2013, available at http://www.iie.com/events/event_detail.cfm?EventID=275.

inflationary pressures, which then led to negative real interest rates, greater demand for gold and lower household financial savings. If the fiscal stimulus had been moderate, then arguably interest rates for the corporate sector could have declined more than they did and that would have also provided an incentive for more investment.

In this context, a valid counter-argument is that there was no crowding out: the higher public S-I gap since 2008-09 just reflects the fact that the government was responding to the collapse in the corporate sector investment. This counter-narrative would be true if the public S-I gap had increased on account of higher public investment. However, the public investment rate actually declined from its 2007-08 level (Table 6). The increase in the public S-I gap thus is attributable to the decline in public savings and only a part of it is attributable to explicit stimulus measures (the reduction in excise duty). A large part of the decline in public savings owes to the increase in subsidies, especially oil; cash subsidies increased by one percentage point of GDP in 2008-09, but the increase was almost 2 percentage points once bonds issued in lieu of cash subsidies are also included. Higher government subsidies clearly were not a response to lower corporate investment.

But, why has corporate investment not picked up, even though public S-I gap has narrowed since 2010-11? First, the public S-I gap is still higher than the pre-NAFC level. Second, and more importantly, the households' financial savings rate continues to decline. The policy bottlenecks alluded to earlier and monetary measures have also impacted corporate investment. The high current account deficit increased external vulnerability. Overall, the combined impact of the increase in the public S-I gap (given that it was driven by subsidies and lower revenues), and lower household financial savings reduced the availability of domestic resources to the corporate sector. The impact on corporate investment was also exacerbated by domestic policy bottlenecks, monetary measures and limited space for further external finance.

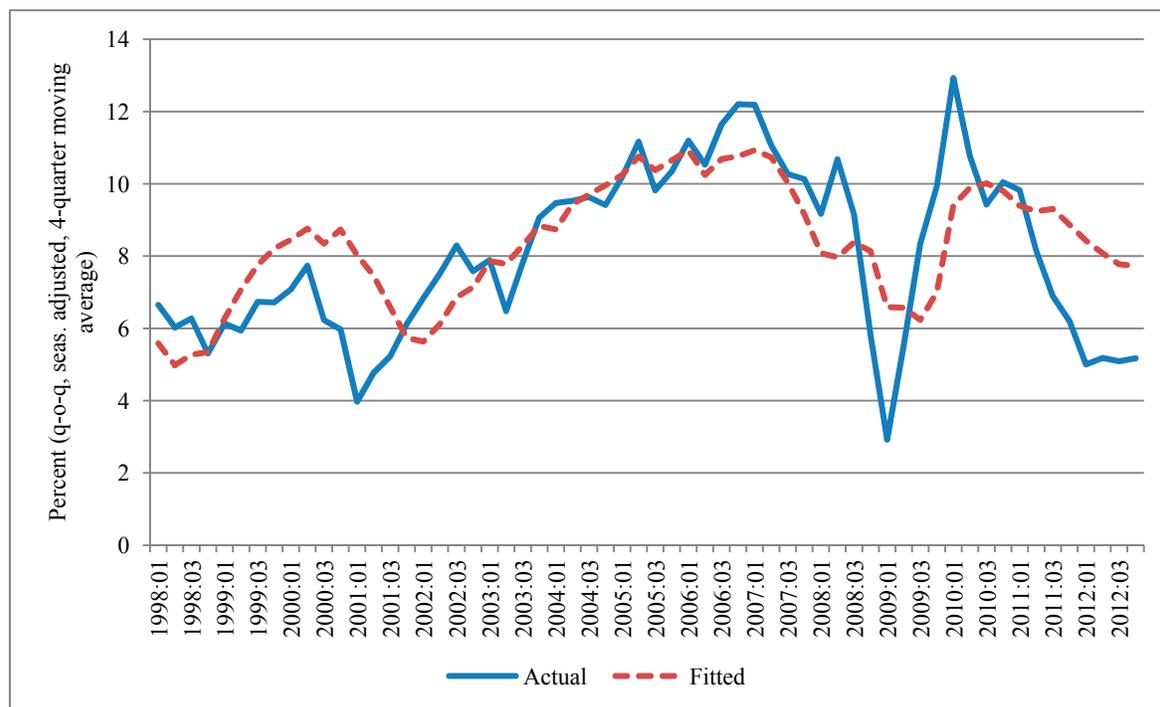
Another potential argument against the crowding out hypothesis is that there was no increase in domestic interest rates: how can crowding out take place without an increase in interest rates? First, as documented above, monetary policy was in an accommodative mode during the initial period: this was mirrored in a decline in government borrowing costs despite the near-trebling of government borrowings. As RBI (2014, para III.53) notes, there was de facto monetization of the fiscal deficit to the extent of 28 percent of the overall borrowing requirement on average via injections of primary liquidity through OMOs. Second, crowding-out can take place without an increase in domestic interest rates if the economy is open to capital flows, which indeed is the case for India and other EMEs. Net capital flows received by India averaged 4.2 percent of GDP during the 2-year period 2011-13, broadly similar to 4.6 percent averaged during 2003-08, even as domestic growth had slowed down significantly to 5.6 percent from 8.7 percent between these two periods (see Section IV and also Table 9). Low global interest rates made external capital flows highly attractive to those corporate borrowers who could access global markets. Third, the post-NAFC period has been characterized by the unconventional monetary policies in the AEs, which led to record low short- and long-term interest rates globally. The available empirical evidence indicates that accommodative monetary policy in the US forces other central banks to pursue more-than-desired accommodative monetary policies, resulting in low interest rates globally – the “Great Deviation” (Caruana, 2012; Hofmann and Bogdanova, 2012; Taylor, 2013). Thus, the UMPs might have also kept domestic interest rates in India from edging higher. Finally, domestic interest rates started to

increase from 2010-11 and this is true for both nominal rates and real rates (adjusted for WPI-manufactured products inflation).

Quantifying the Growth Slowdown

The discussion above suggests that the accommodative monetary and fiscal policies put in place after the NAFC boosted growth during 2009-11, and then the phased reversal of these policies, partial so far in case of fiscal policy, contributed to the growth slowdown during 2011-14. Annex 2 empirically assesses the impact of monetary policy and global conditions on domestic growth. The results show that an increase of 100 bps in the real interest rate leads to a reduction of around 30 bps in GDP growth (non-agricultural non-community services GDP) with a lag of two quarters (Annex Table 2). As regards global demand, a one percentage point reduction in global exports reduces domestic growth by almost 13 bps, while one percentage point reduction in global GDP growth reduces domestic growth by almost 50 bps. The estimated equations track actual growth relatively well for the 2003-08 period, but deviations are observed since then. The estimated equation under-predicts the actual outturn during 2009-10 by around 3.5 percentage points and over-predicts by around 3 percentage points on average during 2011-13 (Chart 6). Given that the model includes the monetary policy and the global demand impacts, one potential reason for the deviation since 2009 is the role of the fiscal policy, which has not been included in the explanatory variables.

Chart 6: Real GDP Growth



India's structural primary deficit increased by 4.0 percentage points of GDP in 2008-09 (IMF, 2013a), reflecting both the stimulus measures in response to the fiscal crisis as well as other measures like the implementation of the Pay Commission award. The structural primary deficit subsequently fell, reflecting the fiscal consolidation measures, but the decline has been

modest; the withdrawal of the stimulus was only 1.4 percentage points during the 3-year period 2010-13 or an annual average of 0.35 percentage point of GDP. Assuming that the fiscal multiplier for India is similar (around 0.5) to that for other EMEs (Bi, Qu and Roaf, 2013), the stimulus of 4 percent of GDP added almost 2 percentage points to the growth in 2009-10. In contrast to the large stimulus, the withdrawal of the stimulus was gradual and remains incomplete. The annual fiscal consolidation of 0.35 percent of GDP during 2010-11 to 2012-13, combined with the multiplier of 0.5, would suggest an adverse impact of less than 20 bps per annum on growth. Even if the fiscal multiplier is assumed to be higher at unity, the annual growth impact would be around 35 bps, abstracting from the lags. Thus, fiscal stimulus can largely explain the high growth in 2009-10, but the subsequent consolidation can explain only a very modest part of the slowdown. One view is that the growth gap during the 2011-13 period appears to be the outcome of the policy bottlenecks noted earlier - such as obtaining environmental permissions, fuel linkages, or carrying out land acquisition, which led to stalling of a number of large projects, and discouraged new investment (Bhalla, 2013a). However, it is not clear as to whether these factors were more binding in the post-NAFC period vis-à-vis the pre-NAFC period and, if yes, to what extent.

IV. THE EXTERNAL SECTOR: CURRENT ACCOUNT

Large current account deficits in the 1980s, averaging around 2 percent of GDP, and their financing with debt flows was one of the factors that contributed to the balance of payments crisis in the early 1990s. Since then and until the recent episode, India's current account deficit had remained modest, averaging 0.6 percent of GDP during 1991-2 to 2007-08. This was the result of consistent structural reforms throughout the period, including an overhaul of the external trade and payments regime, practice of a flexible but managed exchange rate, accompanied by judicious management of the capital account and a reduction in inflation and inflation expectations. Furthermore, the capital account was characterized by a healthy financing mix of non-debt flows and stable debt flows. Excess capital flows were absorbed by the Reserve Bank on its balance sheet leading to a large increase in foreign exchange reserves, as also improving the quality of its balance sheet with high-quality foreign assets. Foreign exchange interventions were appropriately sterilized through a mix of instruments (Mohan and Kapur, 2011). The acquisition of foreign assets, apart from providing comfort to the external sector, was also important from the viewpoint of expansion of the Reserve Bank's balance sheet to meet the economy's monetary and credit needs (Mohan, Patra and Kapur, 2013).

Against this backdrop of a healthy and vibrant external sector, widening of the current account deficit to 4.7 percent of GDP in 2012-13 has attracted a lot of concern (Table 9) (Subbarao, 2013a). The widening reflects a variety of factors. First, sluggish global growth since 2009 has impacted India's export markets. As estimates reported later show, given India's income elasticities for exports and imports, the sharper decline in external demand vis-à-vis domestic demand could have contributed to the widening of the CAD. Second, despite sluggish global growth, international commodity prices have remained at relatively elevated levels, supported by ultra accommodative monetary policies of the advanced economies, abundant global liquidity and near zero interest rates. India, being a net importer, especially of crude oil, has been hit hard. Net oil imports, already high at 4.1 percent of GDP in 2007-08, rose to 5.9

percent by 2012-13. Third, domestic supply and policy constraints led to increase in imports of coal - from around 0.5 percent of GDP during 2004-08 to 0.9 percent in 2011-12 - notwithstanding large domestic stocks. Similarly, exports have suffered from the restrictions on iron ore mining activity since 2010-11.

Table 9: Balance of Payments

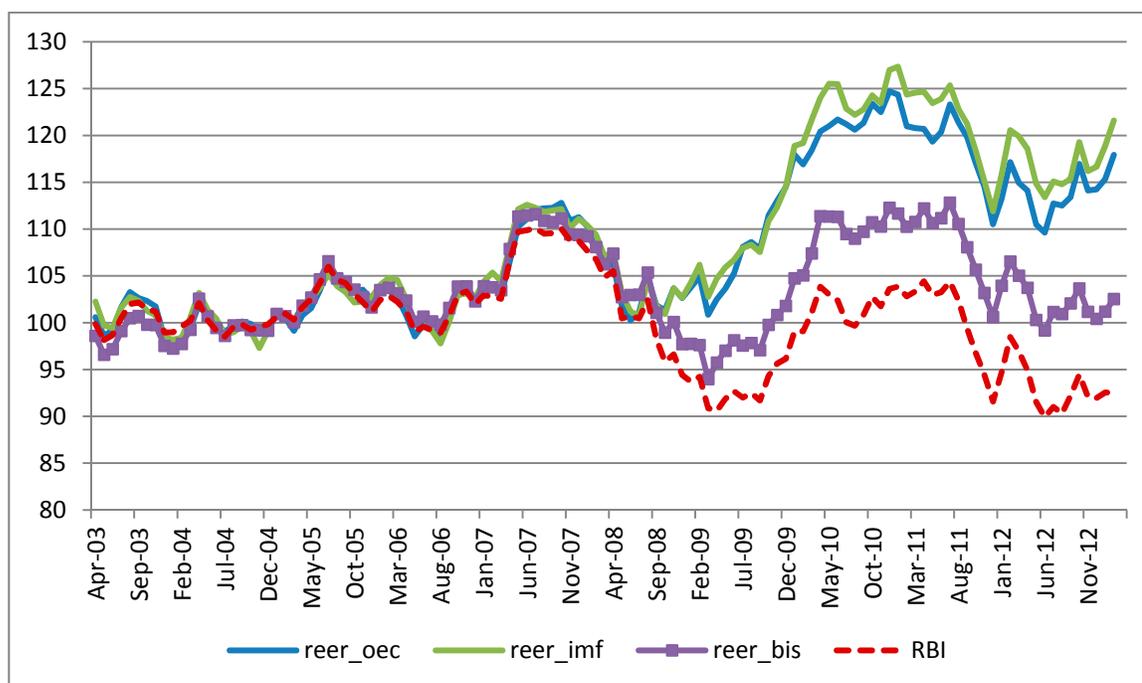
Item	<i>Percent to GDP</i>									
	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
1 Merchandise exports	10.7	11.8	12.6	13.6	13.4	15.4	13.4	14.7	16.5	16.5
a) Oil	0.6	1.0	1.4	2.0	2.3	2.2	2.1	2.4	3.0	3.2
2 Merchandise imports	12.9	16.5	18.8	20.1	20.8	25.2	22.0	22.3	26.6	27.0
a) Oil	3.3	4.1	5.3	6.0	6.4	7.6	6.4	6.2	8.2	9.1
b) Gold	1.1	1.5	1.3	1.5	1.3	1.7	2.1	2.4	3.0	2.9
c) Non-oil non-gold	8.6	10.9	12.3	12.6	13.0	15.8	13.5	13.7	15.3	15.0
d) Net oil imports	2.7	3.2	3.9	4.0	4.1	5.4	4.3	3.8	5.3	5.9
3 Trade balance	-2.2	-4.7	-6.2	-6.5	-7.4	-9.7	-8.7	-7.6	-10.1	-10.5
a) Non-oil balance	0.5	-1.5	-2.3	-2.5	-3.2	-4.4	-4.3	-3.9	-4.8	-4.6
b) Non-oil non-gold balance	1.6	0.0	-1.0	-1.0	-1.9	-2.7	-2.2	-1.5	-1.8	-1.8
4 Invisibles, net	4.5	4.3	5.0	5.5	6.1	7.5	5.9	5.0	5.9	5.8
a) Services, net	1.6	2.1	2.8	3.1	3.1	4.4	2.6	2.9	3.4	3.5
b) Private transfers, net	3.5	2.8	2.9	3.1	3.4	3.6	3.8	3.1	3.4	3.5
c) Investment income, net	-0.6	-0.6	-0.6	-0.7	-0.4	-0.5	-0.5	-1.0	-0.9	-1.2
5 Current account balance	2.3	-0.3	-1.2	-1.0	-1.3	-2.3	-2.8	-2.7	-4.2	-4.7
a) non-oil balance	5.0	2.8	2.7	3.0	2.9	3.1	1.5	1.1	1.1	1.1
b) Non-oil non-gold balance	6.1	4.3	4.0	4.6	4.2	4.8	3.6	3.5	4.1	4.0
6 Capital flows, net	2.7	3.9	3.1	4.8	8.6	0.6	3.8	3.6	3.6	4.8
a) Capital inflows	12.3	13.7	17.3	24.6	35.4	25.8	25.3	29.2	25.5	25.4
b) Capital outflows	9.6	9.8	14.3	19.8	26.8	25.2	21.5	25.6	21.9	20.6
7 Foreign investment, net	2.2	1.8	1.9	1.6	3.5	0.7	3.7	2.3	2.1	2.5
a) FDI inward	0.7	0.8	1.1	2.4	2.8	3.4	2.4	1.5	1.8	1.5
b) FDI outward	0.3	0.3	0.7	1.6	1.5	1.6	1.1	1.0	0.6	0.4
c) Portfolio	1.8	1.3	1.5	0.7	2.2	-1.1	2.4	1.8	0.9	1.5
8 Debt flows, net	-0.1	1.4	1.3	3.1	3.3	1.0	1.2	1.8	1.6	1.7
a) External assistance	-0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.1
b) External commercial borrowings	-0.5	0.8	0.3	1.7	1.8	0.5	0.2	0.7	0.5	0.5
c) Short-term trade credits	0.2	0.5	0.4	0.7	1.3	-0.2	0.6	0.6	0.4	1.2
d) Non-resident deposits	0.6	-0.1	0.3	0.5	0.0	0.3	0.2	0.2	0.6	0.8
9 Others	0.6	0.7	-0.1	0.1	1.8	-1.0	-1.1	-0.5	-0.1	-0.2
10 Overall balance	5.1	3.6	1.8	3.9	7.4	-1.6	1.0	0.8	-0.7	0.2
<i>Memo:</i>										
Current account balance (US \$ billion)	14	-2	-10	-10	-16	-28	-38	-46	-78	-88
Capital flows, net (US \$ billion)	17	28	25	45	107	7	52	62	68	89
<i>End-March</i>										
External debt	17.2	18.1	16.8	17.5	18.0	20.3	18.2	17.5	19.6	21.0
Short-term debt (residual maturity)	1.6	4.3	3.1	3.7	4.4	5.2	4.6	5.0	5.7	6.6
Import cover of forex reserves - goods and services (months)	14.0	11.6	9.5	10.2	12.0	8.4	9.3	7.9	6.1	6.0
Forex reserves/Short-term debt by residual maturity (Percent)	1071	441	595	546	565	438	427	346	296	237
Foreign exchange reserves (US \$ billion)	113	142	152	199	310	252	279	305	294	293

Source: Reserve Bank of India; Ministry of Finance.

Fourth, gold imports increased significantly from around 1.5 percent of GDP during 2004-08 to 3.0 percent in 2011-12 and 2012-13 – high domestic inflation and negative real deposit rates on the one hand and sharp gains in international gold prices and expectations of further gains on the other hand seem to have made gold an attractive asset. Given the oil and gold trends, the non-oil non-gold current account balance (a surplus of around 4 percent) and the non-oil non-gold trade balance (a deficit of around 2 percent) have been broadly unchanged between 2007-08 and 2012-13 (Table 9). It is, however, important to note that the deterioration in overall trade balance as well as the non-oil non-gold trade balance had started well before the NAFC. The high growth phase of 2003-08 had led to a very significant increase in the trade deficit from 2.2 percent of GDP in 2003-04 to 7.4 percent in 2007-08 and further to 10.5 percent in 2012-13; the non-oil non-gold trade balance moved from a surplus of 1.6 percent in 2003-04 to a deficit of 1.9 percent in 2007-08 and, which as noted above, remained around this level till 2012-13. The movements in the trade balance were mirrored in the current account balance over this period, although the impact was muted somewhat by the upward movement in net invisibles surplus (from 4.5 percent in 2003-04 to 6.1 percent in 2007-08). In the post-crisis period, the net invisibles surplus has been range-bound around its 2007-08 level and thus has not provided incremental support to the BoP.

Fifth, the real appreciation of the rupee might have also played a role. Here, the analysis is somewhat complicated by the divergences in alternative available measures of the real effective exchange rate (REER) (Chart 7). For example, between March 2008 and March 2013, the RBI index exhibits a real depreciation of 12 percent, while the BIS index exhibits a depreciation of 4 percent; in sharp contrast, the OECD and the IMF indices show a substantial real appreciation of 12-14 percent. One reason for the difference is that the RBI index uses WPI inflation for India and CPI inflation for partner countries, whereas the OECD/IMF measures use CPI inflation for all countries. Since Indian CPI inflation has been higher than WPI inflation in the past few years, the OECD/IMF indices show a higher real appreciation. According to Bayoumi, Harmsen and Turunen (2011) and Chinn (2006), WPI- and ULC-based REERs may be better indicators of price competitiveness than CPI-based measures. We discuss this issue further in Annex 3.

Sixth, the financing of the elevated CAD is also an issue. Inward FDI flows jumped significantly during 2006-09, but then more than halved from 3.4 percent of GDP in 2008-09 to 1.5 percent in 2012-13. Portfolio flows and debt flows financed almost two-thirds of the CAD in 2012-13. The stock of external commercial borrowings (including trade credits and non-residents investment in domestic securities) has increased multi-fold over the past decade from around US 30 billion (5-7 percent of GDP) during the 4-year period 2000-04 to US \$ 115 billion (9.2 percent of GDP) in 2007-08 and further to US \$ 225 billion (12.2 percent of GDP) in 2012-13. While the jump between 2003-04 and 2007-08 could perhaps be largely attributed to the sustained high growth of the Indian economy, the increase since then has occurred in an environment of slowing domestic growth. The unconventional monetary policies in the advanced economies made such borrowings quite attractive compared to domestic sources. Moreover, there has been a phased liberalization of the policy regime on the ceilings in regard to external borrowings and investments by non-residents in domestic securities. Concomitantly, high external borrowings might have also been the outcome of the crowding out of the private sector in view of the fiscal stimulus and the high government borrowings since the NAFC.

Chart 7: Real Effective Exchange Rate (REER) (2004-05=100)

Exports and Imports: Role of the Exchange Rate

The widening of the current account deficit over the past five years, as noted earlier, reflects a sluggish global economy, elevated international commodity prices, higher gold imports, plateauing of the invisibles surplus and domestic supply constraints that have led to higher imports/lower exports. The role of the exchange rate has, however, attracted some debate. As the PMEAC (2013) notes, the conventional approach to an enlarged CAD would be to allow the currency to adjust downwards. This adjustment, they argued, might not lead to the expected changes in both imports and exports in view of: (a) large gold and oil imports and their relative insensitivity to exchange rate movements and (b) much of exports are exported as part of supply chains and in such situations large depreciation does not escape notice and is often neutralized by price re-negotiations. “It is therefore not surprising that the substantial depreciation of 20 percent in the external value of the rupee (against the US dollar) did not boost exports”, whereas “China was able to register 14 per cent growth in the dollar value of exports in December 2012 and as much as 25 and 22 per cent growth in January and February 2013. The Chinese yuan appreciated against the dollar over the past year by about 3 per cent” (PMEAC, op cit, p.33-34). A few comments on this issue are appropriate.

First, although the rupee depreciated by more than 20 percent in nominal terms between mid-2011 and end-2012, a large part of it offset the higher inflation differentials. Second, based on US dollar terms data, India’s exports indeed performed poorly vis-à-vis China in 2012; however, in order to assess the exchange rate-export linkage, it is appropriate to take a medium-term perspective, given the lags with which exchange rate movements impact trade volumes. India’s average export growth since the NAFC is comparable to that of China, whereas it was much lower in the pre-NAFC period (Table 10). As regards the exchange rate, the Indian REER

recorded an average annual depreciation of 1.0 percent during 2008-12, compared to an annual average appreciation of 4.1 percent in Chinese currency (both based on the BIS data). Given that the global economy is a common factor to both the economies, the REER movements favored India in the post-NAFC period and this appears to be reflected in the relative export performance.

Table 10: Export Growth: China and India

(Percent)

Year	Volume of exports		Value of exports (US \$ terms)				Variation in REER		
	Total Exports		Total Exports		Non-oil Exports		China		India
	China	India	China	India	China	India	China	India	
2003	20.0	13.9	34.6	17.1	34.5	16.1	-7.1	-0.2	
2004	18.2	14.7	35.4	30.0	35.9	26.7	-3.0	1.1	
2005	24.5	12.3	28.4	30.0	28.0	26.4	-1.1	3.5	
2006	24.2	10.5	27.2	22.3	27.5	17.7	1.3	-0.8	
2007	19.3	16.4	25.6	23.1	25.8	18.2	3.7	6.5	
2008	8.2	5.0	17.3	29.7	17.0	34.5	8.5	-4.8	
2009	-10.7	3.3	-15.9	-15.2	-15.9	-17.9	4.4	-5.4	
2010	28.4	15.4	31.3	37.3	31.4	37.5	-0.7	11.7	
2011	9.4	13.8	20.3	33.8	20.3	31.0	2.5	-0.4	
2012	5.7	1.2	7.9	-2.0	8.0	-8.3	6.0	-6.1	
Averages									
2003-07	21.2	13.6	30.3	24.5	30.3	21.0	-1.2	2.0	
2008-12	8.2	7.7	12.2	16.7	12.1	15.4	4.1	-1.0	

Source: International Financial Statistics, IMF; World Economic Outlook, IMF; Bank for International Settlements.

Note: REER data are based on Bank for International Settlements (BIS) indices.

Third, weak domestic supply response due to domestic rigidities, which are now well-recognized, and which had an adverse impact on the domestic investment climate, could have offset the expected impact of depreciation. Estimates of single equation export demand functions implicitly assume elastic export supplies. Finally, the counterfactual – what would have been the path of exports had there been no real depreciation in 2012 – might be the appropriate benchmark to judge the efficacy of exchange rate. Moreover, other policies such as taxation changes as well as government efforts towards product- and market-diversification also play an important role.

Value Added in Exports

As Rangarajan and Mishra (2013) and PMEAC (2013) note, the imported intermediate content of exports can dampen the competitive effects of depreciations. In this context, the joint OECD-WTO data on trade statistics on a value added basis are useful and relevant. These data, inter alia, provide the domestic value-added embodied in exports as per cent of exports. This indicator provides a simple measure that illustrates how much value-added is generated throughout the economy for a given unit of exports. The lower the ratio, the higher the foreign content and so the higher the importance of imports to exports (OECD, 2013).

For aggregate exports, the OECD-WTO data indicate that the value added ratio for India is higher than many Asian EMEs. The ratio averaged 82.5 percent for India during 1995-2009 (averaged over the five data points: 1995, 2000, 2005, 2008, and 2009). India's ratio was above that of European countries and the emerging Asian countries such as China, Korea, Malaysia, Philippines, and Thailand (Table 11). Between 1995 and 2009, the value added ratio declined for India as for many other countries. The decline for India at 12.3 percentage points was less than that of China (20.8 percentage points), and Korea (16.9 percentage points), and was higher than other Asian EMEs.

Table 11: Value Added Export Ratio: Total Domestic Value Added Share of Gross Exports

	<i>(Percent)</i>				
Country	1995	2000	2005	2008	2009
Australia	88.2	86.5	87.0	86.1	87.5
Canada	76.5	69.2	74.9	78.7	80.5
France	82.2	75.5	75.2	72.8	75.3
Germany	81.3	75.6	74.4	72.2	73.4
<u>Israel</u>	71.4	66.2	62.1	65.1	69.4
Italy	78.1	74.7	72.9	77.2	79.9
Japan	93.2	90.1	86.3	80.7	85.2
Korea	76.3	67.1	62.3	56.6	59.4
Mexico	73.5	68.2	69.3	69.4	69.7
Netherlands	65.3	61.8	65.6	63.4	64.1
Spain	79.4	73.0	72.2	75.1	79.3
Switzerland	76.8	72.2	70.7	69.6	71.5
Turkey	88.8	84.7	79.2	73.7	78.2
United Kingdom	79.3	81.6	79.8	81.1	82.7
United States	91.6	91.1	88.9	85.4	88.7
Argentina	91.0	89.9	87.2	86.3	87.9
Brazil	90.3	88.5	87.0	88.5	91.0
China	88.1	81.2	63.6	66.7	67.4
Chinese Taipei	64.2	64.6	57.8	52.2	58.5
India	90.4	87.2	80.5	76.3	78.1
Indonesia	85.3	80.7	82.2	82.6	85.6
Malaysia	59.7	57.0	58.5	61.9	62.1
Philippines	69.1	54.1	54.4	58.3	61.6
Russian Federation	89.3	87.5	91.8	92.6	93.1
Saudi Arabia	98.0	98.2	97.0	97.1	97.0
South Africa	88.3	83.9	83.4	78.9	83.5
Thailand	70.2	65.2	61.5	62.2	65.5
EU27	90.5	87.4	86.5	84.9	86.4

Source: OECD (available at http://stats.oecd.org/Index.aspx?DataSetCode=TIVA_OECD_WTO).

The trends visible for aggregate exports carry through for most manufacturing industries, i.e., the domestic value added ratio is higher for India for most manufacturing industries vis-à-vis other major economies. This is true for major industries such as food products, 'textiles, leather and footwear', chemicals, metals, machinery and equipment,

electrical equipment, transport equipment. The only category for which India lags the other economies in the manufacturing is the residual manufacturing group ('manufacturing nec; recycling'); this could perhaps be reflecting higher exports of oil products, on the back of the increase in domestic refining capacity, and the concomitant increase in crude oil imports. The ratio for this group declined from 85.7 percent in 1995 to 50.9 percent in 2008 and 2009. Interestingly, it is in the exports of services that the ratios for India are relatively lower than other economies (even though ratios for services' activities are higher than manufacturing activities).

These data would suggest that for India, given the relatively lower level of imported content of inputs in exports, the hypothesis that exchange rate depreciation can dampen the competitive effects of depreciation should not be binding, at least in a cross-country perspective. Even as value-added ratio has declined since the mid-1990s, the ratio for India is well ahead of many countries, especially the regional peers. Thus, if the exchange rate channel is effective in other countries, these data would suggest its efficacy in the Indian context as well.

Price and Income Elasticities: Cross-Country Empirical Evidence

Cross-country analysis broadly confirms that both prices and demand conditions have a significant impact on exports and imports (Table 12). For a sample of developing and industrial countries, average long-run price and income elasticities are estimated at (-) 1.0 and 1.5, respectively, for both exports and imports (Senhadji, 1998; Senhadji and Montenegro, 1999). These findings are supported by studies focusing on individual countries or for a more homogeneous group of countries; for example, Hooper, Johnson and Marquez (2000) for G-7; Chinn (2013) for Japan; Bayoumi, Harmsen and Turunen (2011) for euro area; Thorbecke and Atsuyki (2012) for Germany; and Aziz and Li (2008) for China.

Elasticities based on aggregate trade flows could be biased as aggregate trade flows may have feedback effects on exchange rates (Auboin and Ruta, 2013). Therefore, recent studies have focused on firm-wise behavior to estimate elasticities. For example, Berman, Martin and Mayer (2012) use French firm-level data set and find that high-performance firms react to depreciation by increasing significantly more their markup and by increasing less their export volume and they find an average export elasticity of (-) 0.4 with respect to the exchange rate. Since aggregate exports are concentrated in high-productivity firms, heterogeneous pricing-to-market may partly explain the weak impact of exchange rate movements on aggregate exports. Tang and Zhang (2012) estimate an exchange rate elasticity of (-) 0.4 for exports for Chinese firm-level data.

Currency undervaluation stimulates economic growth, particularly for developing countries (Rodrik, 2008). Export surges in developing countries trend to be preceded by a large real depreciation, which is associated with significant reallocation of resources towards the export sector, especially into new products and markets (Freund and Pierola, 2012). Real appreciation leads to a deterioration in the current account balance, savings and exports, and the impact is more pronounced in developing countries (Kappler et al, 2013). Export markets are characterized by the well-known hysteresis phenomenon (Baldwin and Krugman, 1989): appreciation over some period of time could lead to loss of markets and this impact could persist even if the exchange rate returns to its neutral level after a period of appreciation. Both

the US and the UK experienced such effects in the 1980s and potentially such effects can be larger for countries like India with relatively greater share of low-tech exports.

Table 12: Income and Price Elasticities of Exports and Imports

Study	Period	Country coverage	Exports		Imports	
			Income Elasticity	Price Elasticity	Income Elasticity	Price Elasticity
1	2	3	4	5	6	7
Senhadji (1998)	1960-93	60 developing and industrial countries			Mean: 1.5 Min: 0.0 Max: 5.5	Mean: 1.1 Min: 0.0 Max: 6.7
Senhadji and Montenegro (1999)	1960-93	53 developing and industrial countries	Mean: 1.5 Min: 0.2 Max: 4.3	Mean: -1.0 Min: -0.0 Max: -4.7		
Hooper, Johnson and Marquez (2000)	1956-1994	Canada	1.1	-0.9	1.4	0.9
		France	1.5	-0.2	1.6	0.4
		Germany	1.4	-0.3	1.5	0.1
		Italy	1.6	-0.9	1.4	0.4
		Japan	1.1	-1	0.9	0.3
		UK	1.1	-1.6	2.2	0.6
		US	0.8	-1.5	1.8	0.3
Aziz and Li (2008)	1995-2006	China	3.8	-1.6	1.3	0.9
		Euro area	1.7-1.9	0.0 to -0.6		
		Extra-euro area	1.6-1.9	-0.1 to -0.3		
Bayoumi, Harmsen and Turunen (2011)	1980-2009	Intra-euro area	1.4-1.5	+0.4 to -1.3		
Tang and Zhang (2012)	2000-06	China (firm-level data)		-0.4		
Thorbecke and Atsuyki (2012)	1980-2009	Germany	0.7-2.6	-0.6 to -1.0		
Berman, Martin and Mayer (2013)	1995-2005	France (firm-level data)		-0.4		
Chinn (2013)	1990-2012	Japan	1.0-4.0	-0.3 to -0.7	-2.9 to -6.7	0.2-1.0

Source: Respective studies.

Overall, as Auboin and Ruta (2013) conclude, currency undervaluation is generally found to have a positive short-term impact on exports, but the persistence of these effects appears to be limited to developing countries. Price elasticities of exports are statistically significant, but the magnitudes differ across countries and, as some studies show, are sensitive to the choice of variables. However, it also needs to be recognized that exchange rate is just one of the factors that impact export performance. For example, sector-specific policies, effective industrial policy and fortuitous timing are more critical factors in the phenomenal growth in China's exports during 2000-2007, although China's exchange rate policy also had a role (Berger and Martin, 2013).

Recent Indian Evidence

Recent studies present mixed evidence on the efficacy of the exchange rate on exports in the Indian context (Rangarajan and Mishra, 2013), although the studies during the 1990s generally found high and statistically significant elasticities (for example, Joshi and Little, 1994). Aziz and Chenoy (2012), using quarterly data for 1996-2008, find a positive and statistically significant impact of external demand (real GDP growth in partner countries) on exports; the estimated coefficient was 4.6. However, the coefficient on the REER at (-) 0.6, although with the correct sign, was statistically insignificant. None of the sub-sectors in manufacturing including the low, value-added labor-intensive segments such as textiles, leather and gems and jewellery were found to display any statistically significant sensitivity to the exchange rate. Rangarajan and Patra (unpublished), discussed in Rangarajan and Mishra (2013), find qualitatively similar results. IMF (2012), finds negative and statistically significant impact of REER on exports - the long-run elasticity is estimated at (-) 0.1 for the full sample period (1982-2011) and somewhat higher at (-) 0.2 for the post-1990s period. The corresponding long-run elasticities on external demand were found to be 2.9 and 2.2 for the respective periods. Although these studies suggest a much larger role played by external demand than exchange rates in determining exports, existing studies can fail to find strong export-exchange rate elasticities for a variety of reasons (Rangarajan and Mishra, 2013). First, it is hard to estimate the elasticities using macro data – exports and exchange rates are highly endogenous. Second, macro equations do not allow the export-exchange rate elasticity to vary depending on the position of the aggregate supply curve. Nonetheless, as they note, policy should be directed towards ensuring that the rupee does not appreciate in real terms and further worsen the trade balance, while also factoring in the potential impact of depreciation on capital flows and balance sheets of corporate and financial institutions.

Against this backdrop of cross-country evidence and the mixed evidence on the efficacy of the exchange rate on exports in the recent studies on India, we revisit the issue and estimate export and import demand equations (Annex 3). Empirical results show that both external demand (world real exports) and the REER have the expected impact on India's exports. Annual estimates using data for 1980-81 to 2007-08 show that an increase of 1 percent in world real exports is associated with an increase of 1.1-1.4 percent in India's exports in the long-run. As regards the real exchange rate, estimates suggest that 10 percent real appreciation leads to a reduction of almost 2.1-6.5 percent in the volume of exports in the long-run (Annex Table 3).

Moving to estimates based on the post-reforms sample (1996-97 to 2007-08) and using quarterly data, the elasticity with respect to external demand is in a range of 1.6-1.9 (when

world exports are used as an indicator of external demand) and 2.6-3.6 (world GDP as an indicator of external demand) across alternative estimates, somewhat higher than the annual estimates. Second, the absolute coefficient on the REER is substantially higher than the annual estimates: the coefficient is more than unity for RBI's REER and even higher for REERs of OECD and IMF, although the results are sensitive to inclusion of oil exports (Annex 3 and Annex Table 4). Third, the results for overall exports broadly hold for exports of the major manufactured sub-groups (chemicals, manufactures, and machinery). Overall, these estimates show a stronger impact of global conditions – both demand and price factors – on India's exports and this seems consistent with the phased opening of the Indian economy to the global economy and the process of domestic deregulation and liberalization result in a greater role for market forces. The quarterly results are, however, subject to the caveat of a shorter sample period, and the associated estimation uncertainties.

For imports, the long-run coefficients are also on the expected lines, i.e., real appreciation and stronger domestic activity both contribute to higher imports. Income elasticity of imports with respect to domestic industrial GDP turns out to be around 1.55 in the long-run in all the cases. Thus, the volume of imports changes more than proportionally in relation to variations in domestic demand. The coefficient on the REER ranges from 0.19 to 0.42 and, as in the case, of exports, is higher for the RBI-REER; therefore, 10 percent real appreciation increases imports by almost 2-4 percent across the various specifications (Annex Table 6).

Overall, the results presented in this section indicate that both economic activity (home and abroad) and real exchange rate movements have the expected impact on exports and imports. Real appreciation of the currency reduces exports and increases imports. Thus, the estimates suggest that REER appreciation can lead to a widening of the trade and current account balance, and vice versa for real depreciation.

Determinants of Gold Imports

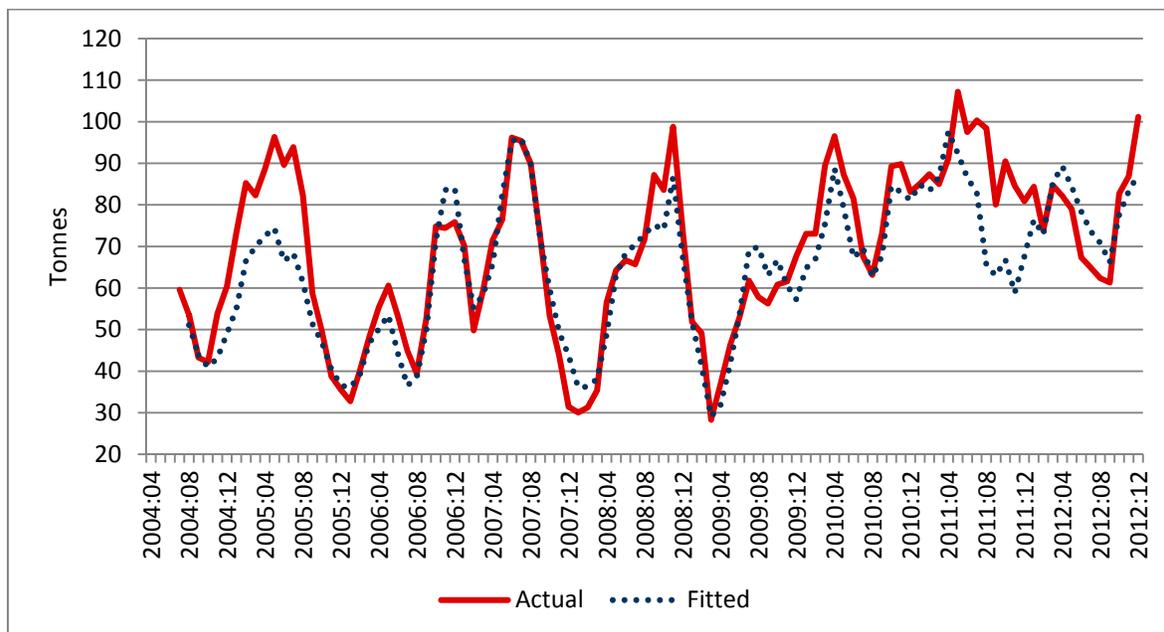
Gold imports jumped from a monthly average of 62 tonnes during 2004-08 to 82 tonnes during 2009-13, while the increase in US dollar terms was much sharper from US \$ 1.2 billion per month to US \$ 4.1 billion over the same period, reflecting higher gold prices. High domestic inflation, low domestic deposit rates, availability of bank loans for gold, the substantial increase in international gold prices, movements in the Indian rupee and pent-up demand are potential contributors to the jump in the quantum of gold imports (RBI, 2013; Rangarajan, 2013; PMEAC, 2013; Vaidyanathan, 1999). An econometric analysis of these potential determinants of gold demand is presented in Annex 4. The impact of gold prices on gold demand is not obvious a priori. On the one hand, as with any normal good, one would expect an increase in its price to reduce the quantity demanded, ceteris paribus. On the other, recent price increases may increase interest in acquiring gold for the investment returns, if recent price increases are interpreted as signaling a likelihood of further increases in the future (Starr and Tran, 2008); this factor could have been relevant during the post-NAFC period in view of the sharp increase in global gold prices, partly fueled by the accommodative monetary policies in the advanced economies). Gold is also a potential instrument for asset diversification by economic agents – therefore, movements in domestic stock prices are also included in the model. The real estate market is also a potential contributor to gold demand, and perhaps even more important than

stock prices in the Indian context, but this variable is not included due to lack of time-series data.

The results indicate that higher gold prices – nominal as well as real - have a significant dampening impact on gold imports in the first few months, but have a lagged positive impact on demand for gold in the fourth/fifth month. The cumulative impact is negative, and statistically significant (Annex Table 7). Thus, both the channels discussed by Starr and Tran (op cit) are seen in the Indian case, but the first impact predominates the second impact and hence gold prices have an overall negative impact on demand.

Higher domestic CPI inflation is also found to have a significant impact on gold imports, but no impact is found for WPI inflation. Estimates show that one percent increase in CPI inflation leads to an increase of 9 percent in gold imports in the long-run. Higher domestic deposit rates, contrary to expectations, lead to more gold demand. This finding could perhaps be reflective of the fact that, over the last four years of the sample period, the real deposit rates were generally negative, notwithstanding some upward movement in nominal deposit rates. Thus, the increase in nominal deposit rates did not have the expected dampening impact on gold, as the real return on deposits was still negative; however, this hypothesis would need to be further examined. Stock market gains also lead to higher gold demand, with a lag, perhaps indicating a wealth diversification motive. Exchange rate depreciation reduces gold demand in all specifications and the effect is generally statistical significant; since the model also includes gold prices in rupee terms, which would capture the exchange rate impact indirectly, it is interesting that exchange rate depreciation has a direct additional negative impact on depreciation. The model captures the various turning points well, although it has difficulties explaining the increase in imports in 2010-11 (Chart 8) – perhaps, the volatility and the uncertain economic environment in the aftermath of the NAFC could have induced more demand for gold.

Chart 8: Gold Imports



Overall, the results suggest that higher domestic CPI inflation and the continued negative real deposit rates could have contributed to higher gold imports, adding to the external vulnerability while also reducing domestic financial savings of households. While WPI inflation has come off from its recent highs in the past few months, CPI inflation – which is found to be related to gold imports – remains at persistently high levels. Success with inflation management and appropriate real returns on bank deposits should provide a durable solution to the surge in gold imports. As Tarapore (2013b) notes, curbing gold imports requires very attractive instruments which would be better than the return on gold - a 3 per cent real rate plus the consumer price inflation of, say, 9 per cent would yield a nominal return of 12 per cent plus inflation adjustment for the capital and such an instrument would knock down the demand for gold. As the CAD and inflation come down, the cost of such an instrument would also come down.

V. MACROECONOMIC MANAGEMENT: SOME ISSUES

External Sector

The level of CAD during 2012-13 and the early part of 2013-14 was well-above the estimates of a sustainable level, which is in the range of 2.3-2.5 percent of GDP (Rangarajan and Mishra, 2013; RBI, 2012). Estimates of sustainable CAD ought to be seen as an upper limit and not as desirable levels of CAD. Sustainable CAD estimates largely rely on the stabilization of external liabilities/GDP ratio and are better viewed as long-run solvency consistent levels. Sustainable levels can also be a challenge from the financing viewpoint, given the volatility of capital flows. Even the 2.3 percent estimate of CAD requires net annual capital inflows of US \$ 50-70 billion at present GDP levels (Rangarajan and Mishra, op cit); the required magnitude of capital flows would be even higher than this estimate if the policy is to aim for some prudent build-up of foreign exchange reserves.

Given the large oil and gold imports and also the large fluctuations in international oil and gold prices, the sustainable deficit needs to be reassessed. Since large fluctuations in prices of oil and gold impact the CAD significantly, it may be prudent to plan for a lower level of deficit so that in the event of large shocks to oil and gold prices, the vulnerability of the country to the widening of CAD to large levels is contained. Against this backdrop, the proposal of Dr. Y.V. Reddy to aim for an average current account balance of zero merits further consideration. Given large domestic savings, foreign savings play only a marginal role in investment and growth. A zero average or low current account deficit does not mean - and is not - an argument for less current account openness. It is the openness of the economy to gross imports and exports of goods and services, and FDI inflows, rather than the volume of current account balance per se, that matters more for competition, productivity, investment and growth. For example, China has persistently recorded high growth in the recent years, despite persistent surpluses.

Given the widening of the CAD, the policy regime with regard to debt capital flows has been liberalized to meet the external payment needs in the recent years. Some of the steps include: an increase in interest rate ceilings on foreign currency non-resident deposits; removal of the interest rate ceiling on non-resident external rupee deposits and capping them at the same level as the domestic rupee deposits; and an increase in local-currency investment limits by non-

residents (Table 13). In the process, external sector sustainability indicators such as import cover and short-term debt to reserves recorded some deterioration (RBI, 2013b). However, these and other external sector indicators still remain at comfortable levels, although their adequacy was questioned by the markets during the June-August 2013 episode.

Table 13: Investment Limits for Foreign Institutional Investors in Debt Securities

End-March	Corporate debt			Corporate debt		
	Government securities	Government securities	Total	Government securities	Government securities	Total
	US \$ billion			Percent to GDP		
1999	1.0	0.0	1.0	0.2	0.0	0.2
2005	1.8	0.5	2.3	0.2	0.1	0.3
2006	1.8	0.5	2.3	0.2	0.1	0.3
2007	2.6	1.5	4.1	0.3	0.2	0.4
2008	3.2	1.5	4.7	0.3	0.1	0.4
2009	5.0	15.0	20.0	0.4	1.2	1.6
2010	5.0	15.0	20.0	0.4	1.1	1.5
2011	10.0	40.0	50.0	0.6	2.3	2.9
2012	15.0	45.0	60.0	0.8	2.4	3.2
2013	25.0	50.0	75.0	1.4	2.7	4.1
Jun-13	30.0	50.0	80.0			
Memo:						
Actual Investments						
2012	11.2	19.1	30.3	0.6	1.1	1.7
2013	15.2	19.7	35.0	0.8	1.1	1.9

Source: Reserve Bank of India and Securities Exchange Board of India.

The policy approach of opening the capital account to meet the persistently high CAD, however, potentially hinders adjustment – allowing more foreign capital might lead to real appreciation which would then itself lead to higher CAD and consequent enhanced external vulnerability (Panagariya, 2013). For the euro area, the empirical evidence is supportive of this channel: abundant capital flows, high credit growth and real appreciation largely determined current account balances in the euro area countries in the run up the 2008 crisis (Atoyan, Manning and Rahman, 2013). Offering more incentives to foreign capital in the current global uncertainty and the unprecedented external imbalance will make the country hostage to short term, volatile capital (Nagaraj, 2013; Subramanian, 2013). Thus, the issue is that of causality: whether higher CAD deficit necessitated more opening up of the capital account or it is the liberalized approach to capital flows which led to real appreciation and then higher CAD?

The empirical results presented in the paper indicate that exports and imports respond significantly to the domestic and foreign income variables as well as to the real exchange rate dynamics. In consonance with previous studies, the income elasticities are greater than the price elasticities and hence growth dynamics at home and abroad are a key driving force beyond the trade and current account balance. Thus, during 2009-12, when external demand plummeted more than domestic demand, some worsening of the trade and current account balance was on the expected lines. At the same time, real exchange rate dynamics also have a significant impact on the external balance, even though price elasticities are lower than income elasticities. In this context, we may note that sustained higher domestic inflation over the past 4-5 years had a

negative impact on external competitiveness through a higher REER. Thus, low and stable inflation would aid the maintenance of external competitiveness and reduce pressures for nominal depreciation, which then has adverse implications for domestic inflation, the government's fiscal position and for corporate balance sheets.

Given the twin and elevated deficits, concerns were expressed during the first half of 2013 that India may face a 1990-like balance of payments crisis (Acharya, 2013; Mody and Walton, 2013; Tarapore, 2013b). These concerns were evident during the June-August 2013 turmoil in the financial markets, notwithstanding a number of alleviating factors. The NAFC has clearly shown that all countries, even advanced countries with sophisticated financial markets, are susceptible to financial crisis. Therefore, prudent macroeconomic and financial policies play an important role in ensuring that a country does not face a crisis. In the Indian context, the range of macroeconomic and financial policies followed since the early 1990s had strengthened India's macroeconomic fundamentals before the NAFC and this helped India, as well as many other EMEs which had followed prudent policies, to see through the worst global financial crisis. These policies focused on pursuing a cautious approach to financial and capital sector liberalization, management of the capital account, a flexible but managed exchange rate, improvement in monetary-fiscal interface facilitated by fiscal consolidation, reduction in inflation and inflation expectations, and continued structural reforms. These policies contributed to sustained high growth in an environment of macroeconomic and financial stability. It would be prudent to continue such policies, going forward.

Rapid financial sector and capital account liberalization often ends up in crisis. Opening the financial account appears to raise the frequency and severity of economic crises; financial openness is not a panacea and it could instead be poison. Benefits of financial openness are most likely to be realized when implemented in a phased manner, when external balances and reserve positions are strong, and when complementing a range of domestic policies and reforms to enhance stability and growth (Obstfeld, 2009). Debt capital flows increase vulnerability to future crises, and this was clearly seen in the NAFC. EDE regions such as Central and Eastern Europe which saw a large increase in debt flows and also had large current account deficits did face crises in the aftermath of the NAFC. Given the structural growth, inflation and interest differentials in favor of EDEs, a fully open capital account would inevitably lead to large flows in search of arbitrage – creating booms when they come in and a bust once they leave. Thus, management of debt flows assumes importance. Indeed, one factor that reduces India's external vulnerability, despite large twin deficits, is the fact the public debt is largely internally held. This issue was also relevant in the recent euro area sovereign debt crisis, as in other previous crises (Gros, 2013).

It would be prudent to continue with this approach and further opening up of government securities market to non-resident investment needs to be carefully watched. Debt investments by non-residents in domestic securities are more volatile than in equity and can add to foreign exchange market pressures. More often, these flows react to monetary policy developments in advanced economies. For example, during June-September 2013, in response to Chairman Bernanke's comments on the likely time path for the roll-back of quantitative easing policies, foreign institutional investors sold both equities and debt securities in the Indian

market, but the sell-off in debt securities (around US \$ 10 billion) was five-times that of equity investments (US \$ 2 billion)⁶. Open debt markets can lead to large destabilizing capital inflows and outflows in response to external developments and complicate domestic macroeconomic management, particularly in the presence of perceived arbitrage opportunity resulting from high interest rate differentials.

There is a view that the traditional fears about foreign-currency borrowing by residents are not applicable to investments by non-residents in local-currency denominated bonds and hence the limits on the latter category of investments should be removed (Patnaik et al, 2013). Such a notion was clearly disproved during the June-August 2013 turmoil. High external borrowings denominated in foreign currencies add to the individual borrowing entity's vulnerability in the event of sharp currency movements, especially if such borrowings are not fully hedged. In the case of non-residents' investments in domestic rupee securities, although the domestic entities who have issued such paper do not bear the exchange rate risk, a sudden large sell-off by non-residents (for example, as witnessed during June-August 2013) puts sharp downward pressure on the currency, which then has adverse implications for the various sectors of the economy, including the corporate and the fisc, as well adding to inflationary pressures. Thus, large borrowings from foreign sources, whether these are denominated in foreign-currency or local-currency, add to the vulnerability of the domestic economy. The massive sell-off by non-residents in the local-currency bonds has an immediate impact on the currency and the broader economy.

Price and Financial Stability: Institutional Issues

Inflation in India had seen a perceptible decline in the post-reform period. Alternative indicators of inflation had averaged 5-6 percent per annum between the mid-1990s and the late 2000s, after averaging higher at 8-9 percent in the previous three decades. Inflation has now increased once again in the post-NAFC period, despite continued low global inflation. CPI inflation remains well above comfort levels. Moreover, there is a gap between the headline WPI inflation and the core WPI inflation on the one hand and between headline CPI and headline WPI inflation on the other. This poses challenges for monetary policy in its conduct, formulation and communication, given that inflation expectations are likely to be influenced more by headline inflation, particularly headline CPI inflation. This has also implications for real interest rates facing the different economic agents – households, corporate and government. Given the continued large weight of food in the various price indices, including the new consumer price indices, and the high volatility in food prices, it is apparent that an inflation targeting framework – with a focus on one inflation indicator as a target for monetary policy - is beset with a number of conceptual and practical challenges in the Indian context (Mohan, 2011). In the new CPI, food items have a weight of 59 percent, 37 percent and 50 percent in the rural, urban and all-India indices, respectively. The fuel group has a weight of 8-10 percent, taking the combined weight of food and fuel to 46-70 percent in the three indices. Given these large weights, the use of core measures of inflation in the conduct and formulation of monetary policy

⁶ The stock of foreign portfolio equity at end-June 2013 was US \$ 139 billion, while that of foreign portfolio debt was US \$ 32 billion.

would lack credibility and thereby limit the use of an inflation targeting framework focused on a single inflation number. As a former chairman of the US Federal Reserve has recently noted, it is “neither necessary nor desirable to try to pin down the price stability objective by setting out a single highly specific target or target zone for a particular measure of prices” (Volcker, 2013). While a conventional inflation targeting framework is problematic, price stability, with the objective of low and stable inflation, ought still to remain the key objective of monetary policy. However, against the backdrop of persistently high inflation and inflation expectations, the *Expert Committee to Revise and Strengthen the Monetary Policy Framework* has, inter alia, now recommended that headline CPI inflation should be the nominal anchor for the monetary policy framework and the predominant objective of monetary policy in India, and which should be communicated without ambiguity to the public (RBI, 2014). The Patel Committee recommendations do not intend to turn the RBI into inflation “nutters” focused on bringing down inflation to the exclusion of all else, including financial stability (Rajan, 2014).

Sustained price stability and financial stability are both essential for high growth. The NAFC has clearly shown that price stability per se does not guarantee financial stability. There is, therefore, now greater recognition that financial stability could be endangered if central banks were to be mandated with only price stability/inflation targeting objectives (Eichengreen and others, 2011). The UK, which had taken the lead in separating financial regulation and supervision from the central bank in the 1990s, has again taken lead in reversing its earlier decision by returning responsibility for financial regulation and supervision back to the Bank of England. In a number of other countries too, the regulatory architecture is being revisited and central banks are being given responsibility for financial sector regulation and financial stability. A central bank’s concern for stability must range beyond prices for goods and services to the stability and strength of financial markets and institutions generally (Volcker, 2013).

A cross-country survey of regulatory and supervisory institutional arrangements with regard to the banking system and covering 136 countries shows the predominance of central bank led arrangements (Barth, Caprio and Levine, 2013). In 89 countries, the central bank is the only such authority. In contrast, in 38 countries the central bank is not a supervisory authority at all. In the remaining 9 countries, the central bank is one among multiple supervisors, with the United States being one of these countries. With regard to the broader financial system, the survey also provides information on whether a country has a single financial supervisory authority or multiple authorities. The results indicate that in 101 countries there are multiple authorities covering the financial sector, while in 25 countries there is a single authority covering the entire financial sector. “Most of the countries with a single authority are relatively small in terms of both population and GDP” (Barth, Caprio and Levine, 2013, p.11).

Issues relating to financial stability and the institutional arrangements thereof have attracted interest in the post-NAFC period. Advanced economies, particularly in Europe, are integrating prudential functions into the central bank (for example, Belgium, France, the United Kingdom, and the United States). Ireland has opted for a stronger form of integration where all supervision of markets and institutions is conducted by the central bank (Nier et al, 2011). “It may often be desirable to identify a lead authority or policymaking committee and to vest it with the mandate and powers to conduct macroprudential policy. The central bank should play an important role, so as to harness its expertise in risk assessment and its incentives to mitigate systemic risk, as well as to ensure coordination with monetary policy. While participation of the

treasury in the policy process is useful, a strong role can pose risks to the established autonomy of separate policy fields, such as monetary and microprudential policy, and lead to delay when policies are needed to constrain financial markets in good times. Separate arrangements for crisis prevention and crisis management will be useful in many cases” (Nier et al., 2011, page 3). In practice, these basic principles have led to the increasing prevalence of three models for macroprudential policymaking (IMF, 2013b, page 30):

- Model 1: The macroprudential mandate is assigned to the central bank, with macroprudential decisions ultimately made by its Board (as in Malaysia, and the Czech Republic). This set up is a natural choice in highly integrated arrangements where the central bank already concentrates the relevant regulatory and supervisory powers.
- Model 2: The macroprudential mandate is assigned to a dedicated committee within the central bank structure (as in the U.K.). This arrangement can help counter the risk of dual mandates for the central bank, by creating separate dedicated decision-making structures for monetary and macroprudential policy even as both functions are under the roof of the central bank. It also allows for participation of separate supervisory agencies and external experts on the decision-making committee.
- Model 3: The macroprudential mandate is assigned to a committee outside the central bank, with the central bank participating on the macroprudential committee (as in Australia, France and the U.S.). This model can more easily accommodate a desire for a strong role of the Ministry of Finance (MoF). However, since a dominant role of the MoF risks delaying macroprudential action and can compromise the independence of participating agencies, including the central bank and separate supervisory agencies, some of these risks can be countered by assigning the central bank the chairmanship (as in Australia), a strong voice (as in Mexico) or a veto over policy decisions (as in Germany). They can also be countered by establishing only soft powers for the decision-making committee (IMF, 2013b).

Against this backdrop, the proposals of the Financial Sector Legislative Reforms Commission (FSLRC) (Government of India, 2013b) to restrict the Reserve Bank’s role mainly to monetary policy and price stability need to be debated seriously (Tarapore, 2013a). The FSLRC recommendation that the executive responsibility for safeguarding systemic risk should vest with the FSDC Board runs counter to the post-crisis trend around the world of giving the collegial bodies responsibility only for coordination and for making recommendations; should the responsibility of the FSDC Board be extended from being a coordinating body to one having authority for executive decisions (Subbarao, 2013)? The proposed arrangement might compromise the synergy between monetary policy and policies for financial stability.

Globally, the mandates of the central banks have shifted over time in response to the evolving macroeconomic and financial conditions, but the outcomes have not been entirely satisfactory. For example, the US Federal Reserve was set up in 1913 with the objective of ensuring financial stability. Over time, the Fed succeeded in maintaining financial stability after the Great Depression, which policymakers and financial markets took for granted during the postwar era (Reinhart and Rogoff, 2013). The consequence was that the objective of financial stability became de-emphasized increasingly, culminating in the 2008 financial crisis. Similar

developments have taken place in other countries and the same logic seems to underlie the FSLRC's recommendations. Arguably, the success of the policymakers in India with maintaining financial stability over the past two decades, even as a number of emerging economies faced financial crises during the 1990s and the advanced economies in the 2008-2009 episode, has led to a situation where financial stability is being taken for granted, a la the experience of the US and other countries. This might be a factor behind recommendations to entrust the RBI with the narrow objectives of monetary policy/inflation targeting. Such an approach, as the international experience shows, runs the risk of financial instability down the road. Thus, the central bank needs to continue to be entrusted with multiple objectives. Multiple objectives need multiple instruments. As Reinhart and Rogoff (op cit) note,

“Policies, such as changes in reserve and margin requirements and a variety of credit measures that have been discarded as antiquated, should be a part of the toolkit of the central bank in the United States and other advanced economies. These instruments have continued to play a central role in defining monetary policy in many emerging markets to the present day. [O]ver the past three decades both the academic literature and the policy practice have increasingly drifted to a world view where the short-term policy rate is a sufficient policy instrument. The theoretical underpinnings supporting that view usually assume complete markets, an assumption that is particularly at odds with a post-crisis environment riddled with a broad assortment of frictions arising from both market failures and a steady stream of complex regulatory changes set in motion by the crisis” (pp.49 and 53).

Fiscal Policy

Fiscal consolidation is necessary for sustained growth in an environment of macroeconomic and financial stability. As the NAFC has shown, high fiscal deficits and debt limit policy flexibility significantly, and contribute to the worsening of the overall economic situation. Weak public finances derail inflationary expectations, provide upward bias to the interest rate, impede investment activity and threaten sovereign credit rating (Kelkar Committee, Government of India, 2012). The recent fiscal consolidation initiatives in India, including measures to rein in subsidies, are encouraging. In this context, it is relevant to note that fuel subsidies in India are found to be badly targeted, with the richest ten percent of households receiving seven times more in benefits than the poorest ten percent (Anand et al, 2013). Thus, there is scope for better targeting of fuel subsidies, while protecting lower income households. Fiscal consolidation would allow government resources to enhance public investment and also to provide a durable way out of the ongoing slowdown. Historically, effective revival of the economy has been through a step up in public sector investment which, then also triggered private sector investment and a revival of industrial growth (Tarapore, 2013b).

While fiscal consolidation is clearly positive from a medium-term perspective, it could have some negative short-term impact on growth. However, this negative short-term impact on growth can be minimized, or even avoided, by calibrating the adjustment in expenditures. For example, according to estimates by Jain and Kumar (2013), the impact fiscal multiplier for non-defense capital outlays (2.1) is substantially higher than that of revenue expenditure (0.2) for the Central government. Thus, fiscal consolidation that directs expenditures away from revenue

expenditure (subsidies) towards capital outlays could have a less negative, or even positive, impact on growth. Moreover, such a fiscal consolidation approach with relatively greater additions to the economy's productive capacity would provide monetary policy greater maneuverability and that could also be short-term growth positive.

A key lesson of the NAFC is that policymakers should have significant policy buffers, which can then be used in times of crises to stabilize the economy. In the Indian context, for example, the buffers were limited at the onset of the crisis and, in the face of the stimulus measures and the slowing economy, the combined deficit levels quickly reached high levels, exacerbated by high public debt levels, leaving India as an outlier among major emerging markets. Against this backdrop, a more ambitious medium-term fiscal consolidation plan beyond 2017-18 is critical. The earlier FRBM plan had targeted a 3 percent of GFD/GDP ratio for the central government and the revised path also targets 3 percent deficit by 2017-18. Accordingly, it would be judicious to aim for balanced budget targets, say by the end of the decade. Stronger fiscal consolidation on these lines, along with quality of its adjustment, would provide a conducive environment for higher domestic savings, lower domestic interest rates and, more flexibility to monetary policy in its operations.

VI. CONCLUSION

The current growth slowdown has occurred after almost a decade of consistent high growth, including a sharp recovery from the 2008-09 crises. High growth during the pre-NAFC period, especially 2003-08, was underpinned by continuing fiscal correction, which then had a number of positive spillovers: increase in public savings, low inflation and anchored inflation expectations, low nominal and real interest rates, and sharp increase in corporate profitability and investments. The largely market-determined exchange rate system, in the context of a prudent approach to management and liberalization of the capital account and sterilized interventions, and in an environment of progressive deregulation and liberalization of the real economy led to sustained increase in the exports of goods and services, which then kept the CAD at moderate levels.

The sustained growth process of the pre-NAFC period has suffered a setback in the past couple of years. This reflects a number of factors. First, while the macroeconomic policy response to the NAFC – both monetary and fiscal policy – was admirably rapid, there was, at least with hindsight, overshooting of the stimulus. The overshooting was reflected in very high growth – averaging around 9 percent - during 2009-10 and 2010-11 and sowed the seeds for inflation and current account pressures. Moreover, the quality of the fiscal stimulus, with its focus on tax cuts and increased revenue expenditure (particularly in subsidies) while keeping capital outlays stagnant, added to demand pressures, which were then mirrored in high inflation. While the fiscal and monetary stimuli were large and rapid, their withdrawal was gradual and it remains incomplete in the case of fiscal measures. The incomplete and delayed pass-through of higher international oil prices to domestic prices added to fiscal pressures, while also impeding domestic expenditure adjustment in both oil and non-oil consumption that would have emanated from higher domestic oil prices. The adjustment in domestic oil consumption, had domestic prices been appropriately adjusted, would have also contributed to lower oil imports and lower CAD. The large monetary stimulus facilitated financing of the near trebling of the government borrowing needs at lower yields. The delayed and the incomplete withdrawal of the fiscal

stimulus has also led to crowding out of the private sector, which in conjunction with other policy bottlenecks, has contributed to the massive decline in private corporate investment.

High inflation and negative real deposit rates have led to a switch away from financial savings towards savings in the form of gold, leading to higher gold imports, which have added to current account deficit pressures. The current account was also hit by domestic policy bottlenecks, which, inter alia, have led to more coal imports and lower iron ore exports. The current account deficit was in any case expected to widen, given the two-speed global recovery and some real appreciation since the NAFC, but domestic policies resulting in higher oil, gold and coal imports magnified the impact on the CAD. Unlike many other major EMEs, especially Asian EMEs, India had a deficit on its current account before the NAFC and the combination of domestic and global factors quickly took it up to 4.7 percent by 2012-13. The rapid policy response subsequent to the market turbulence of mid-2013 has reduced the CAD to 2.3 percent of GDP for 2013-14 (April-December).

Overall, the above analysis suggests need for appropriate policies in regard to domestic oil prices which will help to contain fiscal subsidies as well as oil imports. In this context, the steps taken by the government in the past few months are welcome and would need to be persevered with. Restoration of tax/GDP ratios, along with the proposed efforts towards the institution of the country-wide goods and services tax and the introduction of direct tax code bill and the recent measures to contain subsidies, should help to contain fiscal deficit in the next couple of years. Taking into account the fiscal correction that is being programmed as also the fiscal consolidation record of 2002-07, public sector savings should recover, and that would result in a recovery in the gross domestic savings rate by around 2-3 percent of GDP. A similar event occurred about 10 years ago when public sector savings had become negative (Mohan, 2011b). The envisaged fiscal correction will make more resources available to the private sector and contribute to the recovery of private sector investment and private sector savings.

Fiscal consolidation would also provide the basis for a durable reduction in inflation and low and positive real interest rates for both depositors and borrowers and, in turn, a moderating impact on gold imports and CAD. The analysis presented in this paper suggests that the ongoing slowdown has a large cyclical component, reflecting both domestic and global factors (see also, IMF 2013c). Growth has indeed slowed down since 2011-12, but this is not on account of any reversal in the reforms process, although the pace of new reforms may have been somewhat slower. India's "poor infrastructure, excessive regulation, small manufacturing sector, and a workforce that lacks adequate education and skills" cannot explain the current slowdown, as these deficiencies had existed when India was growing rapidly, although they must be addressed if India is to grow strongly and stably (Rajan, 2013). The structural drivers of growth – the favorable demographics and the high savings and investment rates – are broadly intact. Based on these assumptions, even a conservative estimate would result in a sustained gross domestic saving rate of about 35 percent, which should facilitate growth of 8-8.5 percent, given moderate incremental capital output ratios. This would be contingent on the removal of the recent impediments to domestic investment activity and recovery in the global economy. Finally, given the growth and inflation expectations, interest rates in India can be expected to remain above those in advanced economies, even when we move away from the present aberrations of near zero interest rates in the major advanced economies; therefore, a

prudent approach with regard to opening up of debt flows to foreign investors needs to be pursued.

What then are the key policy priorities that can help to restore Indian growth to sustained rates in excess of 8 per cent, which would be consistent with investment levels in the 35–40 per cent range? For sustained growth, it is first essential to restore macroeconomic stability: of the highest importance is a reduction in medium term inflation to levels achieved in the decade prior to North Atlantic financial crisis (NAFC). This needs coordinated supply side and demand management measures: fiscal consolidation and appropriate monetary policy coupled with active measures to loosen supply constraints. Factor market reforms related to both labor and land are essential to make the economy more flexible in the face of burgeoning demand resulting from growing incomes. Among Asian EMEs, India is notable in the low share of its manufacturing sector in terms of both value added and employment. This has also impeded the pace of rural-urban transformation. A realistic exchange rate policy combined with policies promoting labor flexibility and skill development need to be taken up consciously to promote growth in the manufacturing sector. The animal spirits released in Indian industry by the 1991 reforms seem to be dying out. They need to be revived in a focused manner. The revival of manufacturing competitiveness is essential to achieve 10 per cent plus growth in this sector, without which it will not be feasible to achieve sustained growth rates in GDP of 8 per cent plus.

It is well recognized by all that infrastructure investment is critical to loosening supply side constraints and promoting manufacturing. Fiscal consolidation is also important here. Despite increasing private investment in infrastructure, it is necessary to enhance public investment in infrastructure on a sustained basis. For this to take place, the culture of economic user charges must be reinforced so that infrastructure investment is remunerative; second, with increasing incomes, expenditures on non-merit subsidies must be curtailed and directed toward infrastructure investments. The trend in recent fiscal consolidation efforts has been focused excessively on reduction in expenditure, more in capital expenditure, and less in revenue expenditure, such as subsidies. This needs to be reversed. Moreover, the Indian tax/GDP ratio has been relatively stagnant for a decade, despite high GDP growth and rising incomes. Revenue receipts/GDP ratio of the Central government is now below the levels prevailing in the late 1980s. Public investment in both physical and social infrastructure will be difficult to achieve without revenue enhancement consistent with income growth.

It is apparent that reforms in key areas such as agriculture, and physical and social infrastructure, including urban infrastructure are needed on a continuing basis. The main organizing principle of most reforms carried out so far has been that of freeing the private sector from the myriad government controls that had existed for a long time. Whereas this process itself still has some distance to go, an issue is: whether we have reached the limit of private sector-led acceleration in investment and output growth and will this now be increasingly constrained by the lack of public investment, both physical and social (Mohan, 2011d)?

An underlying theme encompassing most constraints now is the lack of adequate delivery of public services in both quality and quantity. While the first generation of reforms empowered the private sector to perform to the best of its abilities, the second generation of

economic reforms must focus on a similar empowerment of the public sector to deliver public goods and services for the benefit of all segments of the private sector, corporate entities and the public alike. This proposition is not an argument for greater empowerment of the public sector to increase its control over the economy, as was the case in the past. The ‘public sector’ needs to be seen in its widest definition, to encompass all levels of government from the local level, to state and national levels, and their entities, which deliver public goods and services. Illustratively, four areas where we need to give focused attention and which can mainly be done by the public sector, even if some of it is to be delivered through public–private partnerships, are agricultural development, urban development, human resource development, and management of public services. What is common among these sectors is the lack of competence in public systems that govern these areas (Mohan, 2011d). These issues assume added importance in view of governance issues that have come to the forefront in the recent period, and which call for significant improvement in the delivery of public services.

Annex 1: Oil Consumption and Prices

In the context of the large increase in oil subsidies, an attempt is made to examine the determinants of demand for the key administered items (diesel, kerosene, and LPG) and also for petrol which has been controlled at times. Demand for the various oil products is postulated to depend upon income (real GDP) and the prices of the particular products relative to overall price movements (Asali, 2011). Demand for total petroleum products is also modeled, and movements in the minerals oil index of the wholesale price index are used as the relevant price variable. Thus, we estimate the following specification:

$$\text{Log}(C_t) = a_1 + a_2.\text{log}(Y_t) + a_3.\text{log}(P_t/\text{WPI}_t) + e_t$$

Where, C is consumption of the specific petroleum item or total petroleum products, Y is real GDP, P is the price of the specific petroleum item (measured by the respective indices in the wholesale price index (WPI) basket) and WPI captures the general price level in the country. The empirical exercise covers the period April 2001 to March 2013. Since the various variables are non-stationary, we employ cointegration framework, and use the autoregressive distributed lag (ARDL) approach to cointegration⁷. Given the short sample period, the robustness of the results is tested and supported by the Johansen-Juselius approach.

The results indicate that the income elasticity of demand is more than unity (around 1.2) for petrol and almost unity for diesel (Annex Table 1). Income elasticity for LPG demand is below unity, perhaps indicative of supply constraints in meeting the demand. Income elasticity of demand for kerosene oil is negative, given its diminishing role; the share of kerosene in total petroleum products' consumption has halved from around 10 percent to 5 percent over the study period (2002-12). The elasticity of demand for overall petroleum products is estimated to be 0.5.

Turning to the price responsiveness, the price elasticities are found to be statistically significant for petrol, diesel and kerosene. The price elasticity is the highest for petrol (-0.66) followed by kerosene (-0.54) and diesel (-0.36). Thus, an increase of 10 percent in domestic prices is associated with a reduction of 3.6-6.6 percent for these three products. The price elasticities for LPG and overall petroleum consumption are negative, but not significant. The insignificant price elasticity of total petroleum consumption, even as the major components have significant and relatively high price elasticities, suggests merits of pursuing a disaggregated approach in order to assess the determinants of demand for oil.

⁷ F-tests (not reported) confirm the presence of a cointegrating relationship among the variables.

Annex Table 1: Estimates of Oil Consumption in India

1	Dependent Variable				
	LHSDSA	LPETROLSA	LSKOSA	LLPGSA	LPOLTOTSA
	2	3	4	5	6
LG DPRSA	0.96 (37.37)	1.18 (19.33)	-0.49 (9.18)	0.66 (8.61)	0.50 (32.70)
LP_HSDSA	-0.36 (5.62)				
LP_PETROLSA		-0.66 (3.70)			
LP_SKOSA			-0.54 (4.78)		
LP_LPGSA				-0.35 (1.20)	
LMINOILSA					-0.06 (1.48)
R-bar ²	0.996	0.997	0.940	0.986	0.984
Serial correlation	0.25	0.14	0.06	0.30	0.19
Normality	0.52	0.00	0.12	0.04	0.57
<i>Short-run model</i>					
ECM(-1)	-0.42 (6.10)	-0.18 (3.23)	-0.38 (3.73)	-0.29 (2.69)	-- --
R-bar ²	0.48	0.53	0.27	0.21	--
ARDL model	1,0,0	2,0,1	1,0,3	1,0,0	0,3,3

Note:

Estimates are based on autoregressive distributed lag (ARDL) methodology, with model selection based on Schwarz Bayesian Information Criteria.

Estimates are based on quarterly data for the sample period 2001:2 to 2013:1.

Variables are defined as follows:

LHSDA, LPETROLSA, LSKOSA, LLPGSA and LPOLTOTSA are domestic consumption of diesel, petrol, kerosene, LPG and all POL products, respectively.

LP_HSDA, LP_PETROLSA, LP_SKOSA, LP_LPGSA and LP_MINOILSA are WPI indices of diesel, petrol, kerosene, LPG and the sub-group 'mineral oils', respectively. All these indices are taken relative to overall WPI index.

LG DPRSA = Real gross domestic product.

All data are in log terms and seasonally adjusted.

Data for consumption of petroleum products are from Petroleum Planning and Analysis Cell.

Figures in parentheses are t-statistics.

Source : Authors' estimates.

Annex 2: Growth Slowdown

Accommodative monetary and fiscal policies promoted growth during 2009-11 and the phased reversal of these policies, partial so far in case of fiscal policy, contributed to the growth slowdown during 2011-12 and 2012-13. Anemic global growth over both these two periods has also been a factor. To assess the impact of monetary policy and global conditions on domestic growth – the two factors which are seen as the major contributors to the growth slowdown - we model growth on the lines of the IS curve framework in Kapur and Behera (2012). Given the monsoon induced volatility in agricultural output and the impact of government expenditures on ‘community, social and personal services’, the empirical exercise focuses on GDP excluding these two components. Growth is postulated to depend on real domestic interest rates, external demand, real exchange rate, and real bank credit. Real interest rate is defined as effective nominal policy rate less 4-quarter average of non-food manufactured products inflation. External demand is captured through real world exports or global GDP. For real exchange rate, RBI’s 36-currency export-weighted real effective exchange rate index is used. The equation is estimated for the period 1996-97 to 2007-08 using quarterly data and then used to make out of sample forecasts for the subsequent period. All the variables, except the real interest rate, are in growth terms (quarter-on-quarter, based on seasonally adjusted data) and are found to be stationary.

The results show that an increase of 100 bps in the real interest rate leads to a reduction of 26-33 bps in GDP growth with a lag of two quarters (Annex Table 2, columns 2 to 5). Global demand impacts domestic economy in the same quarter and the estimated coefficients suggest that one percentage point reduction in global exports reduces domestic growth by almost 13 bps, while the impact of one percentage point reduction in global GDP growth is almost 40-56 bps. The coefficient on world exports is lower than that on world GDP, given the differences in the magnitudes of the two variables: annual growth in real world exports averaged 7.7 percent vis-à-vis that of 3.8 percent in global GDP over the sample period (1997:3-2008:1). Real exchange rate movements have the expected impact: appreciation reduces domestic output, while depreciation boosts output. The estimated equations satisfy the regression diagnostics.

Annex Table 2: Determinants of Real GDP Growth

Explanatory Variable	Dependent Variable: GDPRGQ				
	Sample Period: 1996:2 2008:1				
1	2	3	4	5	
Constant	6.38 (5.91)	6.45 (6.10)	5.62 (4.78)	5.15 (4.10)	
RIRQ(-2)	-0.32 (3.26)	-0.33 (3.23)	-0.26 (2.76)	-0.27 (2.82)	
WEXPRGQ	0.13 (2.40)	0.13 (2.43)			
GDPWORLDQ			0.40 (1.99)	0.56 (2.42)	
REERXQ				-0.09 (1.74)	
REERXQ(-3)		-0.08 (1.95)			
NFCRQ(-2)	0.14 (3.21)	0.14 (3.15)	0.14 (3.26)	0.14 (3.10)	
R-bar ²	0.30	0.32	0.29	0.31	
DW	1.97	1.76	2.15	2.12	
White test	0.43	0.62	0.69	0.90	
JB test	0.91	0.89	0.91	0.69	
LB-Q test	0.34	0.20	0.47	0.33	

Note:

Dependent variable = GDPRGQ = growth (q-o-q) in real GDP excluding agriculture and community services

RIRQ = real interest rate = nominal policy rate less 4-quarter average of q-o-q non-food manufactured products (NFMP) inflation

WEXPRQ = growth (q-o-q) in world real exports

GDPWORLDQ = growth (q-o-q) in world real GDP

REERXQ = variation (q-o-q) in RBI's 36-currency real effective exchange rate

NFCRQ = Growth (q-o-q) in real non-food credit.

q-o-q growth rates are first-differences (annualised) of (log) seasonally adjusted data.

White test = significance level (p-value) for White test for the null of homoskedasticity of residuals.

JB test = significance level (p-value) for Jarque-Bera test for the null of normality of residuals;

LB-Q test = significance level (p-value) of Box-Pierce-Ljung Q-statistic for the null of no residual autocorrelation for 4 lags.

Source: Authors' estimates.

Annex 3: Determinants of Exports and Imports

Following Hooper, Johnson and Marquez (2000) and Chinn (2013), export demand is postulated to depend on external demand and real exchange rate and import demand on domestic activity and real exchange rate. Since the variables of interest are non-stationary, we use cointegration and vector error correction mechanism (VECM) framework (Johansen-Juselius methodology) to assess the long-run and the short-run dynamics, as follows.

$$\Delta \text{LEXPX}_t = a_1 + a_2 \cdot \text{ECM}(t-1) + \sum a_{3i} \cdot \Delta \text{LEXPX}(t-i) + \sum a_{4i} \cdot \Delta \text{LREER}(t-i) + a_5 \cdot \Delta \text{LWEXPR}(t-i) + u_t$$

$$\Delta \text{LIMPQ}_t = b_1 + b_2 \cdot \text{ECM}(t-1) + \sum b_{3i} \cdot \Delta \text{LIMPQ}(t-i) + \sum b_{4i} \cdot \Delta \text{LREER}(t-i) + b_5 \cdot \Delta \text{LY}(t-i) + v_t$$

Δ is the first-difference, L is logarithm, EXPQ and IMPQ are real volume of exports and imports (measured by DGCIS' quantum index for exports and imports, respectively), WEXPR is world real exports (world exports in US\$ terms divided by their unit value index) as an indicator for external demand, Y is an indicator of domestic activity (real GDP or real industrial GDP or real domestic demand), and REER is the real effective exchange rate. The ECM terms capture the deviations of exports and imports from their long-run equilibrium [(LEXPQ – c1 – c2.LREER – c3.LWEXPR) and (LIMPQ – d1 – d2.LREER – d3.LY), respectively]. The coefficients on the ECM terms measure the speed with which the deviation from the long-run equilibrium is corrected each period and are expected to be negative. World real exports are treated as weakly exogenous in the cointegrating VAR for exports, and domestic activity is found to be weakly exogenous in the imports VAR.

The baseline period for the study is 1980-81 to 2007-08 using annual data. In view of the NAFC and the severe disruptions in the global economy, we focus on the pre-NAFC period; as a robustness check, we also report results for the period up to 2011-12. The starting period of the study, 1980-81, coincides with the first phase of reforms that started in the early 1980s and hence the period is relatively homogeneous. The structural reforms introduced in the early 1990s and continued in the subsequent years with the objective of deregulation and liberalization provided a greater role for market forces and market prices. Thus, the role of price signals can be, a priori, expected to be more in the post-1990s period vis-à-vis the 1980s; for China, for example, Aziz and Li (2008) find evidence of increased responsiveness of exporters to market signals over time. Moreover, given the large intra-year volatility and two-way movements in exchange rates, econometric analysis based on annual data might not appropriately capture the impact of exchange rate changes on trade volumes. If so, the price elasticities using the annual data for 1980-2008 could be an under-estimate of the actual elasticities. Therefore, as a robustness measure, we also present results for the post-reforms period using quarterly data on trade volumes for overall exports as well as major categories of manufactured products (for 1996-97 to 2007-08). The focus on the post-reforms period reduces the sample size substantially, and potentially limits the inferences drawn from cointegration analysis.

As regards the REER, as the earlier discussion showed, there is a substantial divergence in the available REER indicators. Bayoumi, Harmsen and Turunen (2011) and Chinn (2006) report a similar divergence of alternative REER measures – unit-labor cost (ULC)-based REER, CPI-based REER and WPI-based REER - in the context of the US, the euro area and other countries. For example, for Ireland, the CPI-based REER indicated an appreciation of 20

percent between 1995 and 2009, while the ULC- and WPI-based REER showed depreciation of 20-30 percent. And, based on their econometric analysis, Bayoumi, Harmsen and Turunen (2011) suggest that WPI- and ULC-based REERs are better indicators of price competitiveness than CPI-based measures. Accordingly, we present results for the three available REERs.

The share of oil exports in total exports has fluctuated substantially over the sample period, reflecting the movements in international crude oil prices as well as the quantum on the back higher domestic crude production (mid-1980s) and the increase in domestic refining capacity (beginning early 2000s). Since these fluctuations in oil exports are unrelated to price and income variables, we also report results for an augmented specification with real oil exports (oil exports in US dollar terms divided by average crude oil prices) and also dummies for the outliers.

Exports: Annual Estimates

Beginning with exports, and using annual data for 1980-81 to 2007-08, the null hypothesis of at least one cointegrating vector cannot be rejected for both the basic and the augmented specifications for the REER-RBI measure and for the augmented specification for the REER-OECD and REER-IMF measures. Both external demand (world real exports) and the REER have the expected impact and these are statistically significant⁸. An increase of 1 percent in world real exports⁹ is associated with an increase of 1.1-1.4 percent in India's exports in the long-run (Annex Table 3). The long-run coefficient on the REER is 0.21 to 0.65 across alternative specifications, and the coefficients are lower for the specifications using the OECD and the IMF measures of REER. In the short-run model, the coefficients on the ECM term for both the exports and REER equations are correctly signed and significant. Thus, deviations of exports from the long-run equilibrium get adjusted through adjustments in both exports and the REER. The short-run coefficients indicate significant contemporaneous impact of external demand on exports, although partly offset in the next year. The regression diagnostics for the short-run model are satisfactory. The results broadly carry through when the sample period is extended to 2011-12 and are more supportive.

Exports: Quarterly Estimates

Moving to the post-reforms sample (1996-97 to 2007-08) and using quarterly data¹⁰, we observe some differences. First, the elasticity with respect to external demand (proxied by world exports) is in a range of 1.6-1.9 across alternative estimates, somewhat higher than the annual estimates (Annex Table 4). The elasticity with respect to world GDP, as an indicator of external demand, is as expected higher at 2.6-3.6. Second, the coefficient on the REER is sensitive to the

⁸ All estimations have been done using the software WinRATS Pro 8.2 and CATS 2.0.

⁹ When real world GDP is used as indicator of external demand in lieu of real world exports, the null of no cointegration cannot be rejected for the 1980-2008 sample period. The null hypothesis is however rejected for the extended sample (1980-2012) as well as for the quarterly sample (1996:2-2008:1) reported below.

¹⁰ These results are based on DGCI&S' quantum index of exports available for quarter-end months.

choice of the REER and the inclusion of the oil exports. With REER-RBI, the (absolute) coefficient is more than unity and significant when oil exports are included; with REER-OECD and IMF, the (absolute) coefficient is more than 1.6 and is statistically significant only when oil exports are excluded. Third, the results for overall exports are broadly true for exports of major categories of manufactured products (chemicals, manufactures, and machinery). The income elasticities range from 1.5 to 2.8 (with respect to world exports) and 2.9-5.1 (with respect to world GDP) for these three categories of exports. For the sub-group ‘manufactured goods classified chiefly material’ (comprising exports of leather, textile yarn, textile fibers, made-up articles of textile yarn, non-metallic minerals, iron and steel, non-ferrous metals, and manufactures of metals), the elasticity of exports with respect to the REER is 1.6-3.8 across the various REER indicators. For exports of machinery and transport equipment, the price elasticities are 2.4-3.3 for the OECD and the IMF indicators, but the estimate is wrongly signed for the RBI’s REER measure. Finally, for the ‘chemicals and related products’ sub-group, the exchange rate elasticity is 1.7-2.9 for the OECD-IMF indicators, but is not significant (although correctly signed) for the RBI’s REER measure. The regression diagnostics for the short-run model are satisfactory for all specifications for most of the specifications, barring some issues with the normality of residuals for the ‘chemicals and related products’ sub-group.

As a robustness check, given the small sample size, Annex Table 5 presents estimates for overall exports based on the dynamic OLS (DOLS) approach. Given the sensitivity of results to lags and the sample period, the table presents results for the baseline model (i.e., without including oil exports) for one and two leads and lags in the DOLS and also for rolling samples starting the second quarter of 1996 (the effective sample period begins the quarter ended December 1996 given the lags). The estimates based on the DOLS approach with one lead and lag are broadly in line with those from the Johansen-Juselius methodology.

Imports

As regards the domestic activity variable, industrial GDP is found to be a better indicator vis-à-vis overall GDP, reflecting the tilt of the commodity composition of imports towards industrial raw materials. The null hypothesis of one cointegrating vector cannot be rejected. The long-run coefficients are on the expected lines and are statistically significant. Income elasticity of imports with respect to domestic industrial GDP turns out to be around 1.55 in all the cases (Annex Table 6). The coefficient on the REER ranges from 0.19 to 0.42 and, as in the case, of exports, is higher for the RBI-REER. The short-run dynamics indicate that the ECM terms are correctly signed and, both the variables - imports and REER – adjust to the deviations from the equilibrium.

Annex Table 3: Determinants of Exports (Annual Estimates)

	Results for REER-RBI				Results for REER-OECD		Results for REER-IMF	
	1.00		1.00		1.00		1.00	
L(EXPQ)	1.00		1.00		1.00		1.00	
L(REER)	0.37		0.65		0.27		0.21	
	(4.50)		(6.25)		(3.33)		(2.22)	
L(WEXPR)	-1.33		-1.10		-1.35		-1.42	
	(33.60)		(17.02)		(22.07)		(19.83)	
L(OILR)			0.06		0.04		0.02	
			(4.20)		(2.39)		(1.06)	
constant	3.93		1.02		4.50		5.26	
	(6.04)		(1.08)		(5.42)		(5.51)	
<i>Short-run ECM model</i>								
	DLEXPQ	DLREER	DLEXPQ	DLREER	DLEXPQ	DLREER	DLEXPQ	DLREER
ECM(-1)	-1.02	0.37	-0.45	0.69	-0.60	0.21	-0.47	0.09
	(5.39)	(1.98)	(3.07)	(2.74)	(7.70)	(2.00)	(6.98)	(0.72)
DLEXPQ(-1)	0.40	0.07	0.12	0.01	0.27	-0.03	0.20	0.22
	(2.55)	(0.47)	(1.02)	(0.03)	(2.50)	(0.22)	(1.78)	(1.03)
DLREER(-1)	0.41	0.26	0.22	-0.10	0.24	0.61	0.12	0.58
	(1.86)	(1.19)	(1.42)	(0.38)	(2.04)	(3.89)	(1.04)	(2.77)
DLEXPQ(-2)	0.25	-0.26	-0.10	-0.58				
	(1.55)	(1.59)	(0.83)	(2.73)				
DLREER(-2)	0.72	-0.45	0.27	-1.22				
	(2.84)	(1.79)	(1.12)	(2.97)				
DLWEXPR	1.08	-0.14	0.76	-0.44	0.40	0.37	0.38	0.01
	(4.12)	(0.53)	(4.02)	(1.35)	(2.18)	(1.48)	(1.93)	(0.03)
DLOILR			0.03	0.00	0.02	0.00	0.02	0.00
			(3.51)	(0.14)	(3.55)	(0.01)	(2.50)	(0.09)
DLWEXPR(-1)	-0.86	-0.01	0.00	0.42	-0.52	0.00	-0.44	-0.18
	(2.80)	(0.02)	(0.00)	(1.19)	(2.98)	(0.00)	(2.55)	(0.56)
DLOILR(-1)			-0.02	0.02	-0.03	0.02	-0.02	0.00
			(2.17)	(1.31)	(3.42)	(1.62)	(2.81)	(0.25)
DLWEXPR(-2)	-0.31	0.44	0.37	0.67				
	(1.02)	(1.49)	(2.02)	(2.12)				
DLOIL(-2)			0.01	0.03				
			(1.38)	(1.74)				
dum85			-0.14	0.01	-0.11	-0.02	-0.12	0.00
			(4.48)	(0.22)	(3.98)	(0.51)	(4.14)	(0.04)
dum95			0.13	0.18	0.17	-0.03	0.18	-0.07
			(2.76)	(2.10)	(5.82)	(0.84)	(5.87)	(1.15)
dum97			-0.13	0.07	-0.11	0.05	-0.12	0.07
			(2.82)	(0.83)	(3.15)	(1.05)	(3.41)	(0.98)
Serial Correlation @	0.41		0.26		0.07		0.69	
ARCH @	0.53	0.50	0.24	0.43	0.56	1.00	0.32	0.61
Normality @	0.83	0.19	0.74	0.40	0.99	0.22	0.91	0.05
R ²	0.58	0.27	0.90	0.49	0.88	0.66	0.87	0.40
VAR lags	3		3		2		2	
PV (r=0)	0.02		0.04		0.05		0.05	
PV (r=1)	0.21		0.89		0.47		0.41	

Note:

Sample period for the estimation is 1980-81 to 2007-08.

Variables are defined as follows: EXPQ = quantum index of India's exports; WEXPR = world real exports (nominal exports, deflated by unit export values); OILR = India's real oil exports (nominal oil exports divided by international crude oil prices); REER = real effective exchange rates compiled by RBI (36-currency export weighted), OECD and IMF, respectively.

dum85, dum95 and dum97 are dummies for 1985-86, 1995-96 and 1997-98, respectively.

PV (r=0) and PV (r=1) give p-values (Bartlett-corrected) for the null of no and one cointegrating vector, respectively.

@: p-values for the null hypotheses of no serial correlation, no conditional heteroskedasticity and normality of residuals.

Figures in parentheses are t-statistics.

Source: Authors' estimates.

Annex Table 4: Determinants of Exports (Quarterly Estimates)

	Chemicals & Related Products			Manufactured Goods Classified Chiefly by			Machinery and Transport Equipment			Total Exports					
Estimates Using World Exports															
LREER-RBI	0.87 (0.63)			3.26 (1.86)			-2.65 (2.04)			1.48 (1.23)		1.07 (1.75)			
LREER-OECD	2.18 (2.27)			2.50 (1.73)			3.33 (3.21)			2.35 (2.80)		0.81 (1.02)			
LREER-IMF	2.94 (3.45)			3.30 (2.38)			2.71 (2.11)			2.83 (3.59)		1.49 (2.16)			
LWEXPR	-2.41 (13.58)	-2.74 (14.97)	-2.75 (19.85)	-1.56 (9.42)	-1.55 (5.61)	-1.55 (6.84)	-1.94 (11.60)	-2.58 (12.99)	-2.41 (11.48)	-1.81 (12.63)	-1.65 (12.62)	-1.94 (12.14)	-1.77 (10.04)	-1.91 (14.86)	-1.81 (12.05)
L(OILR)										-0.03 (1.85)		-0.01 (0.75)			
<i>Short-run ECM model</i>															
ECM(-1)	-0.47 (3.99)	-0.63 (4.21)	-0.71 (4.90)	-0.64 (4.84)	-0.61 (5.02)	-0.65 (5.32)	-0.81 (5.49)	-0.90 (6.08)	-0.79 (5.57)	-0.40 (4.54)	-0.75 (5.62)	-0.54 (4.70)	-0.70 (5.06)	-0.58 (5.17)	-0.75 (5.60)
Serial															
Correlation @	0.96	0.92	0.58	0.58	0.34	0.39	0.37	0.94	0.90	0.50	0.87	0.88	0.60	0.88	0.85
ARCH @	0.67	0.86	0.93	0.84	0.44	0.41	0.08	0.19	0.11	0.96	0.79	0.50	0.76	0.42	0.99
Normality @	0.02	0.00	0.00	0.05	0.05	0.07	0.36	0.30	0.23	0.65	0.24	0.49	0.39	0.67	0.42
R2	0.33	0.33	0.39	0.51	0.36	0.38	0.40	0.45	0.42	0.44	0.44	0.31	0.40	0.35	0.45
VAR lags	1	1	1	3	1	1	1	1	1	2	1	1	1	1	1
PV (r=0)	0.09	0.06	0.01	0.02	0.01	0.00	0.00	0.00	0.00	0.03	0.01	0.02	0.03	0.01	0.01
Estimates Using World GDP															
LREERX	1.16 (0.83)			3.75 (2.70)			-2.40 (2.11)			1.26 (1.22)		1.39 (2.43)			
LREEROEC	1.73 (1.73)			1.56 (1.26)			2.88 (3.53)			1.63 (2.48)		0.82 (1.15)			
LREERIMF	2.48 (2.60)			2.37 (1.94)			2.37 (2.31)			2.10 (3.41)		1.37 (2.21)			
LWGDP	-4.63 (12.75)	-5.05 (12.51)	-5.12 (15.59)	-3.24 (9.42)	-2.89 (5.76)	-2.96 (6.99)	-3.76 (12.70)	-4.87 (14.81)	-4.58 (12.96)	-3.44 (13.47)	-2.65 (9.77)	-3.61 (13.62)	-3.14 (9.85)	-3.60 (16.90)	-3.23 (11.81)
L(OILR)										-0.06 (3.91)		-0.02 (1.56)			
<i>Short-run ECM model</i>															
ECM(-1)	-0.47 (4.10)	-0.57 (4.12)	-0.62 (4.61)	-0.61 (5.77)	-0.66 (4.87)	-0.71 (5.13)	-0.89 (6.12)	-0.997 (6.85)	-0.88 (6.24)	-0.49 (4.42)	-0.94 (4.64)	-0.63 (4.55)	-0.76 (4.97)	-0.69 (5.05)	-0.82 (5.47)
Serial															
Correlation @	0.91	0.96	0.77	0.50	0.15	0.15	0.43	0.92	0.86	0.85	0.90	0.57	0.94	0.72	0.89
ARCH @	0.50	0.71	0.80	0.53	0.62	0.54	0.24	0.81	0.52	0.58	0.63	0.27	0.40	0.34	0.72
Normality @	0.01	0.00	0.00	0.22	0.04	0.06	0.42	0.06	0.05	0.51	0.78	0.65	0.56	0.80	0.65
R2	0.32	0.30	0.34	0.57	0.33	0.36	0.46	0.52	0.48	0.41	0.52	0.31	0.42	0.36	0.46
VAR lags	1	1	1	2	1	1	1	1	1	2	2	1	1	1	1
PV (r=0)	0.07	0.07	0.02	0.00	0.01	0.01	0.00	0.00	0.00	0.04	0.07	0.03	0.03	0.01	0.01

Note:

Sample period for the estimation is 1996:2 to 2008:1.

Variables are defined as follows:

WEXPR = world real exports (nominal exports, deflated by unit export values); WGDP = world real GDP;

REER = real effective exchange rates compiled by RBI (36-currency export weighted), OECD and IMF, respectively.

OILR = India's real oil exports (nominal oil exports divided by international crude oil prices).

PV (r=0) gives p-values (Bartlett-corrected) for the null of no cointegrating vector.

@: p-values for the null hypotheses of no serial correlation, no conditional heteroskedasticity and normality of residuals.

Figures in parentheses are t-statistics.

Source: Authors' estimates.

Annex Table 5: Determinants of Exports - Quarterly DOLS Estimates

Sample starting from	Results using 1 lead and lag in DOLS						Results using 2 leads and lags in DOLS					
	REER		WEXPR		LB-Q(2)	LB-Q(4)	REER		WEXPR		LB-Q(2)	LB-Q(4)
	Coefficient	T-statistic	Coefficient	T-statistic			Coefficient	T-statistic	Coefficient	T-statistic		
Results using REER-RBI												
Dec-96	0.22	0.16	1.65	12.82	0.01	0.03						
Mar-97	-0.31	-0.23	1.72	13.09	0.02	0.05	-0.04	-0.02	1.74	11.17	0.02	0.06
Jun-97	-0.81	-0.62	1.78	13.37	0.04	0.14	-1.31	-0.70	1.85	11.59	0.05	0.19
Sep-97	-1.56	-1.12	1.87	12.61	0.07	0.22	-2.88	-1.46	1.99	11.61	0.04	0.09
Dec-97	-1.99	-1.31	1.93	11.39	0.09	0.28	-4.94	-2.12	2.19	10.30	0.02	0.03
Mar-98	-2.66	-1.44	2.01	9.45	0.13	0.36	-5.22	-2.02	2.22	9.13	0.08	0.09
Jun-98	-2.84	-1.43	2.04	8.60	0.02	0.08	-5.83	-2.05	2.30	8.19	0.00	0.00
Sep-98	-2.16	-1.01	1.94	7.49	0.03	0.09	-4.89	-1.43	2.20	6.36	0.01	0.01
Dec-98	-1.79	-0.73	1.90	6.40	0.02	0.10	-5.52	-1.28	2.26	5.21	0.00	0.00
Mar-99	-1.78	-0.70	1.91	6.20	0.02	0.08	-6.61	-1.30	2.37	4.63	0.00	0.00
Jun-99	-1.93	-0.71	1.90	5.76	0.02	0.09	-6.70	-1.31	2.35	4.56	0.00	0.00
Sep-99	-1.91	-0.75	1.90	6.29	0.02	0.08	-6.81	-1.44	2.35	5.03	0.00	0.00
Dec-99	-2.05	-1.03	1.84	7.79	0.11	0.31	-7.82	-1.93	2.38	5.98	0.01	0.00
Mar-00	-2.01	-1.08	1.75	7.80	0.40	0.43	-6.22	-1.47	2.16	5.03	0.04	0.00
Jun-00	-1.54	-0.81	1.66	6.87	0.24	0.20	-4.54	-1.03	1.95	4.19	0.04	0.00
Sep-00	-1.40	-0.81	1.61	7.07	0.26	0.29	-3.37	-0.78	1.79	3.76	0.09	0.00
Dec-00	-1.26	-0.78	1.54	7.02	0.32	0.49	-2.07	-0.50	1.57	3.31	0.19	0.23
Mar-01	-0.82	-0.48	1.46	6.14	0.53	0.85	-1.79	-0.41	1.49	2.96	0.26	0.53
Results using REER-OEC												
Dec-96	-2.70	-2.92	1.99	14.21	0.12	0.30						
Mar-97	-2.36	-2.35	1.97	13.83	0.15	0.39	-3.01	-2.67	2.02	13.96	0.10	0.25
Jun-97	-2.18	-2.01	1.96	13.77	0.16	0.43	-2.86	-2.27	2.01	13.41	0.12	0.31
Sep-97	-1.94	-1.67	1.95	13.39	0.18	0.48	-2.51	-1.73	1.99	12.63	0.18	0.41
Dec-97	-2.01	-1.62	1.95	13.21	0.22	0.51	-2.36	-1.59	1.99	12.64	0.22	0.46
Mar-98	-2.03	-1.61	1.95	13.06	0.20	0.46	-2.70	-1.68	2.00	12.66	0.17	0.37
Jun-98	-2.24	-1.91	1.95	14.75	0.15	0.35	-2.84	-1.77	2.00	13.58	0.12	0.25
Sep-98	-2.62	-2.35	1.92	15.41	0.12	0.21	-4.03	-2.83	2.02	16.41	0.04	0.05
Dec-98	-2.56	-2.20	1.90	14.31	0.09	0.18	-4.85	-3.29	2.02	17.03	0.01	0.01
Mar-99	-2.50	-2.08	1.91	14.06	0.07	0.21	-4.82	-3.27	2.02	17.13	0.01	0.02
Jun-99	-2.55	-1.98	1.88	12.70	0.06	0.17	-5.16	-3.23	2.00	15.61	0.01	0.01
Sep-99	-2.56	-2.09	1.88	13.03	0.05	0.14	-5.32	-3.20	2.02	14.68	0.01	0.01
Dec-99	-2.43	-2.36	1.82	14.35	0.19	0.36	-4.60	-2.85	1.95	14.09	0.03	0.03
Mar-00	-2.05	-2.04	1.72	13.09	0.57	0.38	-3.56	-1.98	1.82	11.00	0.18	0.04
Jun-00	-1.79	-1.71	1.65	11.15	0.31	0.06	-2.78	-1.30	1.73	8.22	0.20	0.01
Sep-00	-1.68	-1.66	1.62	10.40	0.33	0.08	-2.45	-1.06	1.68	6.58	0.23	0.01
Dec-00	-1.55	-1.65	1.56	10.23	0.31	0.22	-1.39	-0.57	1.49	5.04	0.36	0.42
Mar-01	-1.38	-1.43	1.52	9.48	0.48	0.53	-1.37	-0.56	1.42	4.65	0.63	0.85
Results using REER-IMF												
Dec-96	-3.03	-3.69	1.94	18.65	0.36	0.27						
Mar-97	-2.74	-3.27	1.94	19.00	0.43	0.40	-3.53	-3.65	2.00	19.22	0.28	0.22
Jun-97	-2.60	-2.99	1.94	19.29	0.44	0.45	-3.39	-3.27	1.99	19.01	0.31	0.25
Sep-97	-2.42	-2.66	1.95	18.87	0.46	0.52	-3.14	-2.74	1.99	18.67	0.37	0.31
Dec-97	-2.43	-2.58	1.94	18.40	0.48	0.53	-3.01	-2.59	1.99	18.67	0.40	0.37
Mar-98	-2.43	-2.55	1.95	17.65	0.36	0.47	-3.15	-2.64	1.99	18.57	0.27	0.29
Jun-98	-2.48	-2.83	1.94	18.98	0.22	0.26	-3.22	-2.81	1.99	19.78	0.14	0.13
Sep-98	-2.60	-3.17	1.89	19.39	0.23	0.19	-3.79	-3.82	1.95	22.60	0.08	0.05
Dec-98	-2.52	-2.91	1.88	17.89	0.19	0.17	-4.04	-3.95	1.92	21.54	0.04	0.03
Mar-99	-2.48	-2.75	1.89	16.93	0.14	0.26	-4.12	-3.87	1.94	20.56	0.03	0.04
Jun-99	-2.45	-2.53	1.86	15.03	0.12	0.19	-4.09	-3.61	1.91	18.30	0.02	0.03
Sep-99	-2.50	-2.61	1.88	14.87	0.09	0.16	-4.37	-3.57	1.95	16.77	0.02	0.02
Dec-99	-2.36	-2.90	1.81	16.06	0.23	0.31	-3.86	-3.17	1.89	16.11	0.07	0.06
Mar-00	-2.00	-2.45	1.72	14.22	0.60	0.26	-3.15	-2.34	1.79	12.72	0.27	0.06
Jun-00	-1.74	-1.97	1.65	11.72	0.30	0.04	-2.68	-1.62	1.73	9.45	0.22	0.01
Sep-00	-1.64	-1.83	1.63	10.35	0.32	0.06	-2.62	-1.31	1.72	6.97	0.21	0.01
Dec-00	-1.44	-1.63	1.57	9.59	0.30	0.21	-1.50	-0.65	1.52	4.70	0.34	0.29
Mar-01	-1.24	-1.33	1.52	8.64	0.49	0.57	-1.11	-0.47	1.39	3.94	0.63	0.92

Note:

Sample period for the estimation ends in 2008:1 and starts from the quarter indicated in the first column.

Variables are defined as follows: WEXPR = world real exports (nominal exports, deflated by unit export values);

REER = real effective exchange rates compiled by RBI (36-currency export weighted), OECD and IMF, respectively.

LB-Q(2) and LB-Q(4) = p-values of Box-Pierce-Ljung Q-statistic for the null of no residual autocorrelation for 2 and 4 lags, respectively.

Source: Authors' estimates.

Annex Table 6: Determinants of Imports (Annual Estimates)

	Results for REER-RBI				Results for REER-OECD		Results for REER-IMF			
L(IMPQ)	1.00		1.00		1.00		1.00		1.00	
L(REER)	-0.39		-0.42		-0.32		-0.19		-0.21	
	(3.70)		(3.74)		(5.85)		(4.90)		(5.17)	
L(INDR)	-1.57		-1.57		-1.57		-1.55		-1.55	
	(32.33)		(32.04)		(45.04)		(59.84)		(60.60)	
CONSTANT	15.58		15.70		15.45		14.67		14.63	
	(15.12)		(14.86)		(23.26)		(29.34)		(29.68)	
<i>Short-run ECM model</i>										
ECM(-1)	-0.38	0.48	-0.33	0.48	-0.30	0.48	-0.93	0.54	-0.74	0.60
	(1.80)	(4.56)	(1.77)	(4.87)	(1.67)	(5.65)	(2.93)	(2.39)	(2.53)	(2.77)
DLIMPQ(-1)	0.17	-0.37	0.21	-0.37	0.04	-0.43	0.39	-0.12	0.34	-0.16
	(0.68)	(3.08)	(0.94)	(3.17)	(0.21)	(4.39)	(1.58)	(0.71)	(1.48)	(0.91)
DLREER(-1)	0.09	-0.17	0.17	-0.17	0.35	0.16	0.47	-0.03	0.50	-0.06
	(0.32)	(1.16)	(0.63)	(1.16)	(1.15)	(1.08)	(1.56)	(0.13)	(1.75)	(0.27)
DLIMPQ(-2)	0.30	-0.01	0.21	-0.04			0.38	0.23	0.27	0.17
	(1.42)	(0.09)	(1.10)	(0.40)			(1.99)	(1.66)	(1.47)	(1.26)
DLREER(-2)	0.32	-0.45	0.22	-0.48			0.53	-0.08	0.36	-0.13
	(1.10)	(3.06)	(0.83)	(3.35)			(1.84)	(0.37)	(1.30)	(0.65)
DLINDR	2.32	0.23	1.98	0.21	2.18	0.16	2.44	-0.37	2.10	-0.36
	(4.76)	(0.92)	(4.32)	(0.87)	(4.81)	(0.74)	(5.46)	(1.14)	(4.92)	(1.14)
DLINDR(-1)	-2.27	0.92	-1.84	1.03	-0.87	0.45	-2.17	-0.01	-1.70	0.12
	(3.17)	(2.55)	(2.74)	(2.89)	(1.98)	(2.19)	(3.40)	(0.01)	(2.71)	(0.25)
DLINDR(-2)	0.28	-0.38	0.32	-0.32			0.01	0.11	0.05	0.23
	(0.48)	(1.30)	(0.59)	(1.10)			(0.02)	(0.28)	(0.09)	(0.59)
dum84			-0.17		-0.22	0.02			-0.16	-0.03
			(2.48)		(2.87)	(0.41)			(2.40)	(0.63)
Serial										
Correlation @	0.21		0.06		0.32		0.14		0.04	
ARCH @	0.15	0.78	0.23	0.89	0.59	0.16	0.43	0.78	0.37	0.61
Normality @	0.41	0.50	0.20	0.46	0.59	0.06	0.17	0.92	0.11	0.86
R2	0.48	0.64	0.57	0.67	0.52	0.77	0.56	0.58	0.61	0.61
VAR lags	3		3		2		3		3	
PV (r=0)	0.01		0.02		0.01		0.03		0.03	
PV (r=1)	0.48		0.81		0.39		0.57		0.78	

Note:

Sample period for the estimation is 1980-81 to 2007-08.

Variables are defined as follows: IMPQ = quantum index of India's imports; INDR = India's real industrial GDP;

REER = real effective exchange rates compiled by RBI (36-currency trade weighted), OECD and IMF, respectively.

dum84 is dummy for 1984-85.

Rows PV (r=0) and PV (r=1) give p-values (Bartlett-corrected) for the null of no and one cointegrating vector, respectively.

@: p-values for the null hypotheses of no serial correlation, no conditional heteroskedasticity and normality of residuals.

Figures in parentheses are t-statistics.

Source: Authors' estimates.

Annex 4: Determinants of Gold Imports

In view of the significant jump in gold imports, we empirically assess the role of the potential determinants – gold prices, domestic inflation, domestic interest rates, currency movements and returns on other assets – highlighted in previous studies (Vaidyanathan, 1999; Starr and Tran, 2008; RBI, 2013). Using monthly data from April 2004 to December 2012 – the period selection is governed by availability of monthly data on the value of gold imports - the following alternative specifications are estimated. The first uses nominal variables augmented by domestic price variables (equation 1) and the second uses the real variables (equation 2):

$$MG_t = a + \text{trend} + b. \Delta LPG_t + c. \Delta LP_t + d. RN_t + e. \Delta LBSE_t + f. \Delta E_t + u_t \quad (1)$$

$$MG_t = a1 + \text{trend} + b1. \Delta LPGR_t + d1. RR_t + e1. \Delta LBSE_{R_t} + f1. \Delta ER_t + u_t \quad (2)$$

ΔL is the first difference of log terms of the variables and the variables enter in the first difference as they turn out to be stationary¹¹. MG is the volume of monthly gold imports, PG is local currency gold price, P is domestic prices (measured by wholesale price index (WPI) or consumer price index (CPI)), RN is nominal deposit interest rate, BSE is Bombay Stock Exchange (BSE Sensitive) index, E is the exchange rate (Rupees per US dollar), PGR is local currency gold price in real terms, RR is real deposit interest rate, BSE_{R} is real BSE index and ER is real exchange rate. The real variables are obtained by deflating the nominal variables with either WPI or CPI in the respective specifications. Real interest rate is computed as the nominal deposit rate less year-on-year WPI (or CPI) inflation. Monthly dummies are included to capture seasonality. A trend term is also included, as a proxy for higher incomes over the time period, which could have a positive impact on demand (Vaidyanathan, 1999); however, Starr and Tran (op cit), in their panel study, find a negative relationship between recent income growth and gold demand, but a positive impact of income volatility on gold demand.

In all, four specifications are estimated (Annex Table 7): columns 2 and 3 estimate equation 1 for CPI and WPI, respectively. Correspondingly, columns 4 and 5 estimate equation 2 for the real variables (nominal variables deflated by CPI and WPI, respectively)¹². All the specifications have relatively good explanatory power and the regressions diagnostics are satisfactory.

¹¹ Augmented Dickey-Fuller (ADF) tests indicate that the null of unit root cannot be rejected for the level series (other than monthly imports and WPI), but can be rejected at the 5 percent level of significance for their first-differences.

¹² The equations are estimated with six lags of each variable and the insignificant variables are excluded using the STWISE command in WinRATS.

Annex Table 7: Determinants of Gold Demand

Explanatory Variable	Dependent Variable: Monthly Gold Imports (LMG)				
	Sample Period (April 2004 to December 2012)				
1	2	3	4	5	
Constant	1.77 (5.14)	1.73 (4.98)	1.79 (4.77)	1.76 (4.83)	
TREND	0.00 (3.83)	0.00 (4.25)	0.00 (3.01)	0.00 (3.47)	
LMG(-1)	0.25 (3.86)	0.24 (3.67)	0.34 (5.18)	0.31 (4.54)	
DLPG	-6.24 (8.39)	-6.43 (8.62)			
DLPG(-3)	-1.05 (1.55)	-0.99 (1.45)			
DLPG(-4)	1.23 (1.76)	0.91 (1.33)			
DLPG(-5)	1.56 (2.19)	1.61 (2.24)			
DLPG_R			-6.39 (8.42)	-6.77 (8.99)	
DLPG_R(-3)				-1.33 (1.86)	
DLPG_R(-5)			1.82 (2.40)	1.45 (1.95)	
DLCPI(-1)	6.84 (1.83)				
DDRATE(-1)	0.26 (1.79)	0.20 (1.38)			
DDRATE(-2)	0.43 (3.13)	0.46 (3.27)			
DDRATE_R(-2)			0.08 (2.39)		
DLBSES(-4)	0.58 (1.38)	0.77 (1.86)			
DLBSES_R(-4)			0.74 (1.70)		
DLEXCH	-2.58 (1.81)	-1.92 (1.38)			
DLEXCH_R(-1)				-1.94 (1.39)	
DLEXCH_R(-5)			-3.21 (2.12)	-3.48 (2.49)	
DUM2006M6	-1.63 (5.62)	-1.65 (5.61)	-1.64 (4.95)	-1.63 (5.05)	
R-bar ²	0.68	0.67	0.62	0.63	
DW	2.07	2.10	2.16	2.00	
White test	0.52	0.53	0.34	0.65	
JB test	0.47	0.46	0.68	0.58	
LB-Q test	0.28	0.27	0.16	0.18	

Note:

MG = monthly gold imports; PG = Price of gold in rupees; CPI = Consumer price index; WPI = Wholesale price index

PG_R = Price of gold in rupees deflated by CPI (column 4) and WPI (column 5)

BSES = Bombay Stock Exchange Index (BSE-30); EXCH = Exchange rate (Rupees per US dollar)

Prefix DL stands for log difference; DDRATE = Variation in deposit rate; DDRATER = Variation in real (CPI-adjusted) deposit rate;

DLEXCH_R = exchange rate depreciation less CPI inflation (col. 4) and WPI inflation (col. 5)

Figures in parentheses are t-statistics. White test = significance level (p-value) for White test for the null of homoskedasticity of residuals.

JB test = significance level (p-value) for Jarque-Bera test for the null of normality of residuals;

LB-Q test = significance level (p-value) of Box-Pierce-Ljung Q-statistic for the null of no residual autocorrelation for 6 lags.

Sample period for regression is April 2004-December 2012 and the regressions include monthly dummies.

Source: Authors' estimates.

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