India's Exports: The New Normal?[1]

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Abstract

Contrary to the perception of India being a closed economy, exports to GDP have almost doubled over the last 15 years and, at close to 20% of GDP, India's are almost at the same as Indonesia's. Furthermore, we estimate that the slowdown in export growth over the last decade explains two thirds of the headline GDP slowdown, thereby underscoring the increasing importance of exports.

Furthermore, India's merchandise exports have undergone a quiet revolution over the last two decades with new-age engineering, electronic and pharmaceutical exports gradually replacing India's traditional exports of leather, textile, gems and jewelry. In this paper, using sectoral and firm level data, we ascertain what drives India's exports? Sectoral data reveal that export volumes are largely driven by changes in partner country growth. Interestingly, this is particularly true in the engineering and electronics sector. That said, we find a structural break around 2005 — well before the global financial crisis and the subsequently documented de-globalization — after which these partner country growth elasticities have fallen sharply, with the decline being largest in India's new age exports. In contrast, changes in the exchange rate and supply side constraints, at the margin, are not found to significantly impact India's export volumes.

Using firm-level data broadly produces the similar results. Controlling for external demand conditions and domestic supply constraints, we find little evidence that exchange rate movements hurt competitiveness at the firm level. There is however, interesting variation across sectors, with firms in sectors with lower domestic value-added content such as drugs and pharmaceuticals, exhibiting a sharper increase in the value of imported intermediates, and a muted response of exports to an appreciation of the exchange rate; while firms in sectors with domestic high value added such as textiles showing a larger response of exports to exchange rate movements.

Keywords: Trade, India
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I. Introduction

Since the Global Financial Crisis (GFC), low economic growth has been recognized as the "new normal" or "new mediocre", especially for advanced economies (AEs), notwithstanding the recent cyclical pick-up in advanced economies. The new mediocre has been attributed to both demand and supply factors - a lack of aggregate demand, and a slowdown in productivity growth. While demand has recently lifted in AE's, underlying potential growth is significantly lower than in the advanced economies, reflecting unfavourable demographics and soft productivity growth.

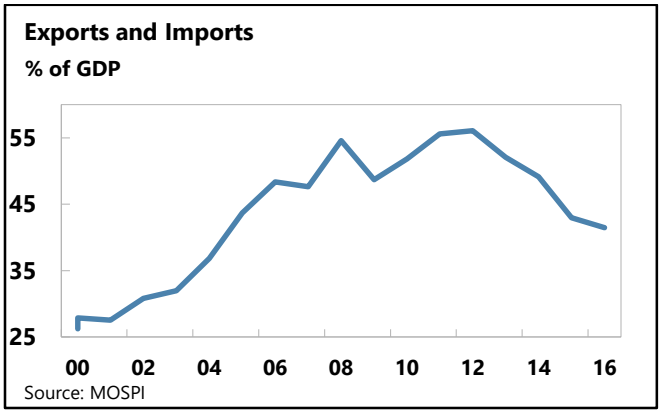
The new mediocre has coincided with a slowdown in trade growth relative to global growth. In contrast to Japan and Korea, China, India, and Indonesia have continued to enjoy relatively higher growth since the global financial crisis on the back of supportive macroeconomic policies and strong convergence dynamics. This chapter studies the case of India and asks the question: how has India fared since the GFC? Is India a closed economy, and has it been insulated from global shocks?

India's financial integration with the rest of the world is increasingly appreciated, and visible through rising capital inflows and outflows and the fact that asset prices in India are increasingly correlated with their global counterparts. But India's integration on the real-economy continues to be under-appreciated, particularly on the export front. The conventional wisdom is that India remains a largely closed economy, where exports are only of marginal significance. In fact, this line of thinking is often used to suggest that India stands insulated from global growth and/or protectionist shocks.

But to believe in the conventional wisdom is to live in the old reality. Over the last two decades, India's tradable sector has grown at a rapid pace. Total trade (sum of exports and imports to GDP) has grown from 27% of GDP in 2000 to 56% of GDP in 2012, before slowing again reflecting the de-globalization in recent years (Figure 1a). More generally, however, this increased integration and exposure to global markets, has forced supply-chain efficiencies, and resulted in the technological transfer and the productivity growth that comes with it. But the growth and productivity benefits of global integration have also made

more vulnerable to global growth and protectionism shocks – more than is commonly assumed.

Figure 1a.



Let's take the case of exports. Measuring India's exposure on the export side is a function of (i) how exports have grown as a share of Gross Domestic Product (GDP); and (ii) how sensitive they are to changes in partner-country growth. The higher the share of exports in GDP and the more elastic/cyclical they are to changes in global economic conditions, the more vulnerable the economy is.

In India's case, we find exports as a share of GDP more than doubled from 12% to 25% between 2000 and 2013. To be sure, India hasn't been able to dodge the de-globalization blues with the share of exports in GDP receding in recent years (Figure 1b). Moreover, the recent slowdown broadly mirrors that of the emerging markets (Figure 1c). Despite the slowdown, however, India's exports to GDP is still at almost 20% in 2017, almost twice the level witnessed just 15 years ago, and almost the same as that for Indonesia.

Figure 1b.

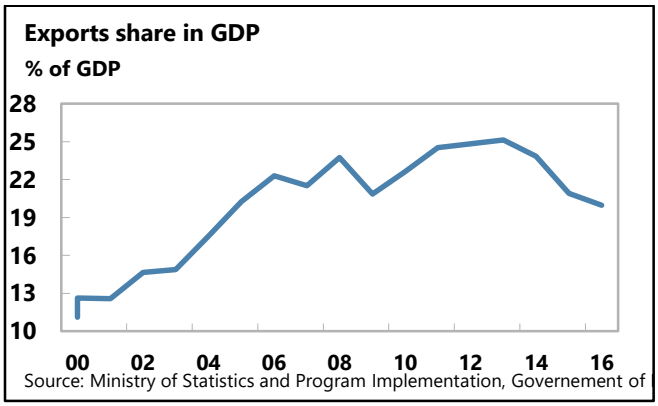
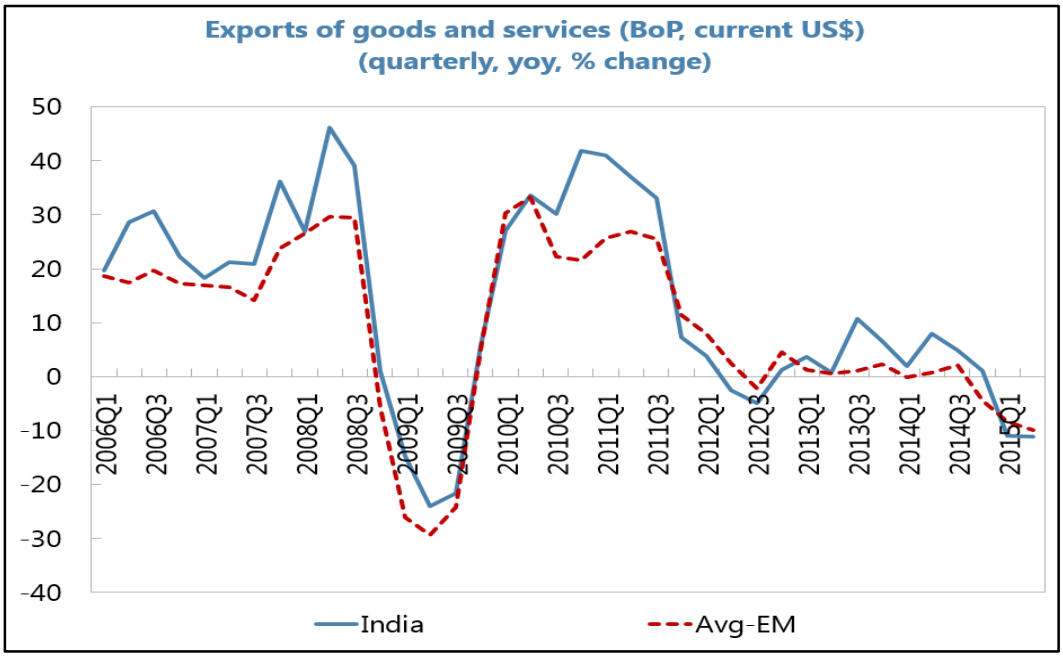


Figure 1c.



Complementing this openness is the fact that India's export basket has become progressively more sensitive to global growth impulses, until recently when the relationship between advanced economy growth and exports seems to have softened, not just for India but for emerging markets more generally. Despite the softening, however, several studies have found that the elasticity to partner-country growth remains high for India (see, Rangarajan

and Mishra, 2013, Aziz and Chinoy, 2012) and is the primary driver of export volumes, eclipsing the role of the exchange rate and the supply bottlenecks.

The growing role of exports in India's growth process can perhaps best be appreciated in recognizing the contribution of slowing exports to slowing headline GDP growth in India. India's much-celebrated 9% growth in the 2000s came largely on the back of surging export growth as global growth lifted and India plugged into the global export market India's 8.8% GDP growth between 2003-2008 was underpinned by exports growing at nearly 18% per year in real terms in those five years.

In contrast, over the last 5 years, export growth has slowed to just 3.4% in real terms. With exports constituting 20% of GDP, a 14 percentage point slowdown in exports – after adjusting for their import content – would shave off more than 200 bps from headline GDP growth.

Now consider this. GDP growth in India has averaged 6.9% over the last five years. This is about a 200 bps slowdown of growth compared to the 8.8% achieved between 2003-8. In other words, the slowdown in exports can explain the entire slowdown in GDP growth over the two time periods!

There is, however, a caveat here. A change in the GDP methodology may render comparison between the two time periods tricky, because there appears to be a level shift up in GDP growth under the new series. For the two years in which both series overlap, the new series is about 110 bps higher, on average, than the old series.

As a thought experiment, however, if we were to bump up the old GDP series by 110 bps to facilitate a more apples-to-apples comparison, the slowdown in growth will be closer to 300 bps. In that case, the exports account for two-thirds of the slowdown. This assumes however that the mark-up to GDP growth in the old series is not accompanied by a commensurate mark-up in exports growth. This appears reasonable because the methodological changes to GDP appears to have largely impacted consumption and investment, not exports. Indeed in the two years in which there is overlapping data exports growth is virtually identical across the two series.

Figure 2.

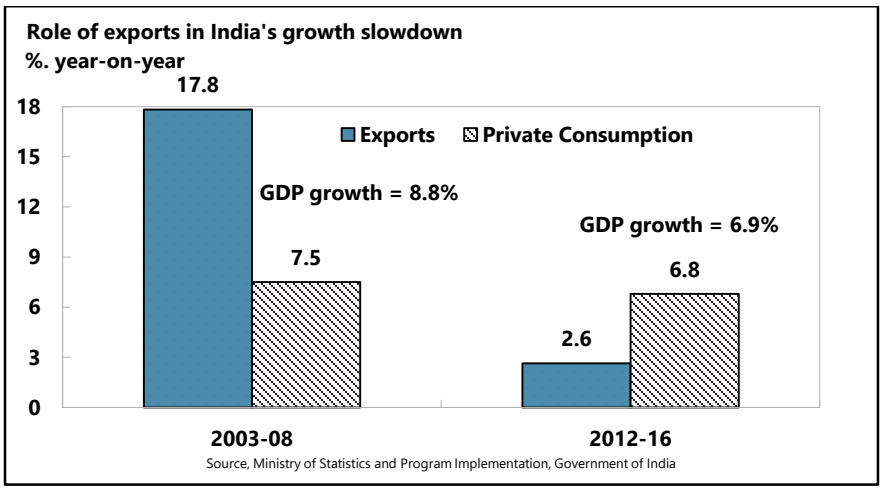
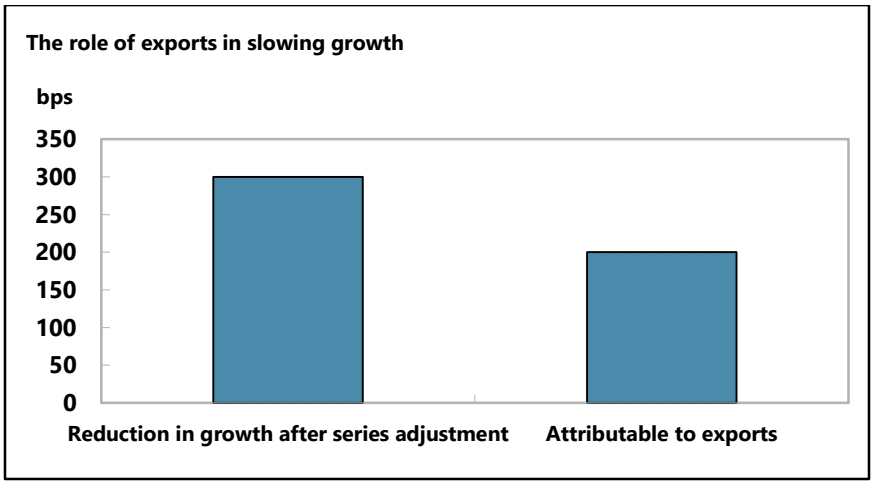


Figure 3.

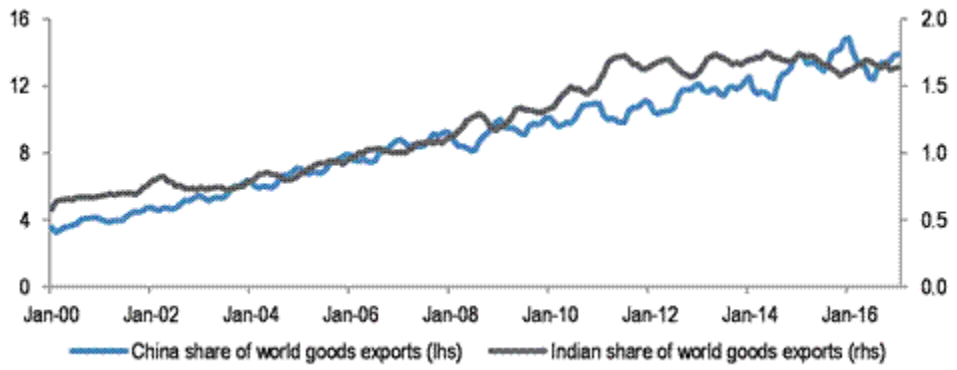


What all this reveals is that exports have been a critical driver of India's slowdown, accounting for about two thirds of India's GDP slowdown over the last decade. In a sense, therefore, India has not escaped the de-globalization blues that has afflicted the world since the global financial crisis.

More importantly, the contribution of exports to India's GDP growth has implications going forward. If global growth is going to remain sluggish, and India's exports are sensitive to global growth impulses, then prospects for exports growth will look commensurately tepid. That will have important implications for growth prospects in India. Either, we need to re-evaluate potential growth in India going for-ward (is 7% growth in this global environment

equivalent to 9% growth when global growth was surging in the mid-2000s?)or India will have to increase its market share of global exports – of which there is no evidence as yet – because India's share of global exports has flat-lined in recent years (see, Figure 4, and also Box 1 for a case study of India's apparel sector). Or India would need to find other sources of domestic growth to offset the loss from external demand. But something will have to give.

Figure 4.



Given the importance of exports to the Indian economy, and the role it has played in the slowdown, this paper attempts to conduct a systematic analysis of the export sector using sectoral and firm-level data. We start by analyzing the changed composition of India's exports. We then try to better understand the determinant's of India's exports: global growth, the real effective exchange rate, or supply bottlenecks. But we do this not just at the aggregate level but also at the sectoral level. Finally, we use firm-level data and a bottom-up analysis to understand the role of the exchange rate. The role of the exchange rate continues to assume significance as India's trade-weighted real exchange rate has appreciated almost 20% over the last four years.

While some of these issues have been addressed individually in different papers (see, for example, see, Rangarajan and Mishra, 2013, Aziz and Chinoy, 2012) some of this work is now dated. This paper tries to present a comprehensive analysis – both aggregate and sectoral – using data all the way till 2016.

The rest of the paper is organized as follows. Section II provides an overview of the changing composition of India's exports. Sections III and IV present our analysis using macroeconomic and firm-level data respectively. Section V concludes with policy implications.

II. Changing composition of India's Exports

Any exploration of India's export sector must contend with the two revolutions that have characterized it. The first – more visible revolution– was the surge in service exports. Back in 2003, service exports constituted 30% of the total export basket. But just in a matter of 4 years, service exports jumped to 40% of the total basket, reflecting the software and BPO revolution around the world, of which India was a major beneficiary. Interestingly, however, after that step jump service exports have plateaued at 40% of the total basket over the last decade (Figure 5).

Instead, over this period, there was a quiet revolution occurring on the manufacturing side (Figure 6). Back in 2003, textiles, leather and gems/jewelry – India's traditional exports – constituted nearly 60% of the merchandise export basket (ex petroleum). But their share has secularly fallen, and currently they account for just 40% of the basket. In contrast, engineering goods exports – auto parts, capital goods -- have grown at an average annual pace of almost 20% for 13 years, such that its share of the manufacturing export basket has almost doubled from 20% to 35% in just 12 years. In a sense, therefore, India has moved up the value chain, with Indian exports increasing in sophistication and value-addition. By 2015, for example, engineering goods, electronics and pharmaceuticals/chemical constituted almost 60% of the merchandise goods basket (ex oil). Equally, however, one could lament that all of this growth has occurred in the capital intensive sectors, when the need of the hour is/was job creation in a labor-intensive country with a favorable demographic dividend.

There are many reasons why India's changed composition of exports matters. First, it reveals the extent to the value –addition and sophistication of India's manufacturing exports has

evolved. Second, however, the changed composition of exports has a crucial bearing on the extent to which Indian exports are impacted by global demand, because the sector elasticities to global growth are very heterogenous.

India's new-age exports (engineering goods, pharmaceuticals, software services) are typically have a far higher sectoral elasticity to global growth than the traditional exports of leather, gems and jewelry – a hypothesis we test in this paper. Like the ASEAN countries, therefore, India's export basket has become more cyclical in nature and is impacted much more by global business cycles – surging in the good times and sharply depressed in a down-cycle. So, global growth volatility transmits more directly and acutely into India from this changed composition of exports.

Figure 5.

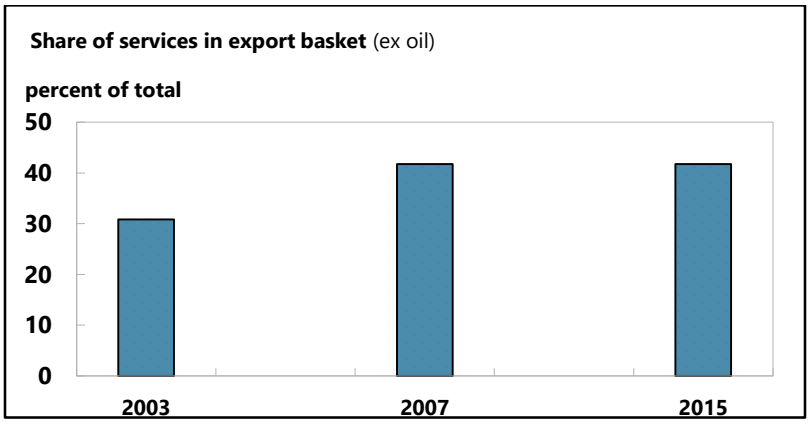
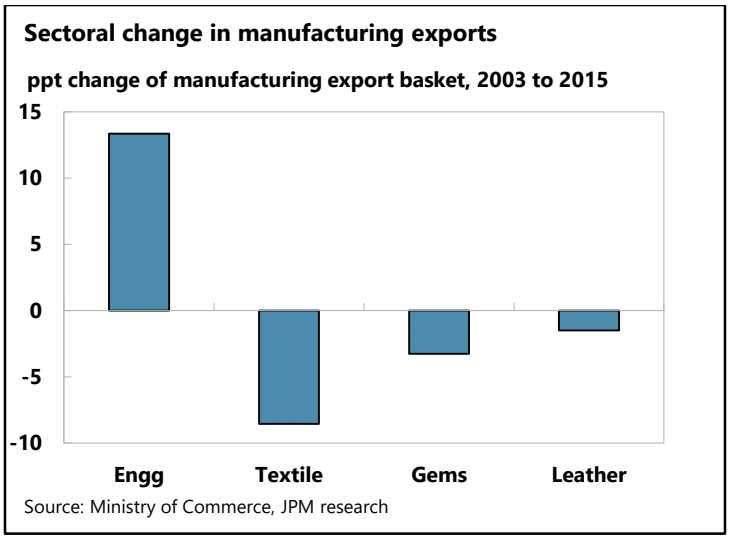


Figure 6.



III. Macro Analysis

In this section, we use time series data to analyze the sensitivity of India's exports to global growth and exchange rate movements.

In order to systematically evaluate the relationship between exports, exchange rate, and partner country demand, we estimate the following empirical specification:

$$\ln(X_t) = \propto + \beta_1 \ln(Y_t) + \beta_2\{D_t * \ln(Y_t)\} + \beta_3 \ln(ER_t) + \beta_4\{D_t * \ln(ER_t)\} + \gamma Z_t + \delta T_t + \omega D_t + \in_{it} \quad (1)$$

Where, time (i.e. quarter) is indexed by t. Equation (1) is estimated separately for total merchandize exports, manufacturing exports, exports in nine broad sectors under merchandize, and services exports. X_t represents the value of real exports (2010 prices) in mn US$. Y_t is the Partner Country GDP (2010=100). The values taken by the index Y_t are different for each sector. For services, it is simply the world GDP (2010 prices) in mn US$. ER_t is the index of Partner Country Real Exchange rate (2010=100). For services, we use the US$ per INR. The variable D_t is a dummy variable indicating the structural break, which we identify by applying the Quandt-Andrews test in each regression, separately. We examine the differential impact of the structural break through changes in intercept (by introducing standalone dummy variable D_t) and changes in the slope coefficients (by interacting D_t with Y_t and ER_t). Z_t denotes additional time varying controls, such as the number of stalled

projects (a proxy for domestic supply constraint) and volatility in the INR/US$ exchange rate. The regression also controls for time-varying effects by introducing a set of dummy variables T_t, where each dummy variable represents a single year. The variables X_t and Y_t are seasonally adjusted for all sectors. We use Newey-West heteroskedasticity and autocorrelation adjusted standard errors in all the regressions.

The coefficient β_1 measures the elasticity of India's exports with respect to the partner country GDP in the pre-structural break sample period. In other words, this coefficient shows, by what percentage India's real exports (or exports volume) will change if the partner countries grow by one percent in the pre-structural break period. The coefficient β_2 measures differential effect of partner country demand on Indian exports post the structural break. Similarly, β_3 measures the percentage change in India's real exports from a 1% appreciation in the real effective exchange rate in the pre-structural break period. β_4 measures the differential effect of real exchange rates on Indian exports post the structural break.

The main findings from our empirical models are summarized below:

- The elasticity of India's exports to partner country GDP is positive and statistically significant. Our estimates suggest that a 1 percent growth in the partner country GDP is associated with a 2.8% rise in India's merchandise exports prior to 2005. The elasticity is estimated at almost in the similar range (2.3 percent) for manufacturing exports. The elasticity for services exports with respect to partner country output is lower at 1.6 percent (Table 1).

- We find evidence for a sharp structural break in the effect of partner country output on Indian exports around 2005; well before the global financial crisis (Table 1). The partner country income elasticity falls sharply post the structural break. The elasticity declines by 2.5 percentage points, thereby bringing down the effective elasticity to almost zero, post 2005. The fall in elasticity in the case of manufactured items is less, and remains high, at 1%, and statistically significant post 2005. In contrast, for

services exports, we do not find any significant evidence for changes in elasticity with respect to partner growth during the post structural break period.

- An important finding is that there is significant variation in partner income elasticities across sectors.[3] Partner country income elasticities vary widely across manufacturing sectors, both pre- and post-structural break (Table 2). Engineering and electronics report the highest elasticities pre 2005, followed by chemicals, pharmaceuticals, and leather and textiles. The fall in elasticity post 2005 is very sharp for electronics and engineering goods. Despite the fall, engineering and pharmaceuticals report the highest income elasticities post 2005. In case of leather and textile, there has been no change in the elasticity post-structural break.

- There is little evidence that an appreciating INR hurts Indian exports. The weak relationship between exports and exchange rates is not surprising as econometrically it is very hard to separate out the effect of exchange rates on trade (Engel (2009)). The estimation of exports-exchange rate equations are plagued by reverse causality and omitted variable concerns, which are hard to address with macroeconomic data. Other related papers have shown that the aggregation of heterogeneous firms or sectors can result into an aggregation bias in the estimation of the elasticity of exports to exchange rate changes (see e.g. Dekle, Jeong, and Ryoo (2009) and Imbs and Mejean (2009)). We examine such sources of heterogeneity at both the sectoral and firm level.

- At the sectoral level, in leather and textiles, we do find that an appreciation in the INR is associated with a fall in real exports, but mostly in the recent years. In all other cases, the elasticity both pre and post structural break is either very insignificant or is counterintuitively positive.

- The volume of stalled projects and volatility in exchange rate does not seem to affect Indian exports adversely (Tables 1 and 2). Further, we do not find any evidence for

[3] Break dates vary as widely as 2005 for engineering and pharmaceuticals, to 2008/09 for metals and electronics to 2013/14 for leather-textile and chemicals.

non-linearity in our estimates of elasticity for partner GDP and exchange rate (Table A1).

- Overall, our findings suggest that there has been slowdown in the partner income elasticity of Indian exports. Yet, the elasticity remains substantial for manufactured items, mostly in sectors like leather and textile, and engineering goods. Exchange rate movements, on the other hand, does not seem to have a significant effect on exports.

IV. Firm-Level Analysis: How Do Exporting Firms in India React to Exchange Rate Changes?

How can we explain the low aggregate elasticity of exports to exchange rate movements in the Indian context? Is there heterogeneity across exporting firms in the responses to exchange rate movements? Could such heterogeneity explain low aggregate elasticities? We draw on the literature (see e.g. Berman, Martin., and Mayer, 2012), and dig into granular firm-level data for India in order to answer this question.

We estimate the following specification, where firms are indexed by *i*, and time by *t*:

$$\ln(F_{it}) = \propto + \beta \ln(ER_t) + \gamma X_t + s_i + \delta t + \in_{it} \quad (1)$$

where

F_{it} is a firm-level outcome, and includes value of exports, imported raw materials, total sales (domestic+foreign), total costs, and profits.

ER_t is the average annual exchange rate.

X_t denotes additional time varying controls, which includes world GDP growth (to measure external demand conditions), and volume of stalled projects (as a proxy for domestic supply constraints).

All regressions include firm fixed effects - s_i, and therefore utilize variation *within* firms over time to identify the responses to exchange rate movements. The regressions also control for a time trend (t).[5] Standard errors are clustered at the firm level.

Results

The main findings from the empirical analysis are summarized below.

- There is little evidence that an appreciation of the exchange rate hurts the value of exports. In fact, the elasticity of exports with respect to exchange rate is positive in the post 2009 period, and in the smaller sample of firms: with an appreciation of the exchange rate being associated with higher value of exports, on average, at the firm level. The long-run effect is also positive, and stronger than the short-run effect (Table 3).[6]

- The value of imported intermediates rises sharply in response to an appreciation of the rupee (Table 4). The finding is robust across several specifications. A one percent increase in the REER is associated with a 0.4% increase in the value of imported intermediates. The magnitude of the effect is much larger in the post 2009 period; for the balanced panel of firms; and in the long run.

- There is variation across sectors. There is some evidence that exports of firms in sectors with high domestic value added (defined by domestic value added content greater than the 25th percentile) decline following an appreciation of the rupee. The

[5] Time dummies cannot be included as the main variable of interest – exchange rate - varies only at the time-level.

[6] The long-run effect is estimated by introducing a lagged dependent variable in the model (columns [10]-[15] in Table 1). The dynamic effects shown in Table 1 are robust to using GMM (which addresses concerns about bias arising from introducing a lagged dependent variable in a panel data model with fixed effects). The smaller sample of firms is a "balanced" panel with the same set of firms over the entire time period.

value of imported intermediate inputs, however, rise more significantly in sectors with low domestic value added (or high foreign value added) content; and exports of firms in these sectors do not decline following an appreciation of the rupee (Table 5). This result is not surprising as a greater reliance on foreign inputs is analytically analogous to a lower pass-through which would dampen the competitiveness effect of exchange rate changes (see e.g. Ahmed, Appendino and Ruta, 2015).

- Consistent with the firm level evidence, we find that the market share in overall exports of several sectors with high domestic value added content (e.g. readymade garments, other textiles, minerals, copper and copper products, trading) decline over time along with the strengthening of the rupee (Figure 7). On the other hand, sectors with high foreign value added content (e.g. drugs and pharmaceuticals, other chemical products, and gems and jewelry) show a rise in market shares with the strengthening of the rupee. (Figure 8).

- Total sales (domestic+foreign) increase following an appreciation of the rupee. Total costs also increase, explained perhaps by the increased spending on foreign inputs. (Tables 6, and 7).

- Profits, on the other hand, do not show any significant relationship with exchange rate movements. In particular, there is no evidence that profitability declines at the firm-level following an appreciation of the rupee. (Table 8).

- We find some evidence that expenditure on wages and salaries are positively associated with a strengthening of the rupee (Table 9).

- Firms however do not seem to adjust their investments in response to exchange rate fluctuations (Table 10).

- Overall, the findings seem to suggest that following a strengthening of the rupee, firms tend to import more intermediate inputs, export more, increase overall sales,

pay higher wages and salaries; but do not adjust their investments, and their profits also do not change significantly. The adjustments on all these margins are significantly higher for firms with greater imported intermediate content of exports.

V. Conclusions and Policy Implications

This paper provided an overview of India's exports. We document that India's merchandise exports have undergone a quiet revolution over the last two decades with new-age engineering, electronic and pharmaceutical exports gradually replacing India's traditional exports of leather, textile, gems and jewelry. Sectoral data reveal that export volumes are largely driven by changes in partner country growth, with new age exports exhibiting the highest elasticities. We find a structural break around 2005 — well before the global financial crisis and the subsequently documented de-globalization — after which these partner country growth elasticities have fallen sharply, but still remain significant, especially for engineering, textiles, and leather. In contrast, changes in the exchange rate and supply side constraints, at the margin, are not found to impact India's export volumes. Using firm level data broadly produces the similar results. Importantly, we find interesting variation in firms across sectors, with firms in sectors with higher imported intermediate input content such as drugs and pharmaceuticals, exhibiting a sharper increase in the value of imported intermediates, and a weaker response of exports to an appreciation of the exchange rate; while firms in sectors with low foreign value added such as textiles showing a larger response of exports to exchange rate movements.

What do our results imply? Given the sharp slowdown in exports which India has witnessed over the last few years, there are two pertinent questions: First, how can India's raise exports amidst the new global normal, especially if the exchange rate is unlikely to be a helpful tool? Second, if exports are less likely to power growth and investment, where will the growth come from? In this global environment – flush with manufacturing capacity -- it may take a brave entrepreneur to invest in a new manufacturing facility in India.

The answer to the first question may rest on four key pillars– (i) building and improving infrastructure, (ii) raising human capital with particular emphasis on vocational and on-the-job training, (iii) simplifying business regulation and taxation, and (iv) improving access to finance. A related question is whether India should encourage or focus on certain industries. Perhaps creating a conducive business environment, and strengthening the four pillars, and

leaving it to the myriad of Indian entrepreneurs to choose the "right" industry might be a better solution (see also Economic Survey, 2012, and Rajan, 2016). Building the four pillars can help raise the growth rate of exports, and India's share in global exports, even amidst the new global normal.

The answer to the second question: where will growth come from, is also related to the first one. Perhaps, growth will need to come from public and private investments in physical and human infrastructure, where India still stares at a large deficit. However, any sustained public investment thrust will necessitate creating commensurate fiscal space. Where will that space come from? Asset sales remains one sustainable option in the medium term – one that policymakers must take seriously. Similarly, any private investment in infrastructure will require getting rid of the debt-overhang on public sector banks and private-sector balance sheets (see Acharya, Prabhala and Mishra, 2017). This, in turn, will require – in some form or another -- creative destruction of capital, the political economy of which is daunting. But perhaps we cannot dither any further.

Boosting supply in the Indian context is critical. As the French economist Jean-Baptiste Say once said, supply creates its own demand. If Indian policymakers double down on the generation of physical and human capital, it will generate demand of its own, while simultaneously addressing a key bottleneck in the economy and improving productivity. Just think back to what the golden quadrilateral or rural infrastructure did to boosting asset prices, rural and urban demand and, most of all, firm productivity and competitiveness. This must be the policy antidote to deglobalization.

India has benefited enormously from global integration on the real side. The flip side is we are more exposed and vulnerable to current global risks than we might envision. The sooner we accept and prepare for this reality, the sooner we can lay the ground work for a new set of growth drivers in the current global environment.

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Table 1: Determinants of India's Merchandize and Services Exports			
	(1)	(2)	(3)
	Total Merchandize Exports	Manufactured Items	Services Exports
	Dependent Variable: Log of Exports (2010 Prices) in US$		
Log of Partner GDP	**2.8*** (0.8)**	**2.3*** (0.1)**	**1.6*** (0.5)**
Log of Partner GDP * Structural Break Dummy	**-2.5*** (0.2)**	**-1.4*** (0.2)**	-0.8 (0.7)
Log of Partner Exchange Rate	**-1.3*** (0.2)**	-0.8 (0.9)	**2.5*** (0.5)**
Log of Partner Exchange Rate * Structural Break Dummy	**1.7*** (0.3)**	1.9 (2.3)	**-2.7*** (0.6)**
Log of Number of Stalled Projects	0.1** (0.0)	0.1 (0.1)	
Volatility of $/Re. exchange Rate	79.1* (41.4)	72.0 (70.0)	71.3 (59.7)
Structural Break Dummy	**3.0** (1.3)**	-2.3 (11.1)	-6.2 (4.8)
Model Properties			
Sample period	2002Q4 to 2016Q3		
Number of Observations	56	56	56
Structural Break Date	2005Q1	2005Q1	2005Q4
Max Wald-F: Quandt-Andrews test for structural break	**59.8*** **	**48.4*** **	**97.0*** **

Sources:
CEIC; World Development Indicators, World Bank CMIE Capex
Notes:
Manufacturing exports exclude the exports of petroleum products, gems and jewellery, and primary products like agricultural items, ores and minerals
Numbers in the parenthesis represent the standard errors
*,** and *** indicate statistical significance at 10, 5 and 1% respectively

Table 2: Determinants of India's Merchandize and Services Exports: By Sector

	(1)	(2)	(2.1)	(2.2)	(2.4)	(2.5)	(2.6)	(3)
	Total Merchandize Exports	Manufacturing Exports	Leather and Textile	Engineering	Chemical Products	Pharmaceutical Products	Electronics	Services
	Dependent Variable: Log of Exports (2010 Prices) in US$							
Log of Partner GDP	**2.8*** (0.8)**	**2.3*** (0.1)**	**2.0*** (0.7)**	**5.5*** (0.3)**	**2.3*** (0.7)**	**2.2*** (0.2)**	**2.8*** (0.6)**	**1.6*** (0.5)**
Log of Partner GDP * Structural Break Dummy	**-2.5*** (0.2)**	**-1.4*** (0.2)**	-1.1 (1.0)	**-4.2*** (0.7)**	**-1.2* (0.7)**	**-1.0*** (0.3)**	**-4.0*** (1.1)**	-0.8 (0.7)
Log of Partner Exchange Rate	**-1.3*** (0.2)**	-0.8 (0.9)	0.6 (0.6)	-0.7 (1.8)	0.6 (0.8)	**5.2*** (0.7)**	**2.2** (1.1)**	**2.5*** (0.5)**
Log of Partner Exchange Rate * Structural Break Dummy	**1.7*** (0.3)**	1.9 (2.3)	**-3.3*** (0.6)**	2.3 (2.2)	**-2.7*** (0.8)**	**-6.7*** (0.9)**	-0.1 (2.1)	**-2.7*** (0.6)**
Log of Number of Stalled Projects	0.1** (0.0)	0.1 (0.1)	-0.2 (0.1)	0.0 (0.1)	-0.1 (0.2)	0.0 (0.0)	**0.2*** (0.0)**	
Volatility of Rs/$ exchange Rate	79.1* (41.4)	72.0 (70.0)	-18.1 (67.4)	93.5 (118.5)	47.6 (33.6)	3.5 (25.0)	120.1* (64.8)	71.3 (59.7)
Structural Break Dummy	**3.0** (1.3)**	-2.3 (11.1)	**20.7*** (4.5)**	7.9 (10.7)	**18.0*** (4.6)**	**34.9*** (4.7)**	19.2 (11.9)	-6.2 (4.8)
Model Properties								
Sample period	2002Q4 to 2016Q3							
Number of Observations	56	56	56	56	56	56	56	56
Structural Break Date	2005Q1	2005Q1	2013Q4	2005Q1	2014Q1	2005Q1	2008Q2	2005Q4
Max Wald-F: Quandt-Andrews test for structural break	**59.8***	**48.4***	**176.0***	**45.6***	**79.4***	**91.6***	**73.7***	**97.0***

Notes. *, ** and * indicate statistical significance at 10, 5 and 1% respectively.**
Numbers in the parenthesis represent the standard errors.

Table 3. Firm Outcomes and Exchange Rates: Value of Exports (in Rs. Million)

Dependent variable. Value of exports (in logs)															
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs
	Full sample			Post 2009 sample			Balanced panel of firms			Dynamic effects			Dynamic effects - post 2009		
Exchange rate (one-year lag, in logs)	**-0.349 [0.260]**	**-0.14 [0.197]**	**-0.005 [0.13]**	**1.364^ [0.85]**	**1.131^ [0.70]**	**0.499^ [0.31]**	**0.863*** [0.282]**	**0.890*** [0.207]**	**0.674*** [0.131]**	**0.334 [0.72]**	**2.197*** [0.589]**	**0.869*** [0.228]**	**1.415^ [0.91]**	**1.173^ [0.760]**	**0.518^ [0.335]**
World growth (one-year lag)	0.020*** [0.006]	0.016*** [0.004]	0.014*** [0.004]	-0.02 [0.020]	-0.007 [0.013]	0.004 [0.007]	-0.002 [0.007]	0.003 [0.005]	0.006 [0.004]	0.016 [0.015]	-0.012 [0.010]	0.008^ [0.005]	-0.012 [0.022]	0.002 [0.014]	0.013^ [0.008]
Volume of stalled projects (one-year lag, in logs)	-0.225*** [0.046]	-0.260*** [0.040]	-0.266*** [0.042]	-0.205 [0.171]	-0.329^ [0.201]	-0.306^ [0.193]	-0.253*** [0.049]	-0.207*** [0.041]	-0.163*** [0.041]	-0.313** [0.136]	-0.537*** [0.085]	-0.337*** [0.047]	-0.21 [0.169]	-0.339* [0.205]	-0.315^ [0.196]
Value of exports (one-year lag, in logs)										0.325*** [0.019]	0.325*** [0.019]	0.325*** [0.019]	0.227*** [0.027]	0.227*** [0.027]	0.227*** [0.027]
Time trend	0.186*** [0.01]	0.184*** [0.017]	0.192*** [0.015]	0.169*** [0.045]	0.278*** [0.088]	0.226*** [0.062]	0.175*** [0.015]	0.220*** [0.018]	0.189*** [0.015]	0.161*** [0.037]	0.366*** [0.061]	0.219*** [0.026]	0.130*** [0.045]	0.243** [0.094]	0.188*** [0.065]
Long-run effect										0.504	3.255	1.287	1.831	1.517	0.6701
Number of observations	27,899	27,899	27,899	15,379	15,379	15,379	10,304	10,304	10,304	20,645	20,645	20,645	13,666	13,666	13,666

Number of firms	6,561	6,561	6,561	5,247	5,247	5,247	1,288	1,288	1,288	5,486	5,486	5,486	4,743	4,743	4,743

Notes. All regressions include firm fixed effects. Standard errors are clustered at the firm-level. An increase in all measures of the exchange rate denotes an appreciation. *, **, *, and ^ denote statistical significance at 1,5, 10, and 15 percent levels respectively.**

Table 4. Firm Outcomes and Exchange Rates: Value of Imported Raw Materials (in Rs. Million)

Dependent variable. Value of imported raw materials (in logs)															
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs
	Full sample			Post 2009 sample			Balanced panel of firms			Dynamic effects			Dynamic effects - post 2009		
Exchange rate (one-year lag, in logs)	**0.452 [0.316]**	**0.611*** [0.234]**	**0.524*** [0.154]**	**2.084* [1.099]**	**1.727* [0.911]**	**0.763* [0.402]**	**1.166*** [0.358]**	**1.063*** [0.264]**	**0.766*** [0.171]**	**0.405 [0.983]**	**3.345*** [0.737]**	**1.326*** [0.282]**	**2.859** [1.112]**	**2.369** [0.921]**	**1.046** [0.407]**
World growth (one-year lag)	0.017** [0.007]	0.018*** [0.005]	0.019*** [0.005]	-0.02 [0.025]	-0.001 [0.016]	0.016* [0.009]	-0.003 [0.008]	0.005 [0.006]	0.008^ [0.005]	0.02 [0.020]	-0.024** [0.012]	0.006 [0.006]	-0.040^ [0.026]	-0.014 [0.016]	0.009 [0.009]
Volume of stalled projects (one-year lag, in logs)	-0.149** [0.058]	-0.122** [0.049]	-0.083* [0.050]	0.134 [0.224]	-0.055 [0.271]	-0.019 [0.260]	-0.148** [0.071]	-0.074 [0.061]	-0.02 [0.060]	-0.138 [0.182]	-0.503*** [0.107]	-0.199*** [0.060]	0.12 [0.230]	-0.139 [0.280]	-0.091 [0.268]
Time trend	0.109*** [0.018]	0.137*** [0.021]	0.115*** [0.018]	0.015 [0.058]	0.181^ [0.119]	0.101 [0.084]	0.095*** [0.022]	0.145*** [0.026]	0.107*** [0.022]	0.081^ [0.050]	0.401*** [0.076]	0.177*** [0.032]	0.013 [0.060]	0.240** [0.122]	0.131^ [0.087]
Long-run effect										0.497	4.099	1.611	3.009	2.494	1.101
Number of observations	19,427	19,427	19,427	10,777	10,777	10,777	8,643	8,643	8,643	14,308	14,308	14,308	9,530	9,530	9,530
Number of firms	4,524	4,524	4,524	3,578	3,578	3,578	1,173	1,173	1,173	3,723	3,723	3,723	3,192	3,192	3,192

Notes. All regressions include firm fixed effects. Standard errors are clustered at the firm-level. An increase in all measures of the exchange rate denotes an appreciation. *, **, *, and ^ denote statistical significance at 1,5, 10, and 15 percent levels respectively.**

Table 5. Firm Outcomes and Exchange Rates: By Domestic Value Added

	Dependent variable. Value of exports (in logs)							Dependent variable. Value of imported raw materials (in logs)					
	[1]	[2]	[3]	[4]	[5]	[6]		[7]	[8]	[9]	[10]	[11]	[12]
	REER	NEER	US$/Rs	REER	NEER	US$/Rs		REER	NEER	US$/Rs	REER	NEER	US$/Rs
	High domestic value added			Low domestic value added				High domestic value added			Low domestic value added		
Exchange rate (one-year lag, in logs)	**-0.874** [0.398]**	**-0.497* [0.296]**	**-0.227 [0.194]**	**0.575 [0.714]**	**0.696 [0.541]**	**0.578^ [0.359]**		**0.423 [0.497]**	**0.574^ [0.367]**	**0.489** [0.239]**	**1.015 [0.725]**	**0.939* [0.551]**	**0.698* [0.367]**
World growth (one-year lag)	0.026*** [0.009]	0.017*** [0.006]	0.014** [0.006]	-0.01 [0.015]	-0.008 [0.011]	-0.006 [0.010]		0.012 [0.011]	0.013* [0.008]	0.014** [0.007]	0.003 [0.016]	0.009 [0.011]	0.012 [0.010]
Volume of stalled projects (one-year lag, in logs)	-0.189*** [0.070]	-0.272*** [0.060]	-0.298*** [0.063]	-0.515*** [0.123]	-0.477*** [0.106]	-0.434*** [0.111]		-0.097 [0.088]	-0.073 [0.073]	-0.036 [0.074]	-0.109 [0.129]	-0.03 [0.109]	0.026 [0.112]
Time trend	0.202*** [0.023]	0.187*** [0.025]	0.210*** [0.023]	0.261*** [0.040]	0.292*** [0.046]	0.266*** [0.040]		0.120*** [0.027]	0.146*** [0.032]	0.125*** [0.027]	0.116*** [0.042]	0.154*** [0.048]	0.117*** [0.041]
Number of observations	12,204	12,204	12,204	3,638	3,638	3,638		8,418	8,418	8,418	3,067	3,067	3,067
Number of firms	2,942	2,942	2,942	788	788	788		2,010	2,010	2,010	677	677	677

Notes. All regressions include firm fixed effects. Standard errors are clustered at the firm-level. An increase in all measures of the exchange rate denotes an appreciation. Domestic value added content is based on an ICRIER study submitted to the Minisry of Finance. High DVA industries are defined as those with DVA content greater than the 25th percentile. *, **, *, and ^ denote statistical significance at 1,5, 10, and 15 percent levels respectively.**

Table 6. Firm Outcomes and Exchange Rates: Total Sales (in Rs. Million)

Dependent variable. Total sales (in logs)															
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs
	Full sample			Post 2009 sample			Balanced panel of firms			Dynamic effects			Dynamic effects - post 2009		
Exchange rate (one-year lag, in logs)	**0.675*** [0.136]**	**0.586*** [0.104]**	**0.402*** [0.069]**	**0.748** [0.372]**	**0.620** [0.308]**	**0.274** [0.136]**	**1.262*** [0.142]**	**1.025*** [0.107]**	**0.679*** [0.068]**	**0.045 [0.309]**	**0.244 [0.254]**	**0.099 [0.100]**	**0.395 [0.381]**	**0.328 [0.315]**	**0.145 [0.139]**
World growth (one-year lag)	0.002 [0.003]	0.006*** [0.002]	0.009*** [0.002]	-0.006 [0.009]	0.001 [0.005]	0.007** [0.003]	-0.013*** [0.003]	-0.003 [0.002]	0.001 [0.002]	0.019*** [0.006]	0.017*** [0.004]	0.019*** [0.002]	0.01 [0.009]	0.014** [0.006]	0.017*** [0.003]
Volume of stalled projects (one-year lag, in logs)	-0.077*** [0.023]	-0.021 [0.020]	0.014 [0.021]	0.242*** [0.084]	0.174* [0.097]	0.187** [0.094]	-0.106*** [0.024]	-0.017 [0.019]	0.038** [0.018]	0.056 [0.058]	0.032 [0.038]	0.054** [0.022]	0.06 [0.079]	0.025 [0.093]	0.031 [0.090]
Total sales (one-year lag, in logs)										0.455*** [0.027]	0.454*** [0.027]	0.454*** [0.027]	0.416*** [0.037]	0.416*** [0.037]	0.416*** [0.037]
Time trend	0.119*** [0.008]	0.142*** [0.009]	0.118*** [0.008]	0.029 [0.022]	0.089** [0.041]	0.060** [0.030]	0.119*** [0.007]	0.164*** [0.009]	0.124*** [0.007]	0.021 [0.017]	0.043^ [0.027]	0.027** [0.012]	0.019 [0.020]	0.05 [0.041]	0.035 [0.029]
Number of observations	27,542	27,542	27,542	15,186	15,186	15,186	10,242	10,242	10,242	20,375	20,375	20,375	13,493	13,493	13,493
Number of firms	6,488	6,488	6,488	5,186	5,186	5,186	1,286	1,286	1,286	5,427	5,427	5,427	4,692	4,692	4,692

Notes. All regressions include firm fixed effects. An increase in all measures of the exchange rate denotes an appreciation. Standard errors are clustered at the firm-level. *, **, *, and ^ denote statistical significance at 1,5, 10, and 15 percent levels respectively.**

Table 7. Firm Outcomes and Exchange Rates: Total Expenses (in Rs. Million)

Dependent variable. Total expenses (in logs)															
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs
	Full sample			Post 2009 sample			Balanced panel of firms			Dynamic effects			Dynamic effects - post 2009		
Exchange rate (one-year lag, in logs)	**0.761*** [0.114]**	**0.685*** [0.086]**	**0.490*** [0.056]**	**1.287*** [0.314]**	**1.066*** [0.260]**	**0.471*** [0.115]**	**1.180*** [0.113]**	**0.978*** [0.086]**	**0.660*** [0.055]**	**0.09 [0.253]**	**0.756*** [0.214]**	**0.300*** [0.084]**	**0.670** [0.332]**	**0.555** [0.275]**	**0.245** [0.121]**
World growth (one-year lag)	-0.001 [0.003]	0.004** [0.002]	0.006*** [0.002]	-0.017** [0.007]	-0.005 [0.004]	0.005** [0.002]	-0.009*** [0.003]	0 [0.002]	0.003** [0.002]	0.019*** [0.005]	0.009** [0.004]	0.016*** [0.002]	0.005 [0.008]	0.011** [0.005]	0.016*** [0.003]
Volume of stalled projects (one-year lag, in logs)	-0.125*** [0.020]	-0.063*** [0.016]	-0.021 [0.017]	0.192*** [0.068]	0.076 [0.080]	0.097 [0.077]	-0.123*** [0.019]	-0.041*** [0.016]	0.011 [0.016]	0.016 [0.047]	-0.066** [0.032]	0.003 [0.018]	0.056 [0.061]	-0.004 [0.073]	0.007 [0.070]
Total expenses (one-year lag, in logs)										0.471*** [0.021]	0.469*** [0.021]	0.469*** [0.021]	0.413*** [0.028]	0.413*** [0.028]	0.413*** [0.028]
Time trend	0.141*** [0.006]	0.167*** [0.007]	0.140*** [0.006]	0.051*** [0.018]	0.154*** [0.034]	0.104*** [0.025]	0.132*** [0.006]	0.175*** [0.008]	0.137*** [0.006]	0.039*** [0.013]	0.111*** [0.023]	0.060*** [0.011]	0.030* [0.016]	0.083** [0.034]	0.057** [0.023]
Number of observations	27,891	27,891	27,891	15,375	15,375	15,375	10,304	10,304	10,304	20,639	20,639	20,639	13,663	13,663	13,663
Number of firms	6,558	6,558	6,558	5,245	5,245	5,245	1,288	1,288	1,288	5,483	5,483	5,483	4,741	4,741	4,741

Notes. All regressions include firm fixed effects. Standard errors are clustered at the firm-level. An increase in all measures of the exchange rate denotes an appreciation. *, **, *, and ^ denote statistical significance at 1,5, 10, and 15 percent levels respectively.**

Table 8. Firm Outcomes and Exchange Rates: Profits (in Rs. Million)

Dependent variable. Profits (in logs)									
	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs
	Full sample			Post 2009 sample			Balanced panel of firms		
Exchange rate (one-year lag, in logs)	**0.093**	**-0.074**	**-0.124**	**-0.703**	**-0.583**	**-0.257**	**0.824^**	**0.427**	**0.187**
	[0.431]	**[0.316]**	**[0.209]**	**[1.797]**	**[1.489]**	**[0.658]**	**[0.531]**	**[0.381]**	**[0.249]**
World growth (one-year lag)	-0.003	-0.001	0.000	0.025	0.019	0.013	-0.021*	-0.012^	-0.01
	[0.009]	[0.006]	[0.006]	[0.042]	[0.026]	[0.014]	[0.011]	[0.008]	[0.008]
Volume of stalled projects (one-year lag, in logs)	0.221***	0.235***	0.228***	-0.273	-0.209	-0.221	0.07	0.147*	0.173**
	[0.083]	[0.069]	[0.069]	[0.347]	[0.429]	[0.410]	[0.107]	[0.088]	[0.086]
Time trend	0.02	0.015	0.016	0.137^	0.081	0.108	0.051^	0.063^	0.042
	[0.026]	[0.030]	[0.026]	[0.091]	[0.194]	[0.135]	[0.033]	[0.039]	[0.033]
Number of observations	14,635	14,635	14,635	8,041	8,041	8,041	6,142	6,142	6,142
Number of firms	4,802	4,802	4,802	3,552	3,552	3,552	1,213	1,213	1,213

Notes. All regressions include firm fixed effects. Standard errors are clustered at the firm-level. An increase in all measures of the exchange rate denotes an appreciation. Firms with negative profits are dropped from the regressions. *, **, *, and ^ denote statistical significance at 1,5, 10, and 15 percent levels respectively.**

Table 9. Firm Outcomes and Exchange Rates: Salaries and Wage Expenses (in Rs. Million)

Dependent variable. Value of exports (in logs)															
	[1]	[2]	[3]	[4]	[5]	[6]	[13]	[14]	[15]	[10]	[11]	[12]	[7]	[8]	[9]
	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs
	Full sample			Post 2009 sample			Balanced panel of firms			Dynamic effects			Dynamic effects - post 2009		
Exchange rate (one-year lag, in logs)	**1.008*** [0.107]**	**0.851*** [0.081]**	**0.573*** [0.052]**	**0.597** [0.288]**	**0.495** [0.239]**	**0.218** [0.105]**	**1.287*** [0.108]**	**1.034*** [0.082]**	**0.673*** [0.052]**	**-0.304 [0.245]**	**0.358* [0.201]**	**0.173** [0.077]**	**0.254 [0.310]**	**0.211 [0.257]**	**0.093 [0.113]**
World growth (one-year lag)	-0.014*** [0.002]	-0.007*** [0.002]	-0.004** [0.002]	-0.008 [0.007]	-0.003 [0.004]	0.002 [0.002]	-0.021*** [0.003]	-0.011*** [0.002]	-0.007*** [0.002]	0.020*** [0.005]	0.008** [0.003]	0.011*** [0.002]	0.003 [0.007]	0.006 [0.005]	0.008*** [0.003]
Volume of stalled projects (one-year lag, in logs)	-0.158*** [0.018]	-0.074*** [0.015]	-0.022 [0.016]	0.199*** [0.062]	0.145** [0.074]	0.155** [0.071]	-0.127*** [0.019]	-0.035** [0.015]	0.021 [0.015]	0.059 [0.046]	-0.042 [0.029]	-0.012 [0.016]	0.132** [0.056]	0.109^ [0.069]	0.114* [0.066]
Value of exports (one-year lag, in logs)										0.553*** [0.023]	0.553*** [0.023]	0.553*** [0.023]	0.458*** [0.034]	0.458*** [0.034]	0.458*** [0.034]
Time trend	0.170*** [0.006]	0.202*** [0.007]	0.167*** [0.006]	0.070*** [0.016]	0.117*** [0.031]	0.094*** [0.022]	0.152*** [0.005]	0.197*** [0.007]	0.156*** [0.005]	0.027** [0.012]	0.078*** [0.022]	0.056*** [0.010]	0.018 [0.014]	0.038 [0.032]	0.028 [0.022]
Number of observations	27,708	27,708	27,708	15,277	15,277	15,277	10,295	10,295	10,295	20,521	20,521	20,521	13,588	13,588	13,588
Number of firms	6,502	6,502	6,502	5,208	5,208	5,208	1,288	1,288	1,288	5,444	5,444	5,444	4,713	4,713	4,713

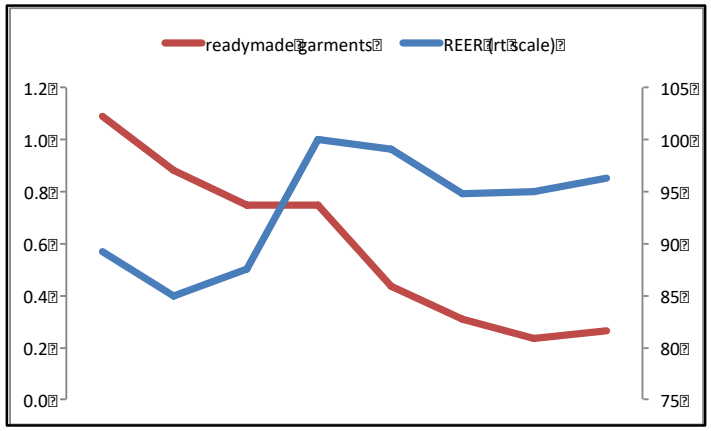
Notes. All regressions include firm fixed effects. Standard errors are clustered at the firm-level. An increase in all measures of the exchange rate denotes an appreciation. *, **, *, and ^ denote statistical significance at 1,5, 10, and 15 percent levels respectively.**

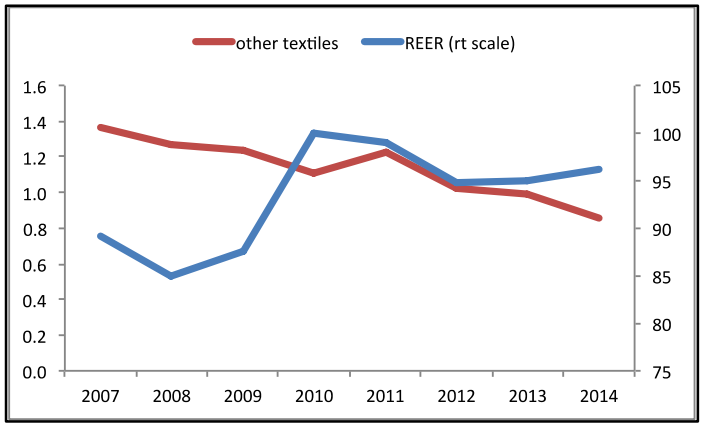
Table 10. Firm Outcomes and Exchange Rates: Investment (in Rs. Million)

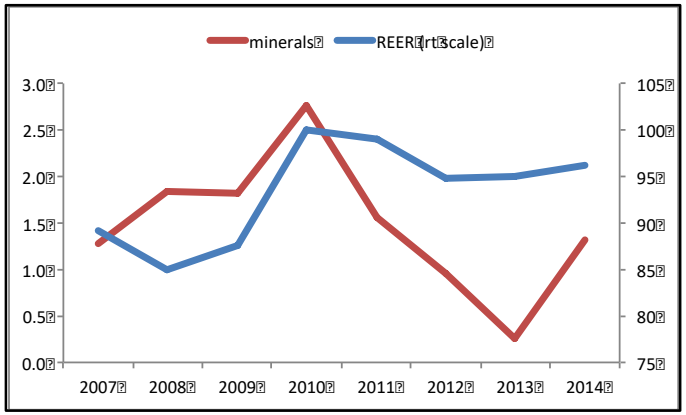
Dependent variable. Value of investment (in logs)															
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs	REER	NEER	US$/Rs
	Full sample			Post 2009 sample			Balanced panel of firms			Dynamic effects			Dynamic effects - post 2009		
Exchange rate (one-year lag, in logs)	**-2.294 [2.729]**	**2.262 [2.216]**	**1.136 [0.847]**	**1.957 [3.709]**	**1.622 [3.073]**	**0.716 [1.357]**	**-3.774 [2.999]**	**1.645 [2.630]**	**1.003 [1.004]**	**-2.197 [2.361]**	**3.281 [2.600]**	**1.791* [1.020]**	**2.489 [3.264]**	**2.063 [2.705]**	**0.911 [1.195]**
World growth (one-year lag)	0.080^ [0.056]	-0.001 [0.037]	0.015 [0.019]	-0.029 [0.088]	-0.011 [0.055]	0.005 [0.031]	0.094^ [0.061]	-0.008 [0.042]	0.001 [0.020]	0.069^ [0.048]	-0.033 [0.048]	-0.015 [0.027]	-0.066 [0.078]	-0.043 [0.049]	-0.023 [0.028]
Volume of stalled projects (one-year lag, in logs)	0.59 [0.525]	-0.117 [0.357]	0.065 [0.195]	1.080* [0.590]	0.903 [0.772]	0.936 [0.730]	1.118* [0.598]	0.227 [0.440]	0.33 [0.233]	0.356 [0.442]	-0.434 [0.346]	-0.175 [0.165]	1.148** [0.524]	0.923 [0.657]	0.965^ [0.623]
Value of exports (one-year lag, in logs)										-0.225*** [0.052]	-0.225*** [0.052]	-0.225*** [0.052]	-0.234*** [0.065]	-0.234*** [0.065]	-0.234*** [0.065]
Time trend	-0.134 [0.145]	0.201 [0.243]	0.071 [0.104]	-0.271* [0.159]	-0.115 [0.384]	-0.19 [0.259]	-0.292* [0.166]	0.05 [0.298]	-0.025 [0.127]	-0.044 [0.121]	0.387^ [0.268]	0.211** [0.105]	-0.237* [0.137]	-0.038 [0.323]	-0.134 [0.216]
Number of observations	17,866	17,866	17,866	12,099	12,099	12,099	8,017	8,017	8,017	11,778	11,778	11,778	9,673	9,673	9,673
Number of firms	5,182	5,182	5,182	4,420	4,420	4,420	1,286	1,286	1,286	3,750	3,750	3,750	3,443	3,443	3,443

Notes. All regressions include firm fixed effects. Standard errors are clustered at the firm-level. An increase in all measures of the exchange rate denotes an appreciation. *, **, *, and ^ denote statistical significance at 1,5, 10, and 15 percent levels respectively.**

Figure 7. Market Share of Exports (in %) over Time: Selected Sectors with High Domestic Value Added







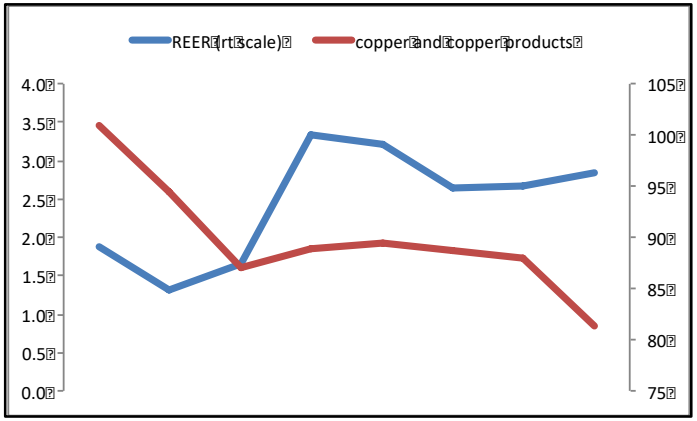
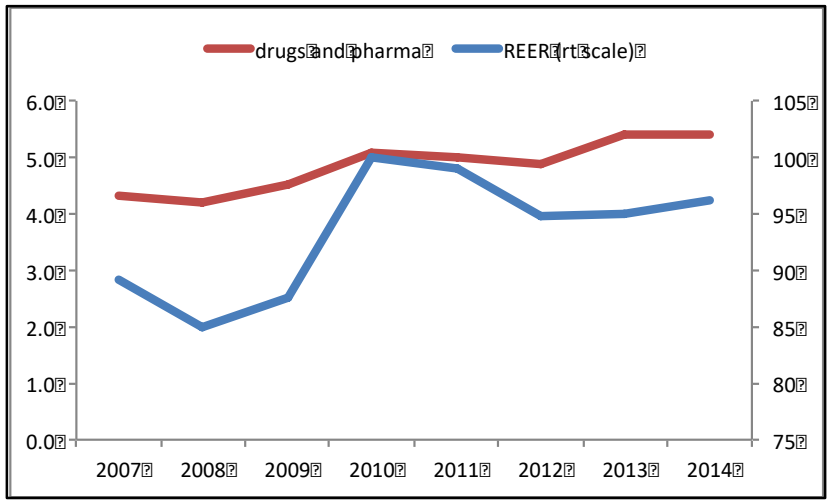
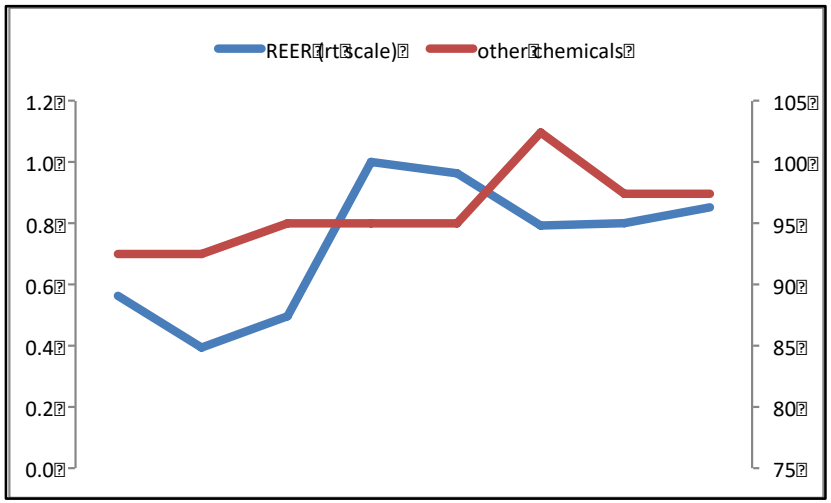


Figure 8. Market Share of Exports (in %) over Time: Selected Sectors with High Foreign Value Added





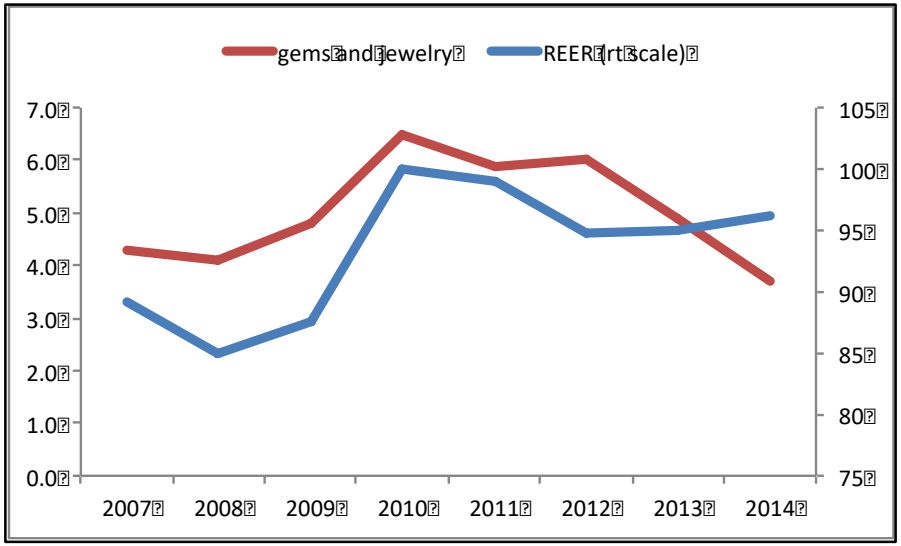


Table A1: Determinants of India's Manufacturing and Services Exports: Check for non-linearity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Manufacturing Exports				**Services Exports**			
	Linear Model	Non-Linearity in Partner GDP	Non-Linearity in Exchange Rate	(2) + (3)	Linear Model	Non-Linearity in Partner GDP	Non-Linearity in Exchange Rate	(6) + (7)
	Dependent Variable: Log of Exports (2010 prices) in US$							
Log of Partner GDP	**2.3*** **	**2.3*** **	**2.3*** **	**2.3*** **	1.6*	**3.0*** **	1.2	**2.7*** **
Log of Partner GDP * High Partner Growth		0.2		0.2		-0.4		-0.3
Log of Partner Exchange Rate	-0.8	-0.9	-0.8	-0.9	2.5*	**3.6*** **	2.3	**3.4*** **
Log of Partner Exchange Rate * High Rupee Appreciation			-0.7	-0.3			0.1	0.1
Log of Number of Stalled Projects	0.1	0.2	0.1	0.1				
Volatility of $/Re. Exchange Rate	72.0	82.6	65.1	77.9	71.3	56.8	54.7	44.6
Structural Break Dummy * Log of Partner GDP	**-1.4****	-1.5*	**-1.4****	**-1.5****	-0.8	-2.2	-0.6	-2.1*
Structural Break Dummy * Log of Partner GDP * High Partner Growth		0.0		0.0		**0.1*** **		**0.1*** **
Structural Break Dummy * Log of Partner Exchange Rate	1.9	2.4	1.9	2.4	**-2.7****	**-3.8*** **	-2.6	**-3.7*** **
Structural Break Dummy * Log of Partner Exchange Rate * High Rupee Appreciation			0.0	0.0			0.0	0.0
Dummy Variables:								
Structural Break	-2.3	-4.7	-2.4	-4.1	-6.2	-4.5	-7.0	-4.7
High Partner Growth		-0.8		-0.9		1.7		1.1
High Rupee Appreciation			3.0	1.2			0.5	0.5
Sample period	2002Q4 to 2016Q3							
Observations	56	56	56	56	56	56	56	56
Structural Break Date		2005Q1					2005Q4	
Maximum Wald-F stat: Quandt-Andrews Test		48.4***					97.0***	
Durbin-Watson d-statistic	2.8	2.6	2.6	2.6	1.9	2.1	2.1	2.1
Ljung-Box Q-stat for first order autocorrelation	**8.5*** **	**4.9****	**5.4****	**5.2****	0.0	0.2	0.2	0.1

Notes:

*, ** and *** indicate statistical significance at 10, 5 and 1% respectively.

High Partner Growth is a dummy variables which assumes value equal to 1 when the QoQ change in Partner GDP is more than 2%.

High Rupee Appreciation is a dummy variables which assumes value equal to 1 when the QoQ change in Partner Exchange rate is more than 2%.

Regression use heteroskedasticity-consistent robust standard error

Table A2: Determinants of India's Manufacturing and Services Exports: Alternative Specifications

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Manufacturing Exports								**Services Exports**					
	Baseline: REER	Baseline: $/Re.	Crisis as Break	Exchange Rate dropped	Lagged Exports	Lagged Partner GDP	Lagged Exchange Rate: REER	Lagged Exchange Rate: $/Re.	Baseline: $/Re.	Crisis as Break	Exchange Rate dropped	Lagged Exports	Lagged World Output	Lagged Exchange Rate: $/Re.
	Dependent Variable: Log of Exports (2010 prices) in US$													
Log of Exports (2010 Prices) - 1Q Lag					-0.1							**0.7*** **		
Log of Partner GDP	**2.3*** **	**2.6*** **	**1.6*** **	**2.3*** **	**2.3*** **	**2.5*** **	**2.3*** **	**2.5*** **	1.6*	1.3*	**2.8*** **	-1.0	0.7	1.9
Log of Partner GDP - 1Q Lag						-0.3							4.4*	
Log of Exchange Rate	-0.8	-0.4	-1.6		-0.4	0.1	-0.7	-0.5	**2.5****	0.3		**5.0*** **	-2	2.7
Log of Exchange Rate - 1Q Lag							0.7	0.2						-1.1
Log of Number of Stalled Projects	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1						
Volatility in $/Re. Exchange Rate	72.0	77.0	69.8	53.2	60.4	68.7	81.9	82.5	71.3	132.9*		47	71.2	65.4
Dummy for Structural Break	-2.3	**11.8****	**-24.4****	5.8*	-3.7	2.9	1.4	10.5*	-6.2	-1.4	**10.3****	**-21.6****	25.9	-1.6
Structural break dummy interacted with :														
Log of Exports (2010 Prices) - 1Q Lag					0.2							-0.2		
Log of Partner GDP	**-1.4****	**-1.9****	0.8	**-1.3****	**-1.5****	-1.2	-1.3*	**-1.8****	-0.8	0.5	**-2.3****	1.2	-0.2	-1.2
Log of Partner GDP - 1Q Lag						-0.2							-4.0	
Log of Exchange Rate	1.9	0.9	**4.6****		1.8	0.7	2.0	1.0	**-2.7****	0.2		**-4.9****	1.8	-2.9
Log of Exchange Rate - 1Q Lag							-1.0	-0.3						1.1

Structural Break Date	2005Q1	2005Q1	2008Q3	2005Q1	2005Q1	2005Q1	2005Q1	2005Q1	2005 Q4	2008Q 3	2005Q4	2005Q4	2005Q4	2005Q4
Sample period	2002Q4 to 2016Q3													
Observations	56	56	56	56	55	55	55	55	56	56	56	55	55	55
D-W Statistic	2.8	2.7	2.6	2.8	3.0	2.8	2.7	2.7	1.9	2.1	2.3	2.4	1.8	2
Ljung-Box Q-stat for first order autocorrelation	**8.5*** **	**6.6** **	**5.8** **	**9.8*** **	**14.0*** **	**10.3*** **	**7.7*** **	**6.5** **	0	0.3	1.1	2.8*	0.4	0
AIC	-158	-160	-172	-163	-153	-151	-152	-151	-134	-132	-136	-152	-134	-126
BIC	-114	-115	-127	-124	-107	-102	-106	-103	-91	-89	-102	-106	-88	-80

Notes:

*, ** and *** indicate statistical significance at 10, 5 and 1% respectively.

We use heteroskedasticity consistent robust standard errors.

Data Appendix

Macro Analysis

We use quarterly data from fiscal year 2002Q4 to 2016Q3 in our empirical models. [9] The data on merchandize and services exports are collected from the CEIC database. This data is available at a monthly frequency. We derive the quarterly exports figures from the monthly information available for the period October 2002 to September 2016. For merchandize exports, disaggregated data is available for the "principal commodity groups", which cover more than 92 percent of the total merchandize exports. Based on the principal commodity groups, we identify 11 broad sectors: agriculture, ores and minerals, chemicals, pharmaceuticals, electronics, engineering goods, leather and textile, metal and metal products, miscellaneous manufactured items, gems and jewelry, and petroleum products. Further, we classify the following as manufactured items: chemicals, pharmaceuticals, electronics, engineering goods, leather and textile, metal and metal products, and miscellaneous manufactured items. Miscellaneous manufactured items include products such as paper and print related items, ceramic and glassware, wood and wood products, plastic and rubber products, handicrafts and other unclassified manufactured items.

The data on both merchandize and services exports are available in million US$, which represent the value of exports. The database does not contain information on the volume. Therefore, we deflate nominal exports' to obtain real exports in million US$. We deflate exports of chemicals, pharmaceuticals, electronics, engineering goods, leather and textile, and miscellaneous manufactured items by the US Producer Price Index. Further, we deflate services exports by the US Consumer Price Index. We deflate the remaining sectors viz. the petroleum products, gems and jewelry, agricultural goods, metal and metal products by the UK Brent (international crude price), international gold prices, United Nation's FAO food price index and CRB metal price index, respectively. For ease of comparison, we normalize all the price indices to the year 2010; or in other words, we define real exports in 2010 prices (mn US$). After deflating sectoral exports, we sum them up to derive the series on

[9] Fiscal year in India runs from April-March. Q4 indicates the quarter October-December and Q3 indicates the quarter July-September.

manufactured items. Total merchandize exports includes manufactured items as well as exports of sectors that are not classified as manufacturing sectors.

Our quarterly dataset also includes information on (i) India's export partners' GDP, (ii) the exchange rate of INR vis-à-vis trading partner currencies, (iii) domestic supply constraints proxied by the number of stalled projects in each sector, and (iv) the volatility of the INR/US$ exchange rate. We take quarterly GDP data in current prices (in mn US$) from CEIC, for about 105 exports partners of India, which roughly comprise more than 92 percent of India's exports. In our empirical models, we use the weighted average index of real GDP of India's export partners. We first deflate the GDP series for each country by the US Consumer Price Index. The, we normalize the real GDP of each country to the year 2010. Finally, we combine these country specific real GDP indices (2010=100) to a composite weighted averaged index called the "Partner Country GDP" (2010=100), where we use each country's share in the value of India's exports as weights. As the export share of partner countries varies significantly across sectors, we construct this index separately for each sector, and also for total merchandize and manufactured items. In other words, we create a separate export-weighted partner country GDP for each sector, by using sector-specific export shares. Since we do not have bilateral data on trade in services, we use the world real GDP (in mn US$) for estimating partner income elasticity for services.

We also construct an index for the real exchange rate. We construct a partner country export weighted real exchange rate for each sector, using sector-specific export shares as weights. By construction, a higher value of the exchange rate indicates an appreciation of the INR against the partner country's' currency. We first convert the INR/partner country nominal exchange rate to a real exchange rate by multiplying with the ratio of India's consumer price index (2010=100) to the partner country's consumer price index (2010=100). We take country-wise annual data on consumer price index (2010=100) from the World Development Indicators, World Bank. Further, we normalize real exchange rates of INR vis-à-vis each country's domestic currency, to the year 2010.

Finally, we combine these country specific real exchange rate indices (2010=100) to a composite weighted averaged index called the "Partner Country Exchange rate (2010=100)",

where we use each country's share in India's exports as weight. As the export share of countries varies across sectors, we construct this index separately for each sector, and also for the total manufactured items.

For total merchandize exports, we use the index of 36 country exports weighted Real Effective Exchange rate for INR, published by the Reserve Bank of India. For services sector, since we do not have the export shares, we use the INR/US$ exchange rate[deflated?] published by the Reserve Bank of India.

We also compile quarterly series on the number of stalled projects, based on the Capex database, collected by the Centre for Monitoring the Indian Economy (CMIE). The volatility in the exchange rate of INR/US$ is measured by the standard deviation of daily exchange rates during each quarter. The daily exchange rates are taken from the CEIC database.

Firm Level Data

We compile an annual firm-level panel dataset that spans the period from 2007-2014, based on the Prowess database, collected by the Center for Monitoring the Indian Economy (CMIE). It covers around 6500 publicly listed exporting firms across 143 industries, with their export earnings comprising roughly 40 percent of total exports (based on the 2013 balance of payments). The dataset includes information on value of exports of goods and services, value of imported raw materials, total costs, and total sales (all in million rupees) at the firm level. The dataset does not contain information on quantities of exports and imports, on unit values, or on destination of exports. The firm level database is merged with data on (i) average annual exchange rates based on three different measures (REER, NEER, and US$/Rs.), and (ii) the domestic value added content of exports at a sectoral level.[10]

[10] The domestic value added content is taken from a recent ICRIER study recently submitted to the Ministry of Finance ("Estimating Domestic Value Added and Foreign Content in India's Exports"). Examples of industries with high domestic value added content include poultry, dairy, and other agriculture products; while industries with low domestic value added (or high foreign value added) include gems an jewelry, consumer electronics; and air and shipping transport services.