Decomposing India's Trade Ratio: 1980-2021[*]

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Abstract

External balance is a critical constraint in the macroeconomic dynamics of a developing economy. Typically, external adjustment is said to occur through changes in the real exchange rate, and implicitly in the terms of trade. This article decomposes India's merchandise trade ratio into three parts, namely, change in terms of trade, relative expenditure growth and relative import intensity over the period 1980–2021. It finds that terms of trade contribute little to the evolution of India's trade ratio from the 1990s. Instead, falling relative expenditure growth, due to India growing faster than its trade partners and, rising relative import intensity, due to a reduction in India's reliance on imports relative to its partners, explain a large share of the change in the trade ratio post-1991. Devaluations have not contributed to the improvement in the trade ratio, while export growth and reduced domestic intensity have been critical.

1 Introduction

In India's macroeconomic history, 1966 and 1991 feature prominently as two disastrous years. In both cases, the country faced a major external crisis and saw steep currency devaluations as a result. The run up to both involved continued and substantial trade deficits and dwindling or reversal of foreign financial flows, resulting in very sharp changes in macroeconomic policy (the latter year is often marked as the one year in which economic reforms took off). In terms of macroeconomic constraints, even to date, the external sector continues to be a central area of concern, with much policy effort aimed at managing foreign inflows, limiting imports (as with the 'Make in India' programme[1]) and with generating exports.

The management of the external balance has involved a number of policy interventions, but the lion's share of debate focuses on rupee (INR) devaluation and changing the terms of trade to reduce deficits (the implicit assumption is that import and export elasticities conform to the technical requirements to do so). However, the terms of trade are only one determinant of trade balances. As has long been known and emphasized in the literature on balance-of-payments constraints (Thirlwall 1979), the relative growth rate of a country as well as the composition of spending (on imports versus exports) are crucial determinants of actual import and export expenditure and hence, balances. To effectively understand and address long-standing trade imbalances, one needs to consider all of these determinants.

This article seeks to do exactly this for India by taking a historical accounting perspective over the last four decades. By accounting, we mean working with a decomposable identity, such that one can precisely quantify the contribution of subcomponents. To do so, we examine the determinants of a related but distinct concept — the *trade ratio* of the country. We undertake an accounting decomposition of India's trade ratio since the beginning of its growth take-off in the 1980s using a mathematical identity. The main reason to work with the trade ratio — the ratio of exports to imports — rather than the trade balance is that it allows us to use a straightforward set of accounting relationships to separate changes in trade flows into three components —relative import intensity,

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[1]The 'Make in India' program is an initiative by the government in India to incentivize producers and companies to manufacture, assemble and distribute products in India. Specifically, the goal was to achieve self-reliance and turn India into a global manufacturing hub.

terms of trade and relative growth. In other words, we can decompose the drivers of trade into three factors: the relatively quicker growth of India compared to its trading partners (a fact that should, ceteris paribus increase the trade deficit or lower the trade ratio), changes in the terms of trade (a more favourable terms of trade should reduce the deficit or increase the trade ratio), and the allocation of spending on imports versus domestic goods relative to that of its trading partners (ceteris paribus, a larger relative reliance on imports for India would increase its trade deficit or lower the trade ratio). In doing so, we identify several periods in which the drivers of the trade ratio differ.

We describe the factors influencing India's trade performance over the past 40 years, a period during which the country shifted from the relatively closed, import-substitution regime of the immediate post-independence decades toward increased openness to foreign trade and financial flows. Having declined through the 1980s and early 1990s, India's trade deficit widened over the next 20 years, especially during the period 2004–12. More recently, India's trade deficit has declined. While the trade deficit is one variable to consider, the trade ratio allows us to identify the relative importance of expenditure switching, differential growth rates and terms of trade in these developments and is of obvious policy and historical interest.

Right at the outset, we should note that this is not an exercise in establishing causality. Accounting approaches simply tell us which components are quantitatively important in the evolution of a composite whole. While such an approach cannot establish causality it has the virtue of focusing attention on the more important components for which causal explanations need to be found. As with many developing countries, India's management of its external account has undergone multiple revisions. The immediate post-colonial period was marked by a desire for self-reliance and as such, the country adopted a broad policy of import substitution which increased in scope and scale through the 1960s and 1970s. A gradual reversal and greater reintegration with the global economy began in the 1980s and, in 1991, India's orientation became decidedly more outward looking as it slowly but surely opened itself up to global competition, allowing market prices to dictate allocation more extensively and increasing its trade share of gross domestic product (GDP) over the 1990s and early 2000s. In both eras, however, the balance of payments and the balance of trade have continued to be seen as key constraints to macroeconomic policy. In the pre liberalization period, persistent negative trade bal-

ances and closed capital accounts meant that foreign exchange was scarce. In the 1990s and 2000s, while capital inflows generated large foreign exchange reserves, trade deficits continued apace and these were often seen to threaten Indian growth going forward (Jawaid and Raza 2013; Rangarajan and Mishra 2013). Approaches drawing from Thirlwall (1979) balance-of-payments-constrained growth approach (see Thirlwall (2011) for a survey) suggest that long-run economic performance and growth is constrained by the need for foreign exchange, thus domestic and foreign demand are critical for raising potential growth. Razmi (2005) finds, for example, that India's growth rate from 1950–2000 closely approximates what one might predict from the balance-of-payments constrained model. Meanwhile, Nell (2013) provides a compelling narrative of India's growth transition and argues that subsequent export growth allowed Indian expenditure to grow much faster.

The theoretical basis for such an argument is straightforward. In the absence of substantial exchange reserves, economies can deal with persistent trade deficits in one of two ways. First, they can adopt expenditure-reducing policies, such as fiscal and monetary, to reduce domestic expenditure to bring down imports. This is the route via deflation. Second, they can adopt expenditure-switching policies, such as exchange rate policy and commercial policy, to encourage exports and discourage imports given the level of domestic expenditure. In standard theory, trade liberalization results in changing international relative prices which induces economic units to switch their expenditure between producers in different countries. In the case of India, policy makers suggested in the early 1990s that the opening up of the economy might lead to India's exports becoming more competitive and the kind of export-led growth model that benefited East Asia. Sufficient devaluation could work to generate, in time, a positive trade balance. Since 1992, the nominal exchange rate has depreciated by nearly 200 per cent and since 1994 the real effective exchange rate has depreciated by approximately 10 per cent. Yet, despite impressive export growth (see Chatterjee and Subramanian (2020)) imports have continued to remain high and the trade balance has been negative and relatively stable throughout the post liberalization era.

Our 'accounting' perspective underlines the sometimes glossed-over fact that while terms of trade and competitiveness generally may have an effect on the trade balance, it is far from the only influence. Relative income growth between trade partners and

relative import intensities are critical too. It is an empirical matter as to what is driving a trade balance, and if other determinants are substantially more important in a quantitative sense,[2] then one cannot presume that observed imbalances can be resolved by exchange rate policy alone.

To foreground our results from our decomposition: the terms of trade did have a critical role in the evolution of the trade ratio only in the first decade of analysis (for example, the 1980s). But in the decades that followed, other factors have been far more dominant. In particular, relative growth rates have contributed the most. From 2010–20, one of the most striking features has been the fact that domestic import intensity is much lower than in the previous decade, making the trade ratio higher than it might otherwise have been. An additional purpose in writing this paper is to potentially foreground useful methodological advances. This article uses an empirical approach to provide a different historical perspective on the record of India's trade performance. It demonstrates the value of the decomposition approach used here for a broader range of questions about trade flows. The growth and decline of trade imbalances within the European Union, the shifts in the US trade balance, or the closing of trade deficits in the 'Asian crisis' countries after 1997 are a few natural applications of this approach.

The next section clarifies the relationships between the terms used here and those more frequently used in discussions of trade flows. As such, we want to make the case for a historical accounting approach to macroeconomic questions more generally with the understanding of specific historical developments. In the terms of Gelman (2011), in many cases we are interested here in a reverse-causal rather than a forward-causal question — in the causes of an effect rather than the effect of a cause. In contrast with most empirical studies of trade flows (Gopinath and Rigobon 2008; Campa and Goldberg 2005), we are not trying to estimate the expected effect of a hypothetical change in a variable, but asking rather what kinds of explanations are possible for the actual changes in trade flows observed over a specific period In what follows we undertake our analysis, foreground the key results before ending with some speculative notes for policy consideration.

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[2]There is a sizeable heterodox literature of course that approaches exchange rates from a structuralist perspective. In these models, the short-run effects of exchange rate devaluations do not necessarily result in export increases and expansions, but could have 'perverse' effects in reducing demand (see, for example, Krugman and Taylor (1978)). For a nice summary of these channels, see Demir and Razmi (2022).

2 Accounting for Trade Flows

In this section we lay out our approach in generic terms, following Schroder (2016) before applying it to the case of India. Trade flows, like other economic variables, are measured in units of currency. For convenience, we will start with units of current domestic currency (LCU). Let $X^\$$ be the country's *nominal* exports measured in LCU and $M^\$$ be its *nominal* imports measured in LCU.

The balance between imports and exports is normally expressed as the trade balance or net exports ($X^\$ - M^\$$), often scaled by GDP. Here, for reasons that will become clear, we will instead work with the *trade ratio*, which we label R:

$$R = \frac{X^\$}{M^\$}. \tag{1}$$

Which measure of the trade balance is appropriate depends on the question being asked. For trade as a component of aggregate demand, the trade balance may be most appropriate. For questions relating to trade as a component of demand, the conventional trade balance may be the most suitable measure. For questions relating to trade as a source of foreign exchange, the broader current account balance may be more suitable. For questions related to competitiveness, the trade ratio may be preferable. We use the trade ratio here because of its convenience for decomposition. As we discussed below, in the case of India the trade balance and trade ratio move together closely enough that it is reasonable to use the more convenient measure.

Let us write P_X for a price index of exports, and P_M for a price index of imports. Then $X_C = X^\$/P_X$ is an index of the volume of exports (i.e. "real" exports). We will write Y_C for an index of the volume of *real* domestic expenditure.

Then we can write:

$$M^\$ = \frac{M_C}{Y_C} \times Y_C \times P_M. \tag{2}$$

We write Y_C^* for an index for *real* foreign expenditure, with countries weighted by their shares of the home country's exports. Then we similarly have:

$$X^\$ = \frac{X_C}{Y_C^*} \times Y_C^* \times P_X. \tag{3}$$

This gives us the expression for the trade ratio

$$R = \frac{X^\$}{M^\$} = \frac{\frac{X_C}{Y_C^*}}{\frac{M_C}{Y_C}} \times \frac{Y_C^*}{Y_C} \times \frac{P_X}{P_M} \tag{4}$$

These equations are true by definition but written in terms of levels they are not meaningful, since the ratio of two index numbers is an arbitrary value. The values of the three terms depend entirely on the choice of base year. To be meaningful, we must instead work in percentage changes.

We write r_t for the log change (approximately the percentage change) in the trade ratio; m_t for the ratio of the growth in the volume of imports to the growth of the volume of domestic expenditure (i.e. $\Delta \log(M_C)$ - $\Delta \log(Y_C)$); x_t similarly for the ratio of the growth in the volume of exports to the growth of the volume of trade-weighted foreign expenditure; y_t and y_t^* for the log change in domestic and trade-weighted foreign expenditure respectively; and p_t^M and p_t^X for the log change in the price index of imports and exports respectively; all over some period t. Then the identity becomes:

$$r_t = (x_t - m_t) + (y_t^* - y_t) + (p_t^X - p_t^M) \tag{5}$$

The first term in parentheses in Equation 5 reflects *relative import intensity*, the second term reflects *differential income growth* or *relative absorption*, and the third term reflects the *terms of trade*. The first and third term together constitute *expenditure switching* while the second reflects *expenditure reduction*. For simplicity, we can combine the grouped terms into individual variables – s_t, g_t and p_t respectively – giving us

$$r_t = s_t + g_t + p_t \tag{6}$$

One way to think about this is to ask, why might a country's spending on imports increase? Logically, there are three possible answers: Domestic expenditure has risen, some of which falls on imports; the country is purchasing some imported goods instead of some domestic goods; or the price of imported goods has increased. It's important to recognize that, because it is an identity, Equation 5 gives a complete partition of the causal space. Whatever factors we may think influenced trade flows in some period, they must necessarily show up in one or more of the terms in Equation 5. Similarly, an

increase in export receipts must reflect some combination of expenditure switching toward the home country's goods, faster growth in its trade partners, and an increase in the price of its exports.

Note that x_t, m_t, y_t^*, and y_t are meaningful in isolation. p_t^X and p_t^M however depend on the currency they are being measured in, so they are meaningful only when combined as $(p_t^X - p_t^M)$, which is dimensionless. A growth differential is the ratio of two independently observable objects, but a relative price exists only as a ratio.

3   Data

The investigation covers the period 1980–2021 and is based upon a dataset consisting of 198 trading partners. There are two key components needed to carry out this decomposition: India's trade statistics and the trade statistics of India's trading partners. In this article, we restrict ourselves to merchandise exports only. Unfortunately, data for service exports is available only from 1995 to 2019, and in two separate series with different classification schemes (one series is 1995–2012 and is based on the International Monetary Fund's Balance of Payments Manual (BPM5) system of classification, while the second series covers 2005–19 and is based on the BPM6 system). There is no natural way of combining these series without adopting some ad hoc assumptions. This is of course a potentially severe limitation, given the centrality of service exports (particularly software and IT sector exports) in India's external sector story. However, we show that the main patterns that we observe in the goods trade only are also observed in the goods and services data for the period 1995–2012 (see Appendix I, below, where we have a consistently defined data series.[3]

Below, we describe the methodology for computing each of the variables for the decomposition, followed by the relevant data sources.

We begin by computing differential expenditure growth or g_t, defined as the difference between logged change in trade weighted foreign expenditure (y_t^*) and logged change in domestic expenditure (y_t). The latter is computed as follows:

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[3]The services trade data is obtained from the World Trade Organization's Balanced Trade in Services (WTO-BaTIS) dataset. This covers over 191 reporter countries, over the period 1995-2012. To access the dataset, see: https://stats.oecd.org/Index.aspx?DataSetCode=BATIS_EBOPS2002

$$y_t = S_t^C \cdot c_t + S_t^I \cdot i_t \tag{7}$$

where c_t and i_t are the growth rates of *real* consumption and *real* investment respectively. S_t^C and S_t^I are the respective weights, calculated as:

$$S_t^C = \frac{C_{t-1}^\$}{C_{t-1}^\$ + I_{t-1}^\$} \tag{8}$$

$$S_t^I = \frac{I_{t-1}^\$}{C_{t-1}^\$ + I_{t-1}^\$} \tag{9}$$

where $C_{t-1}^\$$ and $I_{t-1}^\$$ are total *nominal* nominal consumption and investment respectively. Equations 7 - 9 state that the growth rate of domestic expenditure is the weighted average of the growth rate of domestic consumption and investment.

The data on nominal and real consumption and investment for India was obtained from the United Nations National Accounts database.[4] All variables are in LCU, with the real variables indexed to base year 2015.

The trade weighted foreign expenditure is defined as

$$y_t^* = \sum_j w_{ijt} \cdot y_{jt} \tag{10}$$

The equation says that the growth rate of foreign expenditure is equal to the trade-weighted sum of the growth rate of the real expenditures of countries importing from India (y_{jt}). The weights are defined as

$$w_{ijt} = \frac{X_{ijt-1}^\$}{\sum_j X_{ijt-1}^\$} \tag{11}$$

Equation 11 says that the trade weights as a ratio of India's nominal exports to the country j in time period $t - 1$ to India's total exports in time period $t - 1$. For example, as the USA is a major trading partner of India, the USA's domestic expenditure growth will have a large weight in India's foreign expenditure growth.

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[4]See: https://unstats.un.org/unsd/snaama/

To compute the weights, we obtain the data for India's merchandise exports to each of its trading partners, using the International Monetary Fund's (IMF) Direction of Trade Statistics (DOTS) website. IMF DOTS is a comprehensive website containing detailed data for partner-wise exports and imports.[5] The data for India's total nominal exports was extracted from the UN-NA database (United Nations 2023). Finally, we computed the domestic expenditure growth for each of the partner countries using the methodology described above, yielding a panel of 169 partner countries. Aggregating the trade weighted growth rates yielded the foreign expenditure growth.

Now, that we have y_t^*, and y_t, the computation for the other variables follows immediately. To compute relative import intensity we need x_t and m_t, defined as

$$x_t = x_t^c - y_t^* \tag{12}$$

$$m_t = m_t^c - y_t \tag{13}$$

where x_t^c and m_t^c refer to the log change in real exports and real imports respectively. The log change in the trade ratio is defined as

$$r_t = x_t^\$ - m_t^\$ \tag{14}$$

where $x_t^\$$ and $m_t^\$$ refer to log change in *nominal* exports and imports respectively. Finally, the terms of trade is computed as

$$p_t = p_t^X - p_t^M = (x_t^\$ - x_t^c) - (m_t^\$ - m_t^c) = r_t + (m_t^c - x_t^c) \tag{15}$$

The data for nominal and real exports and imports was again taken from the UN-NA database, where real exports and imports are expressed in constant prices LCU with 2015 as the base year.[6]

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[5]See: https://data.imf.org/?sk=9d6028d4-f14a-464c-a2f2-59b2cd424b85.

[6]We thank an anonymous referee for suggesting that there are potentially many different ways of thinking about the term 'import intensity' and that these are not always the same. Our usage could equally be termed the import intensity of domestic expenditure, which corresponds to the way that the UK Office of National Statistics (Authority 2023), calculates individual consumption by purpose.

4 Results

We begin with summarizing the data before going over the key results of the decomposition.

4.1 Preliminary Analysis

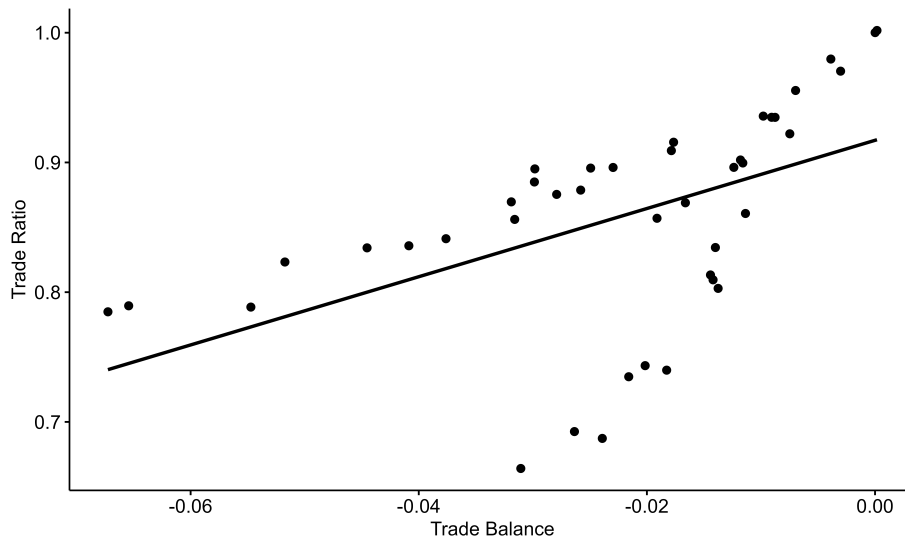Table 1 shows summary statistics for the relevant variables used in our decomposition.

Variable	Mean	St. Dev	Min	Max
Domestic Absorption	5.49	2.95	-6.12	9.50
Domestic Import Intensity	3.59	9.80	-18.55	20.86
Foreign Absorption	2.51	1.87	-4.37	5.61
Foreign Import intensity	6.07	8.07	-8.84	24.04
Relative Absorption	-2.98	2.65	-10.08	1.74
Relative Import Intensity	2.48	9.12	-17.03	23.75
Terms of Trade	1.23	7.91	-13.52	21.95
Trade Ratio	0.73	6.65	-16.83	18.11

Notes: All variables are growth rates, calculated over the period 1980-2021.
Source: Authors' calculations based on UN-NA.

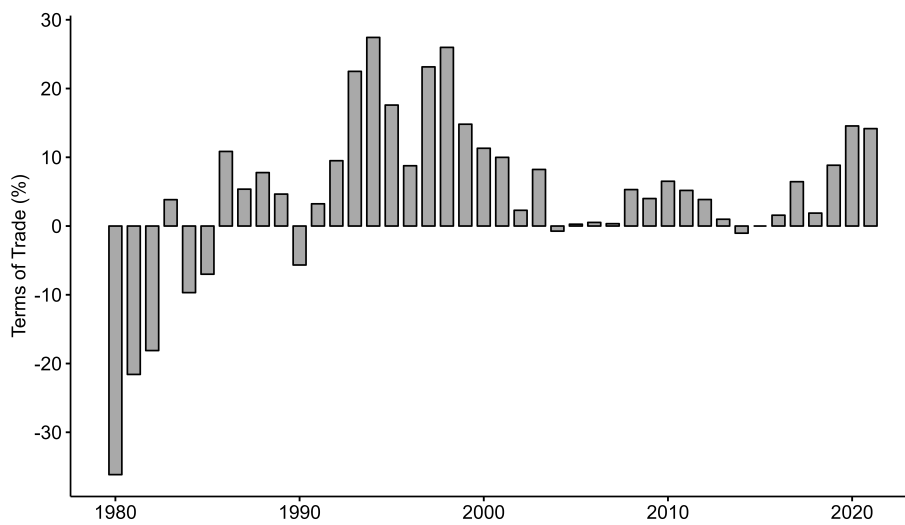**Table 1:** Summary Statistics for key variables.

Three facts stand out. First, domestic and foreign import intensity are more volatile than domestic and foreign absorption. Second, throughout the period 1980-2021, India's expenditure growth has been more than double the growth of its trading partners, on average. This corresponds to the period in which India had its take off. While there is debate about whether to date it to 1991 or 1980 (Rodrik and Subramanian 2005), it is very clear that compared to its major trading partners, bar China, India's growth rate has been substantially higher. Finally, compared to its other components, the trade ratio has changed very slowly, growing only at an average of 0.7% over the whole period.

Notes: $R = 0.52$, $p = 0.00044$.
Source: Authors' calculations based on UN-NA database.

Figure 1: India's Trade Balance vs Trade Ratio (1980-2021)

Source: Authors' calculations based on UN-NA database.

Figure 2: India's Terms of Trade (1980-2021)

Figure 1 plots India's trade balance against the trade ratio over the period 1980-2021. Overall, the trade balance and the trade ratio correlate quite strongly. Figure 2 depicts the terms of trade that India has faced over the period. Since the mid 1980s, it has not seen very sharp fluctuations.

4.2 Key Results

Table 2 decomposes the trade ratio using equation 5. We use turning points in the trade ratio as a rough and ready way to categorise periods.While other time periods may be used, this has rough correspondence to the decade of initial reforms prior to India's external liberalisation in 1991, the first decade of reforms, the interregnum of the first BJP government, the period of India's golden run, and the decade since the period of high growth for the country (in turn divided into two distinct periods).

Period	r	p	y^*	y	g	x	m	s
1980-1991	3.72	3.58	2.59	-4.39	-1.81	2.88	-0.94	1.95
1991-1999	-1.93	1.45	2.33	-6.00	-3.66	8.98	-8.70	0.28
1999-2003	2.72	-1.65	2.69	-4.41	-1.72	9.61	-3.52	6.08
2003-2012	-2.19	-0.49	2.90	-7.29	-4.39	10.33	-7.64	2.69
2012-2016	3.85	-0.57	2.50	-5.85	-3.35	-0.43	8.20	7.77
2016-2021	-0.44	2.52	1.79	-4.42	-2.62	3.08	-3.42	-0.34

Notes: All variables are annualised growth rates. For example, over the period 1980-1991, the contribution of terms of trade (p) is calculated as $(\frac{P_{1991}-P_{1980}}{11}) \cdot 100$, where P refers to logged terms of trade. The variables shown in each column are as follows; r: Trade Ratio, p: Terms of Trade, y^*: Foreign Absorption, y: Domestic Absorption, g: Relative Absorption, x: Foreign Import intensity, m: Domestic Import Intensity and s: Relative Import Intensity. For each period we have $r = p + g + s$ as shown in Equation 6.

Table 2: Annualised period-wise decomposition of India's merchandise trade ratio

Any theory of international trade must, as applied to some concrete setting, explain why the behaviour of trade flows over time. That is, they must explain why, for example, a country's trade balance shifts toward deficit in one period and toward surplus in another. Regardless of its theoretical coherence or empirical validity in other contexts, a theory that does not point toward a credible explanation of concrete historical developments must be judged irrelevant in the context of those developments. The decomposition results in Table 2 indicate the kinds of theoretical explanations that may be

relevant for India's trade balance over the past 40 years. Whatever more general causal relationships we think are implicated in India's growing trade deficits in the 1990s, for example, must be consistent with the actual drivers of that shift.

The purpose of the decomposition is to break down changes in the outcome variable into the quantified contributions of the various components. It gives a complete partition of the causal space, indicating where causal explanations must be found. For example, if two periods saw the same growth of exports (relative to the relevant baseline) but very different growth in imports, then a causal story around export demand would be unsuitable for explaining the shift in the trade balance between the two periods.

Period	Real Exports	Real Imports
1980-1991	7.50	7.25
1991-1999	18.41	28.01
1999-2003	15.88	9.33
2003-2012	25.45	31.49
2012-2016	2.17	-2.24
2016-2021	5.52	9.59

Notes: All variables are average growth rates.
Source: Authors' calculations based on UN-NA.

Table 3: Periodwise growth of India's exports and imports

With that in mind, we will walk through the results in Table 2 and consider what kinds of explanations are and are not plausible for the movements in India's trade balance since 1980.

During the first period, 1980–1991, India's trade ratio improved by 3.7 points per year, or 40 points in total, from imports one third less than exports at the beginning of the period to imports roughly equal to exports at the end of the period. This corresponded to a move from a trade deficit of 3 per cent of GDP in 1980 to balanced trade in 1991. Adjusting for relative price changes, the share of foreign income falling on Indian goods increased substantially, by about 2.8 points a year. Offsetting this was a 1 point per year increase in India's own import intensity. However, income growth in India was much faster in this period than those of in its trade partners (this is true in subsequent periods as well). Faster growth in India almost exactly offset the favourable expenditure switch-

ing that we just described. Finally, the terms of trade shifted by 3.5 points per year in India's favour, or 40 points during the full period. In other words, during the 1980s, the common currency price of India's exports rose by 40 per cent relative to its imports.

To put it another way, during the 1980s, the volume of Indian exports and imports rose at 7.5 and 7.25 per cent per annum respectively (Table 3), yielding a cumulative growth rate of 82.5 and 80 per cent respectively, over the decade. But because the price of India's exports rose relative to the price of its imports, its trade balance improved. Of course, this historical decomposition cannot tell us what would have happened in the counterfactual case where relative prices moved the other way. Perhaps the effect on trade volumes would have more than offset the less favourable shift in the terms of trade. It is nonetheless striking that one of the biggest improvements in India's trade ratio came during the largest increase in the relative price of its exports — an increase that was fully responsible, in an accounting sense, for the move toward balanced trade during that period.

During the 1990s, in comparison, India's trade balance worsened, with the deficit rising from near zero in 1991 to 2 per cent of GDP in 1999, and a corresponding 15-point decline in the trade ratio. So, if we compare the first two periods, there is a 55-point swing in the change in the trade ratio. To what can this reversal be attributed? One factor that did play a role was differential expenditure growth. Real expenditure growth in India was 6 points this period, compared to 4.3 points in the previous period, while real growth in its trade partners was almost exactly the same. Import intensity in both India and its trade partners rose sharply in this period, by 9 points in India and 8.7 points in its trade partners, annually. In absolute terms, these changes cancelled out. Finally, while India's terms of trade continued improving during this period, they did so much less than in the previous period — by 13 points rather than by nearly 39 points.

In summary, if we ask why India's trade deficit narrowed during the 1980s and widened during the 1990s, the answer is that while India's growth was much faster than that of its trade partners in both periods, in the 1990s the deficit-boosting effect of faster growth was no longer offset by improving terms of trade or by larrge increases in the import intensity of its trading partners. What does not explain the difference is any unfavorable change in export growth; in fact, the volume of Indian exports grew more than twice

as fast during the rising deficit period of the 1990s (18.4 per cent per annum) as during the falling deficit period of the 1980s (7.5 per cent per annum). Any causal story about India's trade deficits during the 1990s must focus on what lay behind the sharp acceleration in India's import demand during this period, despite the fact that the relative price of imports fell by less, compared to the previous decade.

Turning to the third period, 1999–2003, we see that in these four years there was an improvement in India's trade balance, with the trade ratio rising by 2.7 points per year or more than 10 points over the four-year period. However, the trade deficit reduced by half, from 2 per cent to 1 per cent of GDP. Table 2 makes clear that this improvement in the trade balance was primarily due to domestic factors. Both foreign income growth and the growth of foreign import intensity were only slightly greater than in the preceding period. Given the nearly 5-point shift in the change in the trade ratio over this period (from a 1.9-point annual decline during the 1990s to a 2.7-point annual improvement from 1999 to 2003) the story of this period is evidently one of declining import growth, not increased export growth. Annual growth of exports was about 16% a year on average between 1999 and 2003 and about 18.4 % a year on average in 1991-1999. By contrast annual growth of imports was about was about 9% a year on average between 1999 and 2003 and about 28% a year on average in 1991-1999 (Table 3). To the extent that the closing of the trade deficit during this period is the result of successful trade policy, then, it appears to be a success of import substitution rather than export promotion. This corresponded to a 2.2-point annual decrease in the trade ratio.

In the fourth period, 2003–12, the trade deficit widened substantially, from 1 per cent of GDP to nearly 7 per cent and the trade ratio declined by 2.2 points annually. The terms of trade worsening by about half a point per year. The reversal of the trade ratio was driven first, by a roughly 3-point increase in Indian expenditure growth during the 2003–12 period relative to the 1999–2003 period (4.4 to 7.2), and second, from a 4-point increase in the import-intensity of Indian growth (3.5 to 7.6). Import growth in this period was 31.5% on average annually as compared to 9% between 1999 and 2003. Export growth in this period averaged 25% vs 16% in the 1999-2003 period. While both grew, the relative growth of imports was substantially higher. As with the improvement in the trade balance in the earlier period, the shift toward growing deficits in the 2000s was largely due to faster import growth, with both faster domestic income growth and a rise

in the relative amount that Indian expenditure fell on imports.

From 2012 to 2016, India once again saw its trade balance improve, with the deficit falling from 7 to 2 per cent of GDP in just five years. This corresponded to a 3.9 point per year improvement in the trade ratio. As with the two previous shifts, this one happened entirely on the import side. World expenditure growth was somewhat lower in this period (which includes the aftermath of the worldwide financial crisis), while the share of foreign expenditure falling on Indian exports did not change at all (-.43 points a year) The volume of Indian exports rose at an annual rate of just 2.17 per cent in this period, compared with 25% per cent in the previous period. This near cessation of export growth was, however,e n counterbalanced by an absolute fall in the volume of imports (the growth rate of imports was - 2 percent a year) This is why in fact the contribution of import intensity switches signs in the period. In the last period (2016-2021) there was another reversal with the deficit rising from around 1.7 per cent to around 2.4 per cent of GDP and the trade ratio fell by -.4 points a year. This move back toward deficits and falling trade ratios came despite a sharp acceleration in foreign demand for India's exports; while annual expenditure growth in India's trade partners contributed 4.4 points, the volume of India's exports rose by 5.5 per cent per year over this five-year period as opposed to a 2.5 % growth (per annum) over the previous four years. Despite this significant improvement in exports, the balance moved toward deficit as import volume increased even faster, increasing at an annual rate of 9.5 per cent compared with an annual average growth of -2 per cent in the 2012-2016 period. However, the trade ratio only worsened by 0.4 points annually due to a strong improvement in the terms of trade, which contributed an annual average of 2.5 points. Overall, the return of the terms of trade as a major contributor to the trade balance makes the last period distinct in comparison to the previous four.

A few general patterns stand out. the largest swings in India's trade balance are entirely driven by the import side. Periods of rising trade deficits in fact saw faster export growth, while the slower growth in exports came precisely in the periods when the trade ratio (1981-1991, 1999-2003, and 2012-2016) was improving. A shift from improving to worsening terms of trade explains a substantial part of the shift from falling to rising deficits between the 1980s and 1990s, and accelerated domestic income growth explains rising deficits, and falling trade ratios after 2003. (Aggregate income growth among In-

dia's trade partners shows little variation.)A large part of the variation between periods of rising and falling deficits is accounted for by changes in India's import intensity.
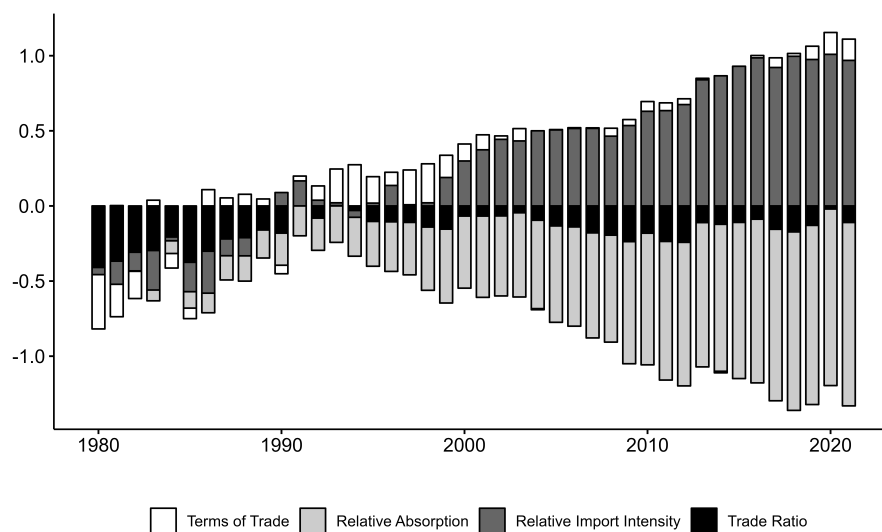
What is most striking is India's ability to sustain growth rates well above its trade partners for nearly 30 years with neither large changes in its terms of trade nor a secularly rising trade deficit. Over the long run, favourable expenditure switching kept pace with the growth differential.

These decompositions do not involve any causal claims and do not depend on theory. They are simply restatements of the facts as reflected in the official data series. But they do limit the kinds of causal stories about trade that can be relevant for modern India. We can now ask: What kind of causal claims about trade flows are consistent with the developments described above?.

In response to this question, two points stand out. Narratives based on relative prices do not work in terms of explaining the evolution of India's foreign trade balance. As such, it is not clear how much devaluation or trying to alter the terms of trade may affect it. But equally, a simple balance-of-payments constrained growth story has limited relevance for modern India. Due to substantial structural changes and a decreasing domestic import intensity, India's growth has been less constrained by external balances than it might otherwise have been.

Figure 3 shows the contribution of each component of the decomposition over time as a stacked bar chart. Perhaps the most striking fact here is the relative unimportance of the terms of trade after the 1990s, and correspondingly, the large and counterbalancing changes in the other two terms.
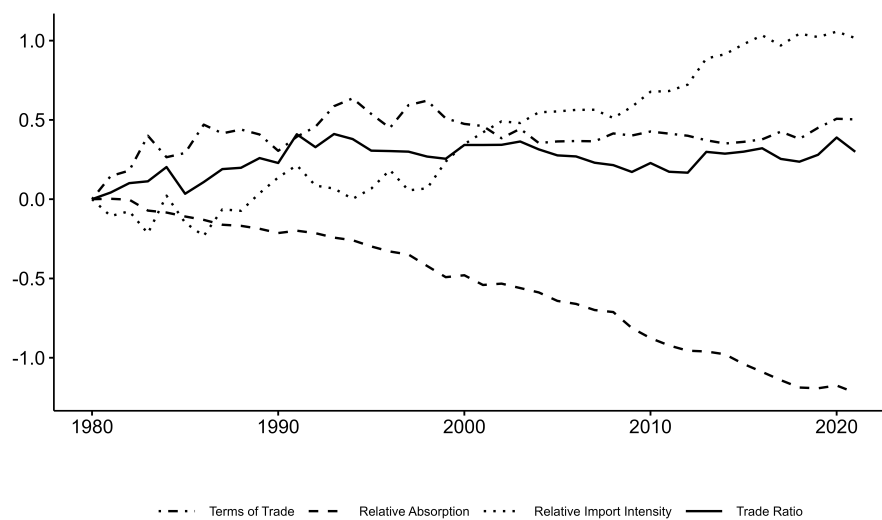
Figure 4 below shows this in another way, this time indexing the initial starting levels to depict the evolution of each of the variables over time relative to each other. Both the trade ratio and terms of trade improved till 1990 and then remained stable since then. Since 2000, the sharp changes in relative import intensity and relative absorption–the former increasing (i.e.India's dependence on imports relative to its trading partners decreasing) and the latter decreasing (i.e. India's expenditure relative to that of its trading partners increasing) are the major story.

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Figure 3: Evolution of components of India's merchandise trade ratio

Figure 4: Evolution of components of India's merchandise trade ratio.

5 Counterfactuals

One way to assess the impacts of the three drivers of the trade ratio is to construct counterfactual trajectories of the trade ratio if they had behaved differently. We turn to considering some alternative ways in which the trade ratio could have evolved over time by conducting two kinds of counterfactual analysis.

The first counterfactual examines how the trade ratio would have evolved if one of the three components — relative expenditure growth, terms of trade and relative import intensity — had remained fixed at its level in 1980 over time, while the other two followed the actual trajectory observed historically. This generates three scenarios: what the trade ratio would have been if (1) the terms of trade was fixed at its level in 1980 while relative absorption and relative import intensity followed their historical trajectory; (2) relative expenditure was fixed at its level in 1980, and the terms of trade and relative import intensity followed their historical trajectory and (3) relative import intensity was fixed at the level in 1980 while relative absorption and the terms of trade vary. The results, along with the actual trade ratio are shown in Figure 5.
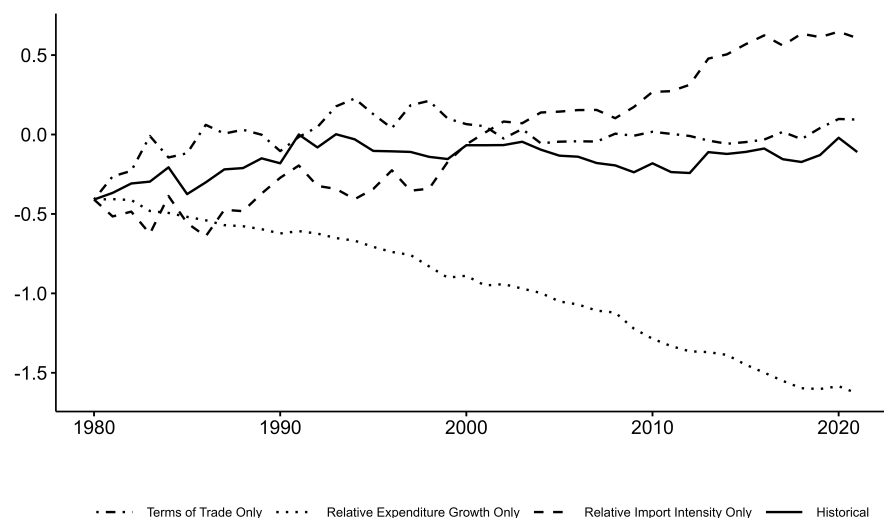

Notes: All components are in logs. The starting value for each component is the logged trade ratio in the year 1980. Each line keeps one component "fixed", while allowing others to vary according to their actual trajectory.
Source: Authors' calculations based on UN-NA and IMF-DOTS databases.

Figure 5: Counterfactual 1.

The dot-and-dashed line shows what the trade ratio would have been with unchanging terms of trade. Since the terms of trade contributed most significantly to the improvement in the trade ratio in the 1980s, keeping it fixed at the 1980 level would have meant that there would have been a fall in the trade ratio. But since then, since the terms of trade had little quantitative contribution to the trade ratio (which was driven by the other two variables) the counterfactual trade ratio is parallel to the actual historical trajectory (solid line). The dotted line in Figure 5 shows what the trade ratio would have been if relative absorption had remained unchanged. In this scenario, because India's domestic import intensity declined substantially, and there was an initial improvement in the terms of trade from the 1980s to the 1990s, India would have been running substantial trade surpluses by the 1990s and these surpluses would have continued rising since then. Finally, the dashed line in the Figure shows how the counterfactual trade ratio would have evolved, had relative import intensity remained the same as in 1980 and the other two variables evolved as they did historically. Here the initial improvement in the terms of trade and the fact that India's growth rate and that of its trading partners were roughly the same would have led to a surplus by the mid-1990s. However, since then, the vastly faster growth of Indian expenditure would have reversed this and from the 2000s onwards, the country would have seen increasing trade deficits and declining trade ratios.

The second kind of counterfactual examines how the trade ratio would have evolved if only one of the three components was allowed to contribute to the change in the trade ratio (with the other two remaining fixed at their levels in 1980). As before, we have three scenarios, namely, where only the terms of trade contribute, only the relative expenditure contributes, and only the relative import intensity contributes. The results along with the actual trade ratio are shown in Figure 6.
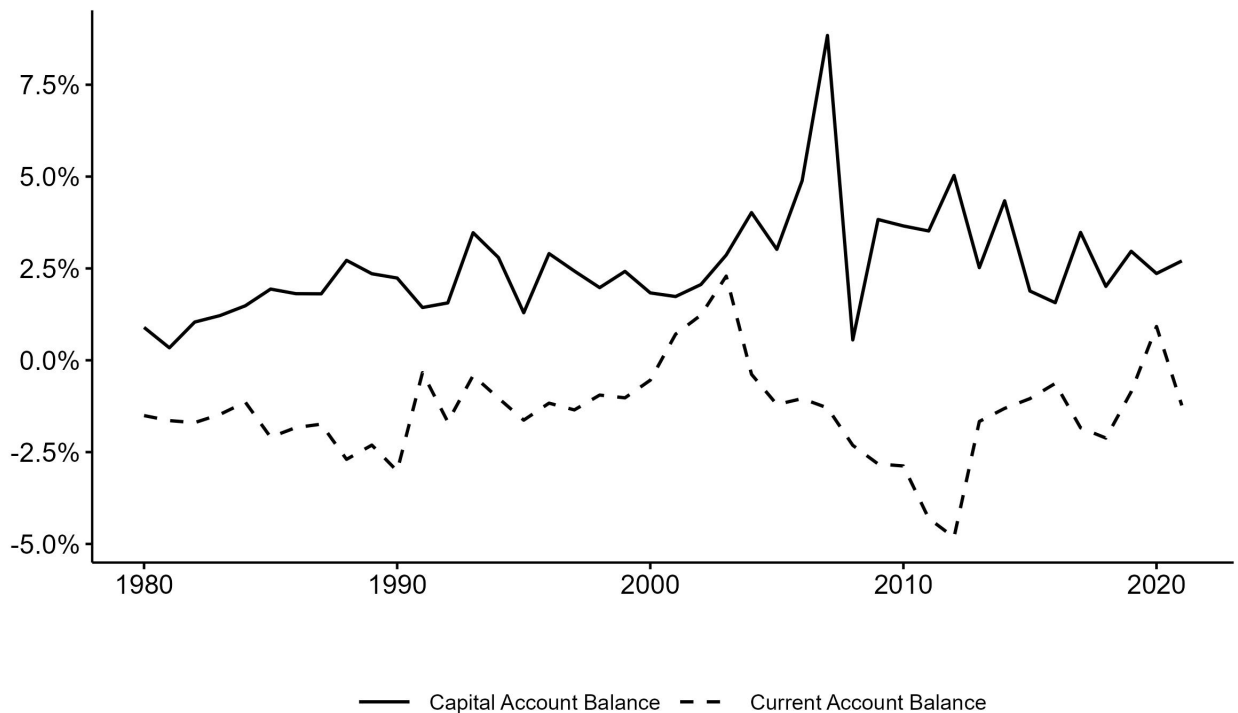
Figure 6: Counterfactual 2.

In Figure 6, the dashed line depicts what would have happened to the trade ratio if only relative import intensity changed (as it did historically), with the other two variables remaining at the 1980 levels. In this scenario, the trade ratio would have improved, and from the mid-2000s the country would be running a trade surplus. The dotted line suggests what would have happened if only relative absorption changed as it did. Here, because of India's relatively quicker growth, the trade balance would have deteriorated further and fallen to almost three times below its 1980 level (-0.5 to -1.5). The dot-and-dashed line depicts what the trade ratio would have been if only the terms of trade had changed. Here, the initial improvement in the terms of trade followed by a long period of stability suggests that the trade ratio would have seen a shift to a trade surplus in the 1990s and from the 2000s there would have been roughly balanced trade.

Figure 7: India's Current and Capital Account Balance

One important feature to underline in India's trade performance is that in aggregate India has run persistent deficits. As has been noted by many commentators (Ghosh and Chandrasekhar 2009), the relative stability of the currency in the medium term has been maintained by capital inflows and massive exchange rate reserves that accrued as a result.[7] This is depicted in Figure 7. While it is not the subject of this paper, if one is to tell the larger story of India's management of its balance of payments, capital flows and their management play a very large role. In this regard, India's 'strong consensus on weak reforms' (Ahluwalia 2002) led to a much more stable set of capital flows that permitted a greater degree of macroeconomic management (For a description of these, see Jayadev (2005)). What it also suggests is that Indian reserves are also capable of depletion in the event of a rapid capital reversal.

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[7]As of 2023, India had roughly $ 600 billion in reserves.

6 Discussion and Conclusion

This article is an exercise in macroeconomic accounting, using an empirical approach to provide a different historical perspective on the record of India's trade performance. Most empirical exercises are attempts to construct point estimates of average correlations. Put differently, exercises examining the trade performance of India would typically run a regression with the trade deficit or trade ratio as the variable to explain and a host of potential explanations (exchange rates, relative growth rates, distance, government deficits) as explanatory factors. The coefficients thus obtained give a measure of the size of these correlations over the time period.

Our decomposition begins from an accounting identity and as such completely partitions the causal space into three distinct mechanisms. As such, the expenditure-switching and expenditure reducing variables together fully account for the historical evolution of trade ratio. As Jayadev and Mason (2021) note, this accounting approach allows us to better identify the mechanisms at play because it provides a clear empirical accounting which any explanation must be consistent with. One is then able to describe historical evolution and specific phenomenon in terms of this partitioning to construct a narrative and to identify the mechanisms at play. For the case of the Indian trade performance, this exercise may help to clarify the areas which ought to be less or more emphasised in policy debates, and we can summarise some of these by way of conclusion.

First, the decomposition identifies the critical role of demand in the determination of trade ratios. From standard trade theory, deficits ought to be self-correcting through flexible exchange rates, but the role of demand is rarely emphasised. Presuming that the Marshall-Lerner condition (Caves, Frankel, and Jones 2007) holds (which is a contested empirical proposition), devaluations should result in improvements in the trade balance. What we find instead is that even in the era of flexible rates and a steady devaluation in nominal terms, there has been no improvement in the trade ratio. The Reserve Bank of India's 2021 revised update[8] of the rupee real effective exchange rate suggests that the rupee is only slightly over-valued, and as of February 2020, it is almost at par (Lokeshwarri 2021). As such, there is little evidence to suggest that the trade ratio would necessarily be improved by further devaluation.

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[8]See: https://cimsdbie.rbi.org.in/#/dbie/home

However, in contrast, the growth rate of India and that of its trading partners is a quantitatively important component of the trade ratio. India has been growing substantially faster than its partners in real terms for three decades, hence one may naturally expect this to be a serious constraint. The fact that it has not been suggests that liberalization and subsequent export growth as well as capital inflows mitigated the balance-of-payments constraint that would have otherwise limited the country's growth. Foreign exchange inflows and burgeoning reserves have permitted India's progress to not be checked by rising import bills as they may have been in the pre-liberalization period. To the extent that reserves in particular have been growing, it may continue to be a key buffer.

Furthermore, in the most recent period, another important reason why the trade deficit or trade ratio has not yet been a constraint, given the critically important role of foreign and domestic expenditure, is the very sharp shift away from foreign imports as a fraction of all expenditure within the country. Even as the country has grown, imports have not grown apace, suggesting a shift of expenditure towards domestic goods. This may be one of the more important transitions (if it turns out to be durable) in reducing external constraints on the performance of India's economy.

The historical record does not suggest that flexible rates and devaluations can and will improve the trade ratio. For policy makers this is an important consideration going forward. While the 1991 devaluation may have done so temporarily, the period of market based rates since then has not closed the deficit. Instead, export growth and reduced domestic intensity have been critical. As Chatterjee and Subramanian (2020) suggests, India's stellar export growth since the 2000s has been underappreciated but to the extent that this engine of demand is now lagging, it may foreclose the kind of potential growth rates that were available in the boom of the 2000s. On the other hand, the decreased reliance on imports– a "Buy in India" if not a "Make in India" phenomenon may mean that the constraints emanating from integration have been less binding than might otherwise be the case. Policy makers seeking to manage India's external challenges may look to each of these as critical factors going ahead.

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Decomposing India's Trade Ratio: 1980-2021

Appendix

A Decomposition results for dataset including services

India has a large and growing services component in its trade. Hence the Table and Figures below show the same results regarding the goods and services trade ratio as described in the main article. In Table A1 we present the annualized decomposition of India's trade ratio from 1995–2012.

Period	r	p	y^*	y	g	x	m	s
1995-2000	0.72	-1.26	2.49	-6.12	-3.63	7.50	-1.90	5.61
2001-2006	-1.44	-1.89	3.65	-6.04	-2.39	15.16	-12.33	2.84
2007-2012	-1.26	0.70	1.50	-6.63	-5.13	8.02	-4.85	3.17

Notes: All variables are annualised growth rates. For example, over the period 1990-1995, the contribution of terms of trade (p) is calculated as $\left(\frac{P_{1995}-P_{1990}}{5}\right) \cdot 100$, where P refers to logged terms of trade. The variables shown in each column are as follows; r: Trade Ratio, p: Terms of Trade, y^*: Foreign Absorption, y: Domestic Absorption, g: Relative Absorption, x: Foreign Import intensity, m: Domestic Import Intensity and s: Relative Import Intensity. For each period we have $r = p + g + s$ as shown in Equation 6.

Table A1: Annualised period-wise decomposition of India's trade ratio

As shown in Table A1, from 1995–2000 the trade ratio improved, on average, 0.72 points every year in logged terms. The biggest contributor to this is the relative import intensity, particularly the foreign intensity, which rose by 7.5 points per year, but domestic intensity contributed -1.9 points, yielding the net contribution of the relative import intensity to be 5.6 points per year, in log terms. Due to unfavorable terms of trade, the trade ratio decreased by 1.2 points per year, and due to relative absorption which fell by 3.6 points. This was largely due to India growing much faster than its trade partners, with domestic absorption contributing around 6 points every year, to the fall in the logged trade ratio.

From 2001–06, the logged trade ratio fell by 1.4 points per year, largely due to unfavourable terms of trade and falling relative expenditure. The terms of trade fell by 1.9

points per year, while relative expenditure fell by 2.3 points yearly, again driven by India's fast growth. However, this decline was stemmed partly by a positive contribution of 2.8 points of logged relative import intensity per year, with foreign intensity again outpacing domestic intensity.
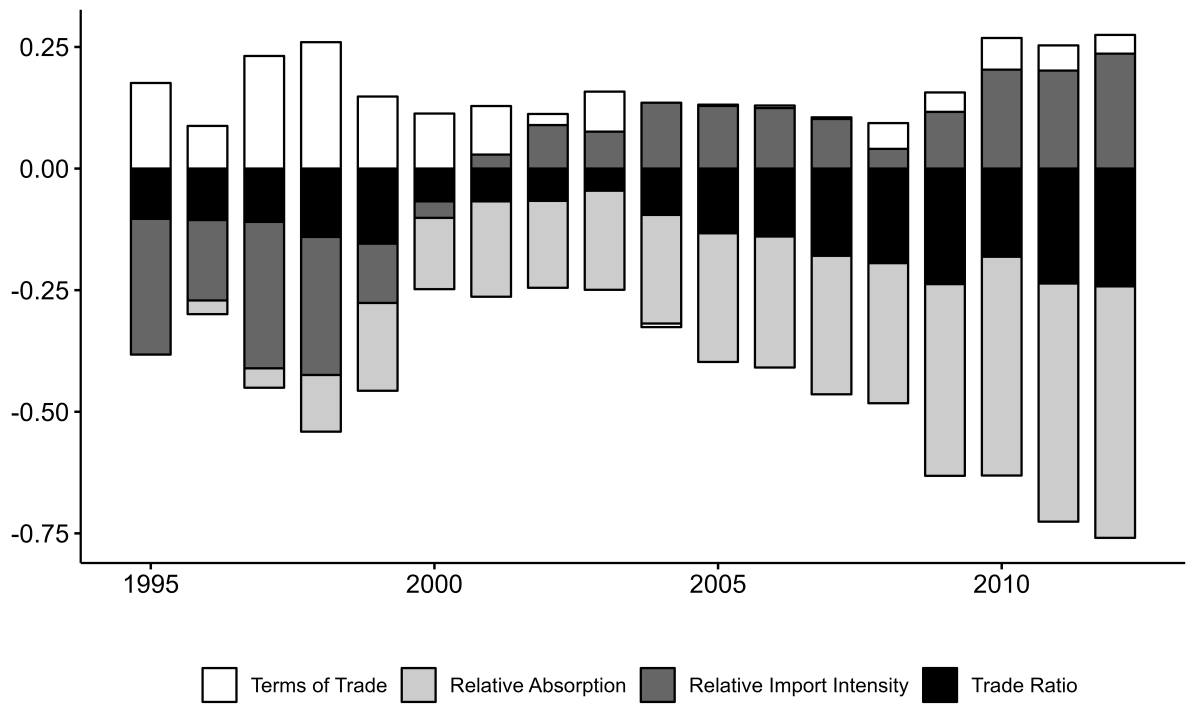
The trade ratio continued to fall over the period 2007–12, despite the terms of trade contributing positively, by increasing 0.7 points per year in logged terms. However, this was overshadowed by relative expenditure, as it pulled down the trade ratio by 5 points annually, as this period coincided with the golden age of India's domestic growth. Relative import intensity again stalled the decline by contributing about 3 points annually, with foreign import intensity growing by 8 points compared to the 4.8 point increase in domestic import intensity. Broadly, the influence of the terms of trade continued to wane, while the role of relative expenditure and import intensity was on the rise.

A.1   Figures for dataset including services

Figures A1 and A2 present the decomposition of the various contributors to India's goods and services trade ratio, over the period 1995-2012. Figure A3 shows the evolution of relative import intensity and relative absorption for the goods only dataset, and the dataset including goods and services. Figures A4 and A5 present two counterfactual scenarios.
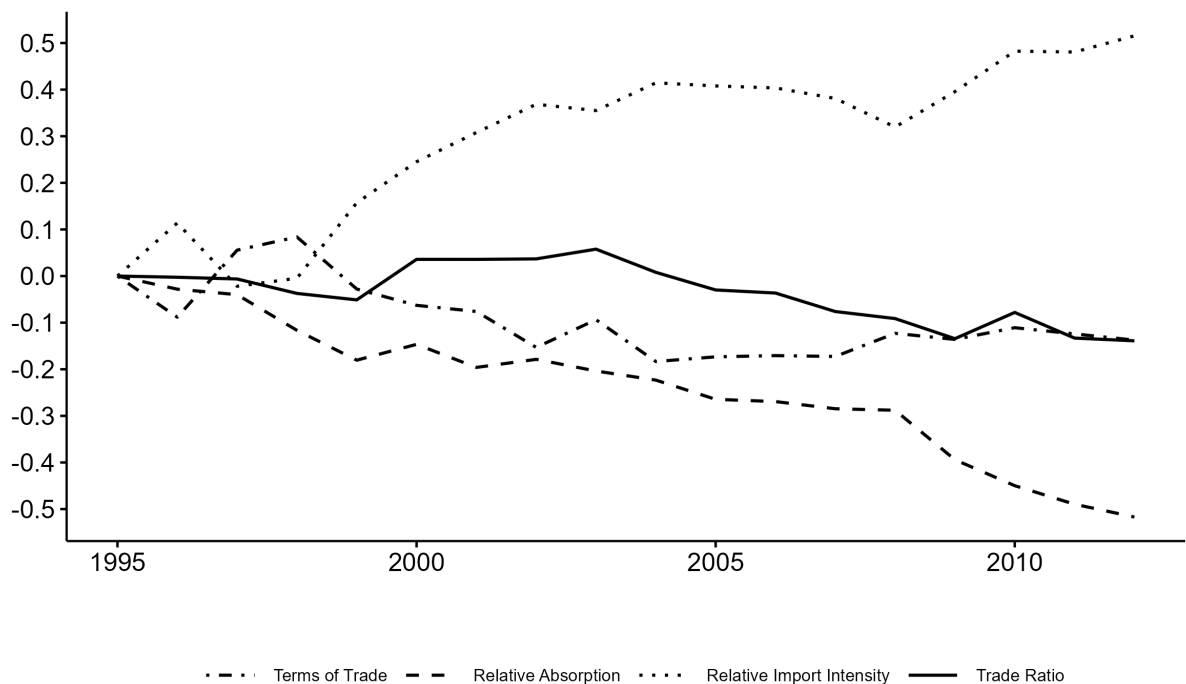
Figure A1 shown below, summarizes the contribution of each component in the form of a stacked column chart. The patterns by and large mirror the goods case, with the terms of trade waning in influence over time, rapidly overshadowed by the counterbalancing forces of rising import intensity and falling relative absorption. Overall, the trade balance continues to be in a stable deficit over the entire period.

Figure A2 shows the same information as A1, but indexes the value of each of the components in logged terms to 0 in the year 1995. This allows us to visualize the evolution of each of the components relative to each other. The story remains the same as the goods only case, with the terms of trade contributing in a smaller magnitude, while relative absorption and relative import intensity counterbalance each other.

Notes: All components are in logs. Source: IMF DoTS, UN-NA and Authors' calculations.

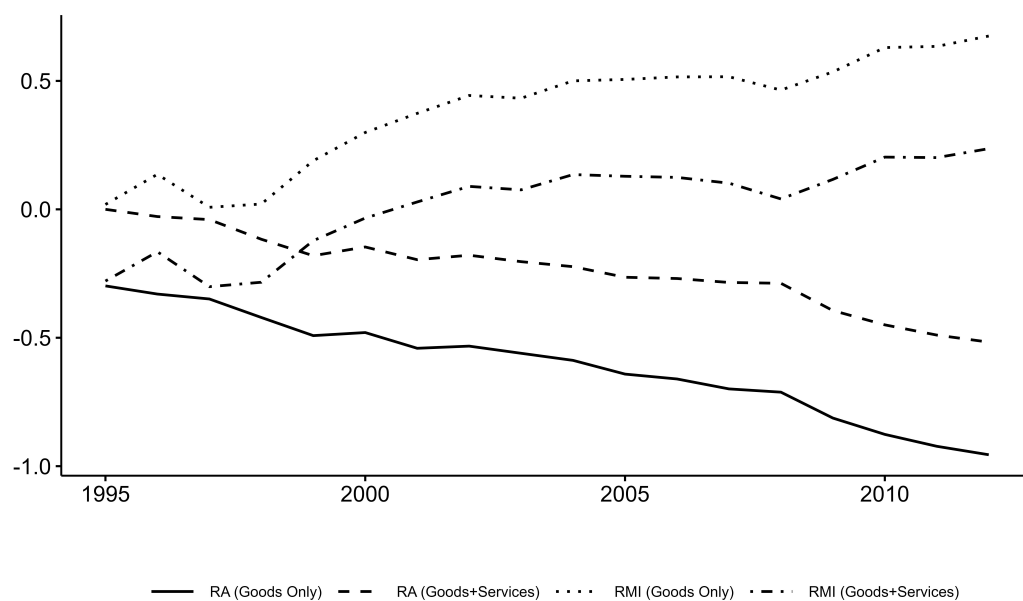**Figure A1:** Evolution of components of India's trade ratio

Notes: All components are in logs. Each component is indexed at 1995=0. Source: IMF DoTS, UN-NA and Authors' calculations.

Figure A2: Evolution of components of India's trade ratio.

Figure A3 shows, in logged terms, the evolution of the Relative Absorption and Relative Import Intensity components for both the datasets i.e. goods only and goods plus services. The contribution of both these components in the latter case is simply a scaled down version of the former.

The reason for this "scaling down" is fairly simple. Relative Absorption is the ratio of Foreign Absorption to Domestic Absorption. The growth rate of the latter is simply the growth of real GDP, and remains unchanged in both the datasets. However, the growth rate of foreign absorption is higher when services are included: this follows from the fact that services have become a larger and faster growing component of India's exports. Hence, the growth rate of Relative Absorption is higher when services are included.

Relative Import Intensity is the ratio of Foreign to Domestic Import Intensity. Foreign Import Intensity, is the ratio of exports (from home country) to Foreign Absorption. With the inclusion of services, the quantum of exports increases. Concurrently,
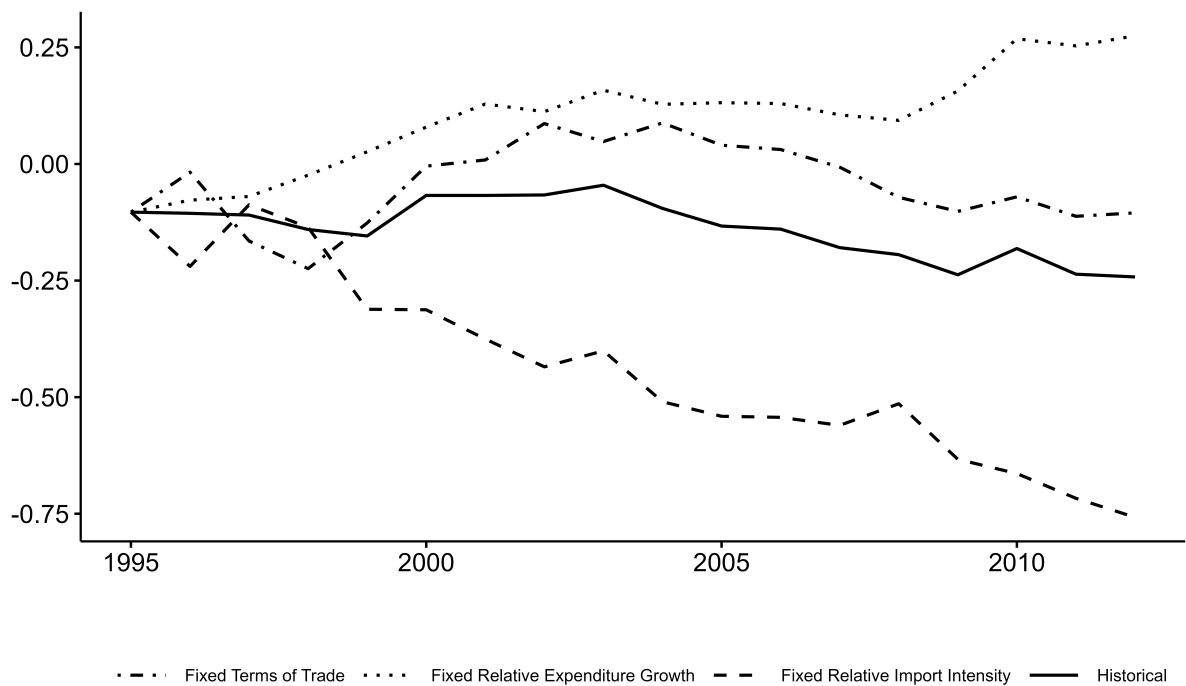
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Figure A3: Relative Import Intensity and Relative Absorption over time.

Domestic Import Intensity, is the ratio of imports to Domestic Absorption. Similar to the above case, the quantum of imports increases with the inclusion of services. Hence, for a given level of Absorption, both "intensities" grow faster with the inclusion of services. As explained in the above paragraph, the growth rate of domestic absorption remains unchanged, leading to a faster growth of domestic import intensity in the goods relative to the goods only case. This pulls down the growth of relative import intensity, as is evident from Figure A3.

We repeat the counterfactuals conducted for the goods decomposition for the combined dataset here. The first set of counterfactuals has the same three scenarios in terms of what the trade ratio would have been had, (1) the terms of trade been fixed at its level in 1995 while relative absorption and relative import intensity followed their historical trajectory; (2) relative expenditure is fixed at its level in 1995, and (3) the terms of trade and relative import intensity followed their historical trajectory and if relative import intensity is fixed at the level in 1995 while relative absorption and the terms of trade vary.The results, along with the actual trade ratio are shown in Figure A4.

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Notes: All components are in logs. The starting value for each component is the logged trade ratio in the year 1995. Each line keeps one component "fixed", while allowing others to vary according to their actual trajectory. Source: IMF DoTS, UN-NA and Authors' calculations.
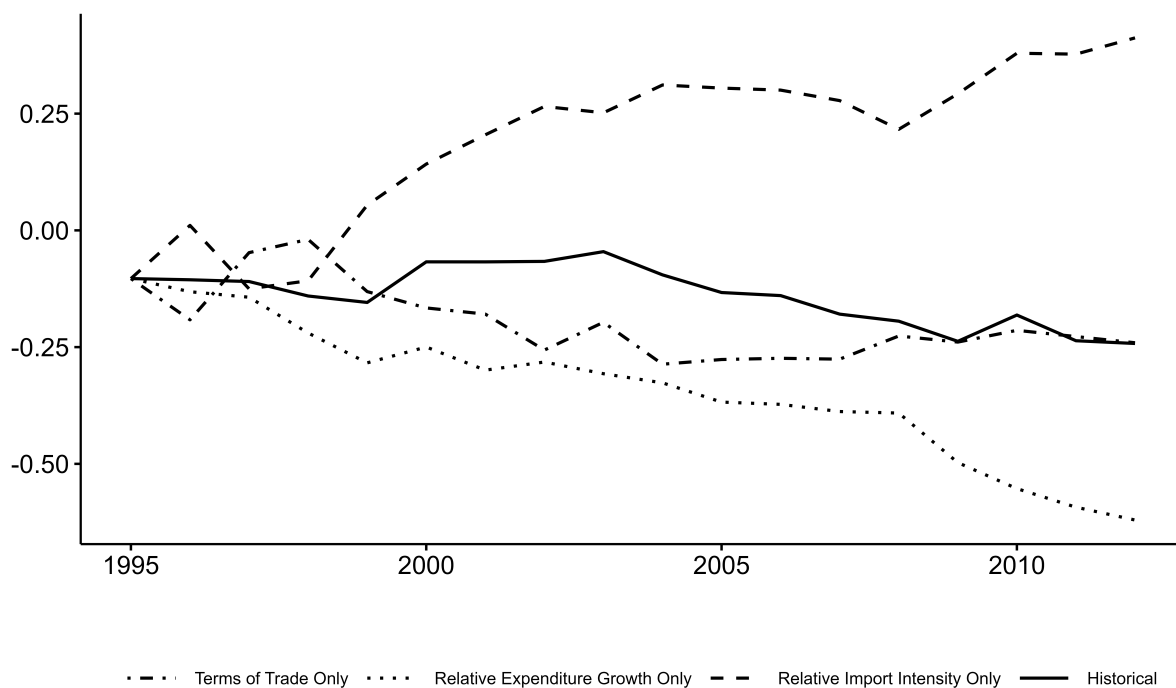
Figure A4: Counterfactual 1.

The overall counterfactual trajectories follow the same patterns as that of the goods decomposition, with the results being scaled up due to inclusion of services data.

The second kind of counterfactual, as shown in Figure A5, eamines how the trade ratio would have evolved if only one of the three components was allowed to contribute to the change in the trade ratio, while the other two remained fixed at their levels in 1995. As before, we have three scenarios, namely, where (i) only the terms of trade contribute, (ii) only the relative expenditure contributes, and (iii) only the relative import intensity contributes

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The patterns here again replicate the ones seen in the goods only case.

Notes: All components are in logs. The starting value for each component is the logged trade ratio in the year 1995. Each line keeps one component "fixed", while allowing others to vary according to their actual trajectory. Source: IMF DoTS, UN-NA and Authors' calculations.

Figure A5: Counterfactual 2.