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A Critical Analysis of the Terms of Trade in India

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ABSTRACT

Open economy macroeconomic dynamics and their implications after liberalization and globalization initiated during the 90s on terms of trade generated very important dimensions in the Balance of Payments for India as we started viewing the importance of external economic scenario not only for export promoting activities but also prominently for capital and financial flows. The movements in and behaviour of various measures of terms of trade have become increasingly complex given the diversities that exist at both economy and firm levels. This study thus aims to critically analyze the dynamic behavioural movements and trends in the various measures of terms of trade for understanding the consequences of open economy macroeconomic process. The study is conducted for the period 1991-92 up to 2016-17 for critical analysis as this phase can be seen as a period of high growth and considerable variability in terms of trade as consequences of what happened in the domestic economy and rest of the world after the liberalization process was initiated. Instability and variability noticed in both aggregated levels of exports and imports as well as in various commodity groups indicate the vulnerability of Balance of Payments to external shocks. Therefore, this study strongly suggests that variability in exports and imports are to be reduced for smooth, consistent and sustainable growth of external balance.

KEYWORDS: Quantum Index, Terms of Trade, Trade Instability, Unit Value Index.

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INTRODUCTION

The analytical issues and empirical facets pertaining to terms of trade play an important role in determining the overall growth process and external balance for an economy. Economic events occurring outside the country are particularly important for understanding economic efficiency and productivity specially when economies are globally integrated and organized for openness.India is not an exception to this. The policy-planners realized the importance of international trade and business, particularly in a growing world, and its possible gains for India. The advantages accruing to India were thought in terms of both consumption and production gains in a broader setting of global market economy for the prudent management of macro-economic growth and stability. India was liberalized, deregulated and privatized to reap the same. It was perhaps inevitable after the Balance of Payments (BOP) crisis in the late 80s and its subsequent impacts on the economic slowdown during early 90s and now rest is the history on how far Liberalization and Globalization benefitted India.

Terms of trade played a very important function related to adjustments in the BOP particularly for India as it started viewing the importance of external economic scenario not only for export promoting activities but also prominently for capital and financial flows. It is also very important to estimate and analyse the terms of trade for various business activities and opportunities both at home and abroad. The information pertaining to regular estimation and publication of terms of trade can serve good amount of usefulness for firm-level decision makings, economic policy analysis and forecasting. The role of terms of trade in India is more complex given the diversities that exist at both economy and firm levels. Our focus will be on broad aggregates and commodity groups for understanding implications of terms of trade. Therefore, the aim of this study is to critically analyze the dynamic behavioural movements and trends in the various measures of terms of trade for understanding the consequences of open economy macroeconomic process.

BACKGROUND

Industries in India have reorganized the factors of production to a great extent to suit the liberalized global markets. Slowly they are also aiming at the level playing field across the country rather than restricting to the Indian regions. Apart from Government measures pertaining to export promotion and Industrial environment, which is conducive for export-oriented production, the private players have raised themselves to the occasion of global competition. Trans-nationals and multi-national companies have added good group dynamics in not only enabling production, but also in enhancing exports. A globalized economy does bring considerable amounts of imports not only for consumption but also for production activities. Foreign Direct Investment (FDI), Technology

and, Machineries and Equipments from abroad are the key elements of the flows that are directed towards production activities. If markets are opened globally, free flow of exports and imports become a part of both strengths and weaknesses.

India's exports have grown steadily over time. Exports have increased from 5.83 percentage of Gross Domestic Product (GDP) in 1990-91 to 9.84 percentage of GDP in 2000-01 and subsequently to 15.4 percent of GDP in 2010-11 and presently it stands at approximately 13 percent of GDP. As a proportion of GDP, even if one compares at global level, this increase is considered to be substantial for developing economies. For an economy where inventions in electronics and communication, machineries and production related know-how are essentially weak, these numbers and facts on exports should be quite encouraging. Even imports have grown phenomenally over time. They were 8.8 percent of GDP in 1990-91 and steadily rose to 12.5 percent of GDP in 2000-01, reached up to 22.6 percent in 2014-15. Presently they are around 7.3 percent of GDP. Overall imports have been higher than the exports at any given point in time, especially after 1990-91. Though, both imports and exports have fallen from 2014-15 till date in terms of proportion of GDP, still, imports are higher than exports. It is amply clear that the market forces operating have taken predominant role than Government's intervention and planning to optimize the trade growth. A conventional wisdom can suggest that a substantial growth rate in imports can be understood as an indicator of the size of the market and, the levels of real income and purchasing power associated with the people in an economy where imports are flowing. It goes with a now-established wisdom that India organizes itself as a huge market force, while actually giving considerable scope for innovation, expansion of consumer base and possibility to export more.

A typical situation in which imports are more than exports, trade balance is considered to be a crucial factor for understanding the link between foreign economies and domestic industries including markets. Managing India's trade balance is a big challenge for policy makers and all the institutions that are responsible for policy analysis are constantly aiming at evolving short-term and long-run prudential interventions that can help reallocation issues in markets and bring admissible trade balance. India started with a trade balance as close as 3.00 percent of GDP during the initial phase of our study period and for some times it was stable at around 2.5 percent of GDP. After 2004-05, trade balance has phenomenally increased to a level which is significantly above than the danger limit of around 3-3.5 percent of GDP. In 2004-05 it was around 4.8 percent of GDP and increased to about 10 percent in 2011-12 and it was brought to around 5 percent of GDP in 2016-17. This speaks volumes about the dynamic movements in imports and exports. After reaching the peak, consciously, policies were aimed by the Government to bring it down to a manageable level. Exports were not

picking up as western and emerging economies, except China, experienced considerable recession and it was difficult to penetrate the markets.

A critical element that served as a blessing in disguise for quite a long time in the context of the broad setting of current account framework in India was net invisibles. It was observed negative only for the year 1990-91 after which it has been continuously increasing and has remained positive. It was -0.08 percent of the GDP in 1990-91, went up to 2.2 percent of GDP in 2000-01 and steadily moved on to mark the highest proportion of GDP at 6.2 percentage in 2011-12. It remained stable at around 5 percent of GDP after 2012-13. Current Account Balance (CAB) was invariably kept below 2 percent of GDP due to the phenomenal growth of invisibles after 1991-92 till date. Though the CAB was fluctuating anywhere between 1.5 to 2.5 percent of GDP from 1991-92 up to 2016-17, the critical phase of turbulence was observed from 2008-09 through 2012-13, where CAB varied between 2.5 to 4.9percent of GDP[1]. These are precisely the years of the aftermath effect of the global financial crisis and recession experienced in industrialized countries. This was essentially due to slow growth of exports and invisibles coupled with persistent rise in the imports. India never satisfactorily realized its CAB. This could be partly because of the consequences of structural adjustment and liberalization and, weak strength in the export sector. Import as a proportion of export in trade account is always more than 100 percent as trade balance was always negative but if one looks at trade balance as proportion of net invisibles, there are years where the ratio is less than 100 percent after 1990-91 indicating the phenomenal growth of invisibles in off-setting large negative growth in the imports of goods. In fact, the variations indicated by the fluctuations in the ratio of trade balance to CAB are considerably smoothened due to the persistent growth rate in the invisibles. If one looks at imports as a ratio of exports plus net invisibles, in most of the cases, the ratio is around 104 to 108 percent on an average after 1991-92[2].

DATA AND METHOD

Data employed in this study are all collected from various published sources including those of the Reserve Bank of India (RBI) and the Government of India. Specially, the information is collected from various issues of Handbook of Statistics on Indian Economy, Annual Reports of the RBI, RBI Monthly Bulletin and the Economic Survey. Most of the time series data in the official published sources are produced with varying bases and definitions across time. It is essentially impossible to pick up a period of investigation of time series in which uniformity is maintained in definitions, frameworks and index bases. We have selected 1991-92 up to 2016-17 as the period of study for critical analysis as this phase can be seen as a period of high growth and considerable

variability as consequences of what happened in the domestic economy and rest of the world after the liberalization process was initiated.

While collecting data, as it is inevitable, we could only obtain information on various definitions and variables on varying degrees of measurements and bases. As a result, we estimated indexes of most of the variables used in this study to the uniform base year of 1999-00, by using proper linking factors through splicing method. While analysing various indexes of exports and imports over a period of time, we found that the compilation and presentation methodology and definitions are different and therefore, we have adjusted the items to suit uniform broad bases. The study employs ratios, annual growth rates and descriptive statistical methods for analysing the pattern and behaviour of terms of trade.

CONCEPTUAL NOTE

It is customary to analyse the terms of trade by constructing various terms of trade measures through index number framework. The popular methods such as gross barter terms of trade, net terms of trade and income terms of trade are employed for critical review and accordingly quantum indexes and unit value indexes are used. Gross Barter Terms of Trade (GBTOT) is defined as the quantum index of imports to quantum index of exports while Net Barter Terms of Trade (NBTOT) examines the ratio of unit value indexes of exports to imports. Presumably, these two can give different dimensions of analysis on volume and value as quantity and price play a predominant role in the stock and flow dimensions of the variables. Finally, to understand the propensity of imports, including the capacity and ability of a nation to sustain imports, the analysis is also undertaken in terms of Income Terms of Trade (ITOT). This is defined as a product of the NBTOT with unit value index of exports. Analyses on different commodity groups including that of aggregates are based on these three measures of terms of trade.

ANALYSIS OF AGGREGATES

Growth of terms of trade and their subsequent behaviour across time have implications for the very dynamic flows of variables and relations in external sector vis-à-vis the domestic economy. Serious economic and financial events and their implications are invariably exposed through terms of trade and transmitted to the underlying behavioural sources in domestic and external sectors, and the consequences thereof can create repercussion effects. It is in this dimension that India's terms of trade and their trends and behaviours are analysed. The essential objective of this study is to bring out various implications of terms of trade with reference to its annual growth rates and examining the behavioural patterns by using proper descriptive statistical estimates for reflections and implications.

Graph 1: Quantum and Unit Value Indexes of Exports and Imports
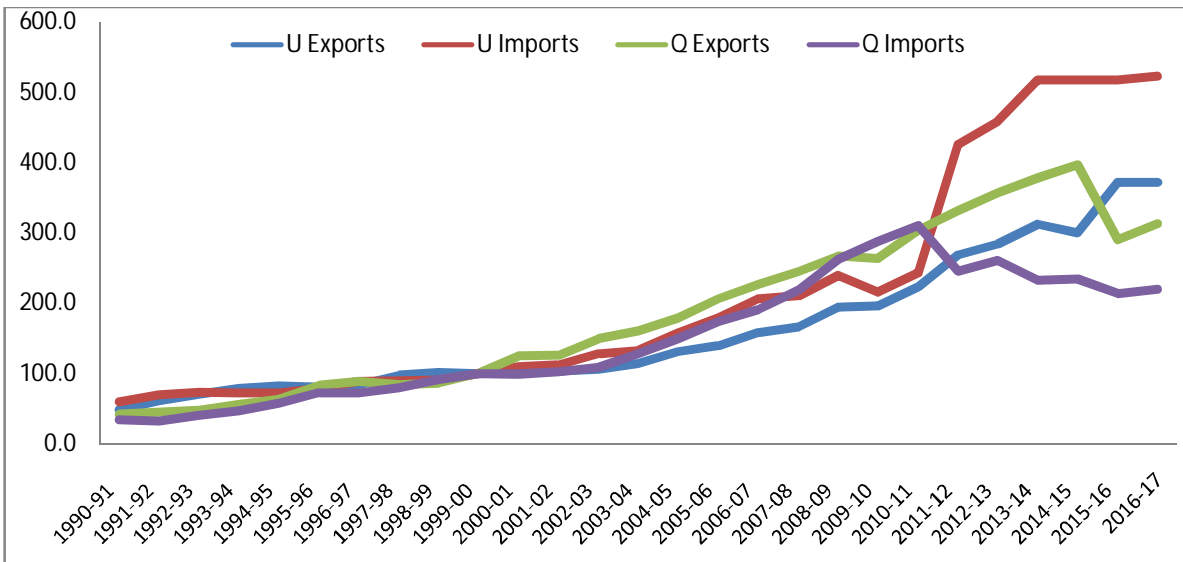
Notes: U Exports and U Imports refer to Unit value indexes of exports and imports and, Q Exports and QImports indicate Quantum indexes of exports and imports respectively. Base year 1999-00.

Source: Handbook of Statistics on Indian Economy (Various Issues), Reserve Bank of India.

As a matter of choice, this study proposes to examine the behaviour and growth rate of exports and imports, organized in the form of unit value indexes and quantum indexes, so as to get a holistic understanding of price and quantity movements across macro framework before any pattern in the terms of trade is proposed to be analysed. The Graph 1 above shows movements of unit value indexes for both exports and imports and quantum indexes of both exports and imports. It can be observed that all the indexes move very closely up to 2001-02 and there is a moderate departure in the same up to 2010-11. It is interesting to note that the movements among all four indexes are considerably different from each other and also not closer to one another after 2011-12. If one observes the unit value index of imports and exports, not only they depart to opposite directions but also the gap between them are widening. This is due to the substantial growth rate of unit value index of imports as compared to exports. A sharp increase in the unit value of imports is noticed from 2010-11 and the rise could not be compensated by the rise in the unit value index of exports so as to close the gap between them for some years. Similar but not same movement is evident in the quantum index of exports and imports. In fact, quantum index of exports is higher than the quantum index of imports whereas the case is reverse in case of unit value indexes. The gap between quantum indexes of exports and imports is not that large as compared to unit value indexes of the same, though we cannot conceptually and strictly compare them.

Table 1: Annual Growth Rates (%) of Indexes of Exports, Imports and Terms of Trade

Year	Unit value indexes		Quantum indexes		Terms of trade		
	Exports	Imports	Exports	Imports	Gross	Net	Income
1991-92	26.3	15.5	7.5	-4.1	-10.8	-9.7	0.1
1992-93	14.1	7.1	6.9	23.7	15.7	9.3	17.6
1993-94	12.5	-1.1	15.5	16.7	1.0	6.5	13.8
1994-95	4.3	-0.8	13.7	24.1	9.2	13.8	31.4
1995-96	-2.1	8.1	31.3	26.1	-3.9	5.2	19.5
1996-97	4.2	13.9	7.2	-0.6	-7.2	-9.5	18.9
1997-98	16.8	1.1	-6.3	9.8	17.1	-8.5	-1.9
1998-99	3.8	0.9	3.4	14.6	10.9	15.5	8.3
1999-00	-1.3	10.3	15.5	9.5	-5.3	2.9	6.3
2000-01	2.0	9.0	25.0	-1.0	-20.8	-6.4	17.0
2001-02	1.0	2.8	0.8	4.0	3.2	-1.7	-0.9
2002-03	2.9	14.3	19.0	5.8	-11.0	-10.0	7.2
2003-04	7.5	3.1	7.3	17.4	9.4	4.3	11.9
2004-05	14.9	18.9	11.2	17.2	5.4	-3.5	7.4
2005-06	6.1	14.0	15.1	16.0	0.8	-6.8	7.1
2006-07	13.7	15.1	10.2	9.8	-0.5	-1.3	8.8
2007-08	5.1	1.9	7.9	14.1	5.8	3.0	11.2
2008-09	16.9	13.8	9.0	20.2	10.2	2.8	11.9
2009-10	1.0	-10.0	-1.1	9.9	11.2	12.3	11.0
2010-11	13.8	13.0	15.2	8.0	-6.2	0.7	15.9
2011-12	20.2	74.9	8.9	-20.9	-27.4	-31.3	-25.2
2012-13	6.0	8.0	7.9	6.1	-1.6	-1.9	5.8
2013-14	9.9	12.9	5.9	-10.7	-15.7	-2.7	3.1
2014-15	-3.8	0.0	5.0	0.9	-3.9	-3.8	1.0
2015-16	24.0	0.0	-27.0	-8.9	24.7	24.0	-9.4
2016-17	0.0	1.0	7.9	2.8	-4.8	-0.9	6.9

Notes: Annual growth rates are calculated from the respective indexes of exports, imports and terms of Trade and they are based on the year 1999-2000.

Source: The source of the table is author's calculations and the data required is obtained from Handbook of Statistics on Indian Economy (Various Issues), Reserve Bank of India.

These behavioural tendencies become clearer when the Table 1 above is properly analysed. This table gives a consolidated picture of the annual growth rates on unit value indexes of exports and imports, quantum indexes of exports and imports and growth rates of various measures of terms of trade. Firstly, all the indexes have registered sizeable negative growth rates across the study

period. Growth rates of unit value indexes of exports and imports are highly fluctuating and fundamentally not stable to a proper growth trajectory of exports and imports respectively. Though this may be a non-stationary series in statistical sense of the term, but huge variations in the growth rates essentially indicate price instabilities across both export and import sectors. In fact when one looks at the frequency of variations in the growth rates, imports seem to be more unstable than exports possibly because of the considerable variability in the price behaviour of imports in India than the same in foreign countries for Indian exports. The range of growth rates for unit value index of exports worked out to be -3.80% to 26.30% and the same can be observed for unit value of imports as -10.00 % to 74.9 %. Therefore, there exists a clear instability for exports and imports. This cannot be a misleading gross statement even if one constructs more complex macroeconomic model for analysing the same.After 2013-14, the growth rates of unit value index of imports are declining and closer to zero while for the same period a huge volatility in the growth rate is observed for exports. Quantum indexes of exports and imports do exhibit almost similar pattern up to 2006-07. After this, one finds considerable variability in the growth rates of the same. The range of growth rate for quantum index of exports is estimated to be -27.00 % to 31.30 % and while that of imports is calculated as -20.90 % to 26.1 %. Estimate of Quantum index of exports exhibits more variability than the quantum index of imports. It is unique to observe that while export variability is comparatively less in the estimates of unit value indexes, the same is high in the estimates of quantum indexes. If one looks at general variations in frequency of negative growth rates for both exports and imports, variabilities are higher in both quantum indexes and unit value indexes respectively during the sample period.

Behavioural trend observed in the unit value, quantum indexes must explain the variations in different measures of terms of trade, and Graph 2 above depicts the movements of time-series of various values of GBTOT, NBTOT and ITOT. Although there is considerable variability in the movements of individual indexes, in both unit value and quantum indexes, GBTOT and NBTOT seem to be moving very closely in the same directions.

The co-movement is so close that the simple correlation worked out to be 0.81. A significant departure of the co-movement is observed for ITOT from GBTOT and NTOT, since 2000-01 and in fact a steep continuous rise in ITOT is observed till 2009-10 and from there some decline in trend is evident.

Graph 2: Indexes of Terms of Trade
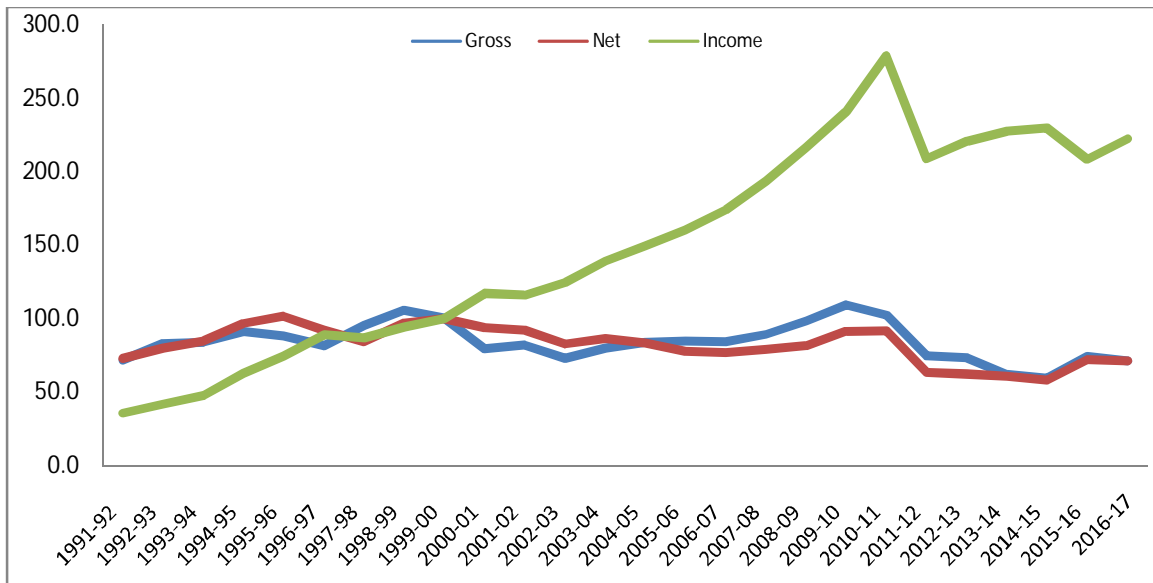
Notes: Gross, Net and Income are respective terms of trade indexes for Gross barter, Net barter and Income barter terms of trades. Base Year 1999-00.

Source: Handbook of Statistics on Indian Economy (Various Issues), Reserve Bank of India.

The ranges for annual growth rates for GBTOT, NBTOT and ITOT are estimated to be -27.10 % to 24.70 %, -31.30 % to 24.00% and -25.20% to 31.40% respectively. All the measures of terms of trade have considerable variability though the variability is less for GBTOT. Incidentally frequencies of negative growth rates are very high for both GBTOT and NBTOT. As much as thirteen to fourteen growth rates out of twenty seven observations are negative for both GBTOT and NTOT. For the same period, ITOT has only four negative growth rates. Therefore, the volatility expressed in terms of growth rates are very high for both GBTOT and NTOT compared to ITOT.

Table 2 above and Table 3 below give different perspectives on the same issue. These tables present the estimates for descriptive statistics narrated in the form of mean, standard deviation and coefficient of variation. Our study period ranging from 1991-92 to 2016-17 is sub-divided into 1991-92 to 1995-96, 1996-97 to 2000-01, 2001-02 to 2005-06, 2006-07 to 2010-11, and lastly 2011-12 to 2016-17. This is undertaken in order to analyse shifts in the mean values across various sub-periods and their associated variability's. A broad and fundamental observation can be that the mean values for unit value indexes of exports and imports and, quantum indexes for exports and imports are fluctuating quite widely.

Table 2: Descriptive Statistics of Annual Growth Rates (%) Pertaining to Unit Value and Quantum Indexes

Years	Unit value indexes						Quantum indexes					
	Exports			Imports			Exports			Imports		
	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV
1991-92 to 1995-96	11.0	10.8	97.6	5.7	6.9	120.6	15.0	9.9	66.0	17.3	12.5	72.1
1996-97 to 2000-01	5.1	6.9	134.6	7.0	5.8	82.4	9.0	11.9	132.9	6.5	6.9	107.1
2001-02 to 2005-06	6.5	5.4	82.7	10.6	7.3	68.6	10.7	7.0	65.9	12.1	6.6	54.5
2006-07 to 2010-11	10.1	6.7	66.5	6.8	10.8	159.2	8.2	5.9	71.9	12.4	4.9	39.5
2011-12 to 2016-17	9.4	11.0	117.5	16.1	29.3	181.5	1.4	14.0	972.7	-5.1	10.2	-198.5

Notes: Annual growth rates are calculated from the respective indexes of exports, imports which are based on the year 1999-2000. SD = Standard Deviation and CV = Coefficient of Variance.

Source: Author's calculation

A cursory look at the Table 2 reveals that variability and inconsistency expressed in terms of coefficient of variation is comparatively larger for the sub-periods two and five respectively and the same is less for other periods. In most of the cases where variability is high, standard deviation is higher than the mean and in each case minimum two values of coefficient of variation happen to be more than 100 %.

Table 3: Descriptive Statistics of Annual Growth Rates (%) Pertaining to Terms of Foreign Trade

Year	Terms of trade								
	Gross			Net			Income		
	Mean	SD	CV	Mean	SD	CV	Mean	SD	CV
1991-92 to 1995-96	2.2	10.5	467.7	5.0	8.9	177.0	16.5	11.3	68.4
1996-97 to 2000-01	-1.1	15.2	-1424.8	-1.2	10.6	-881.6	9.7	8.5	87.1
2001-02 to 2005-06	1.5	7.7	497.1	-3.5	5.4	-153.8	6.5	4.7	71.1
2006-07 to 2010-11	4.1	7.4	179.9	3.5	5.2	149.7	11.8	2.6	21.9
2011-12 to 2016-17	-4.8	17.4	-362.9	-2.8	17.5	-630.8	-3.0	12.3	-415.7

Notes: Annual growth rates are calculated from the respective indexes of terms of trades which are based on the year 1999-2000. SD = Standard Deviation and CV = Coefficient of Variance.

Source: Author's calculation

Descriptive Statistical estimates presented in Table 3 above disclose that mean values for GBTOT and NBTOT turn out to be negative for sub-periods two and five and in fact all mean values for the last period are negative, and have very high values of standard deviation and coefficient of variation. At least in terms of mean and co-efficient of variation, the last sub-classification is a critical period for the external sector as average growth rates are inconsistent. Negative growth and high variability can be as bad as mini-crisis situation and this has to be addressed immediately as this period is connected to the on-going economic activities. Among all values of coefficient of variation, the worst case is for GBTOT during sub-period two though all other negative values of mean are equally considered to be bad.

It is interesting to go through various descriptive statistical evidences and growth rates to pulse the movements of various measures of terms of trade. As we have employed only growth rates and descriptive statistics along with graphs, the decomposition of behavioural movements are clear, in what we have explained so far, to say that the aggregate measures of terms of trade presently have been in a turbulent phase.

ANALYSIS ON MAJOR EXPORTS

Sometimes, taking perspectives based on aggregates can be misleading to understand the distributional and fundamental behaviour of exports and imports sectors in terms of both consumption and production. Therefore, a modest presentation is given on exports of various items from India over our study period. Sub-classification of the sample period has been maintained the same as narrated above. We have classified all exports into broadly food and food articles; beverages and tobacco; crude materials, inedible except fuel; mineral, fuel and lubricants; animal and vegetable oils, fats and waxes; chemical and related products; manufactured goods, classified chiefly by material; machinery and transport equipments, and miscellaneous[3]. Mean growth rates reported for various sub-periods under various commodity-classifications as shown by quantum index in Table 4 below indicate that again, growth rates vary diversely, and associated variabilities are also very high. Despite variations in the mean growth rates, commodities such as beverages and tobacco, chemicals and related products, manufactured goods, and machineries and equipments have registered positive growth rates. In case of animal and vegetable oil, fats and waxes, the average growth rates have been consistent but showed very high variability. In fact, variability for the same is very high across all sub-periods. Crude materials and inedible except fuel shows extremely high variations compared to any sub-classification in our study. General variability across all items is observed to be very high. In most of the cases average growth rates have been declining over the period and, therefore, highly volatile and declining mean growth rate across sub-periods can be a case of very serious process of

fluctuations in case of exports. At least in individual categories, if one goes by quantum index, export instability is clearly evident.

Table 4: Descriptive Statistics of Annual Growth Rates (%)in Quantum indexes of Major Exports

Items	Descriptive Statistics	Years				
		1991-92 to 1995-96	1996-97 to 2000-01	2001-02 to 2005-06	2006-07 to 2010-11	2011-12 to 2015-16
Food & Food Articles	Mean	20.9	-0.4	10.3	3.8	7.6
	SD	26.9	16.8	12.0	18.9	18.6
	CV	128.5	-4634.5	115.6	501.4	246.5
Beverages & Tobacco	Mean	7.9	16.8	6.5	11.9	2.9
	SD	39.3	43.1	13.4	15.8	4.6
	CV	494.1	256.9	206.8	133.1	160.4
Crude Materials, Inedible, except Fuels	Mean	1.2	6.3	17.2	0.1	-9.7
	SD	38.0	26.2	25.5	33.3	8.5
	CV	3151.8	414.1	148.5	63325.7	-87.2
Mineral Fuels, Lubricants, etc.	Mean	-7.5	313.0	27.6	19.4	-5.2
	SD	16.3	769.7	15.6	22.9	33.7
	CV	-215.7	246.0	56.7	118.2	-648.3
Animal & Vegetable Oil, Fats & Waxes	Mean	47.3	-2.1	7.3	5.5	5.7
	SD	40.9	21.1	32.2	14.6	10.0
	CV	86.4	-1016.2	444.1	264.5	176.0
Chemicals & Related products	Mean	16.5	17.6	21.5	3.0	12.4
	SD	30.9	15.3	11.6	11.0	26.9
	CV	187.6	87.1	53.9	359.1	216.7
Manufactured Goods Classified Chiefly by Material	Mean	17.3	12.2	8.1	3.4	-1.6
	SD	8.3	27.1	6.1	15.1	11.4
	CV	47.7	222.3	75.6	441.6	-708.4
Machinery & Transport Equipment	Mean	25.0	5.0	16.3	18.1	6.0
	SD	31.0	26.4	11.0	24.4	18.3
	CV	124.2	524.5	67.8	134.3	305.9
Miscellaneous & Manufactured Articles	Mean	12.3	17.2	8.0	27.5	3.8
	SD	6.2	24.7	23.6	79.3	9.3
	CV	50.2	143.3	296.3	288.4	240.6

Notes: Annual growth rates of quantum indexes of exports for major exports are calculated from the respective Quantum indexes of major exports of commodities which are based on the year 1999-2000. SD = Standard Deviation and CV = Coefficient of Variance.

Source: The source of the table is author's calculation and the data required is obtained from Handbook of Statistics on Indian Economy (Various Issues), Reserve Bank of India.

Table 5: Descriptive Statistics of Annual Growth Rates (%) in Unit Value indexes of MajorExports

Items	Descriptive Statistics	Years				
		1991-92 to 1995-96	1996-97 to 2000-01	2001-02 to 2005-06	2006-07 to 2010-11	2011-12 to 2015-16
Food & Food Articles	Mean	11.5	7.4	-0.2	14.5	9.6
	SD	14.1	12.0	8.1	15.9	6.8
	CV	122.7	162.8	-4153.0	110.2	70.9
Beverages & Tobacco	Mean	12.1	5.5	3.5	13.7	8.1
	SD	24.2	14.5	6.4	16.6	6.4
	CV	199.5	263.9	182.1	121.4	79.1
Crude Materials, Inedible, except Fuels	Mean	16.4	4.9	18.6	22.6	13.0
	SD	22.1	12.7	22.5	26.8	32.9
	CV	134.1	259.6	121.0	118.2	252.8
Mineral Fuels, Lubricants, etc.	Mean	30.8	8.6	14.3	12.6	19.6
	SD	52.6	14.9	20.6	21.1	33.1
	CV	170.9	172.3	143.9	167.6	169.2
Animal & Vegetable Oil, Fats & Waxes	Mean	12.4	8.1	0.9	19.2	6.3
	SD	8.0	11.8	17.2	26.1	15.7
	CV	64.3	146.7	1871.5	135.9	249.6
Chemicals & Related products	Mean	16.6	2.8	-0.9	12.2	6.8
	SD	22.6	6.2	7.1	10.2	23.3
	CV	135.9	223.0	-802.3	83.6	341.1
Manufactured Goods Classified Chiefly by Material	Mean	9.5	5.3	5.3	15.4	8.8
	SD	9.8	20.5	10.9	21.3	9.5
	CV	102.7	385.3	207.2	138.0	108.2
Machinery & Transport Equipment	Mean	6.0	13.0	8.8	8.4	7.7
	SD	25.4	16.4	7.8	19.0	12.7
	CV	423.5	126.6	88.5	225.1	165.8
Miscellaneous& Manufactured Articles	Mean	14.0	4.5	5.8	5.1	10.7
	SD	10.5	32.8	18.7	29.3	6.6
	CV	75.0	727.8	320.2	570.6	61.5

Notes: Annual growth rates of unit value indexes of exports for major exports are calculated from the respective unit value indexes of major exports of commodities which are based on the year 1999-2000. SD = Standard Deviation and CV = Coefficient of Variance.

Source: The source of the table is author's calculation and the data required is obtained from Handbook of Statistics on Indian Economy (Various Issues), Reserve Bank of India.

For the same commodity classifications, instead of quantum indexes in terms of volumes, unit value can give more useful information on price behaviour and market dynamics. This information is portrayed in Table 5 below. Out of the nine commodity-classification narrated, seven items such as beverages and tobacco, crude materials, minerals, animal and vegetable oils, manufactured goods, machinery and equipments have registered very strong positive growth. In fact in the entire classification of mean growth rates under different commodities, only two commodities such as food and food articles and chemicals have registered negative growth which is less than one percent, during sub-period three. Despite moderately consistent mean value of average growth rates across all sub-periods, variability seems to be very high as most of the cases have very high coefficient of variation and standard deviation which is greater than mean. Therefore, even in terms of unit value indexes, export variability and thereby instability[4] is clearly evident.

ANALYSIS ON MAJOR IMPORTS

Imports are an important component of BOP and the growth rates and variations of the same can have far reaching implications for the dynamic behaviour of the external sector. Although we have examined behaviour of imports at aggregate level, it is important to look at the various commodity groups and their trends and growths over the given study period. Even in case of individual commodity groups, imports happen to be higher than exports, whichever the way one classifies. Table 6below gives a clear presentation of measures of descriptive statistics estimated for the growth rates of imports for various commodities. It is clear that there exist positive mean values of growth rates that are very strong. The variability expressed in terms of standard deviation and coefficient of variation seems to be very high. There are a few negative growth rates particularly for the last sub-classification. Animal and vegetable oil, fats and waxes registered very strong growth rates along with crude materials and chemicals. For the last sub-period, not only growth rates are negative, variabilities are high as the values of coefficient of variations are very high for all the commodity-classifications

Price behaviour of major imports depicted in the Table 7 below gives alarming information about extremely fluctuating mean values across all commodity groups. As it is seen in most of the cases earlier, here also the values of coefficient of variation are very high. There are few negative mean values, and also high estimated values for coefficient of variation indicating that even imports are highly unstable.

Table 6: Descriptive Statistics of Annual Growth Rates (%) in Quantum Indexes of MajorImports

Items	Descriptive Statistics	Years				
		1991-92 to 1995-96	1996-97 to 2000-01	2001-02 to 2005-06	2006-07 to 2010-11	2011-12 to 2015-16
Food & food articles	Mean	20.7	17.2	25.2	17.6	13.8
	SD	96.0	50.0	37.8	57.9	17.3
	CV	462.9	290.2	149.9	329.1	125.4
Beverages & tobacco	Mean	31.5	20.5	38.6	11.6	8.8
	SD	55.1	76.5	27.8	25.7	22.1
	CV	174.8	372.9	72.2	220.8	251.9
Crude materials, inedible, except fuels	Mean	6.4	7.8	15.2	19.3	6.6
	SD	25.4	16.1	33.3	48.0	16.6
	CV	393.8	205.9	218.9	248.6	253.1
Mineral fuels, lubricants, etc.	Mean	13.3	5.8	9.3	5.9	-1.4
	SD	7.0	7.1	2.9	7.3	20.8
	CV	52.6	123.0	30.8	123.1	-1510.4
Animal & vegetable oil, fats & waxes	Mean	40.6	40.5	12.4	-7.0	15.3
	SD	89.4	58.2	62.6	31.3	15.5
	CV	220.1	143.7	506.3	-449.6	101.2
Chemicals & related products	Mean	10.4	4.2	18.6	19.5	4.2
	SD	6.5	18.8	28.0	19.7	3.5
	CV	62.4	443.9	150.7	101.1	81.9
Manufactured goods classified chiefly by material	Mean	5.1	11.5	15.1	22.8	-2.5
	SD	18.3	18.8	9.0	38.0	10.3
	CV	359.2	163.6	59.6	166.7	-410.7
Machinery & transport equipment	Mean	34.2	-4.4	42.7	3.9	-11.2
	SD	57.3	12.5	51.5	25.8	24.7
	CV	167.8	-284.5	120.5	654.3	-219.7
Miscellaneous manufactured articles	Mean	47.7	35.8	-10.5	46.7	4.9
	SD	67.5	37.9	21.4	67.8	15.1
	CV	141.7	105.7	-204.0	145.4	310.0

Notes: Annual growth rates of quantum indexes of imports for major imports are calculated from the respective quantum indexes of major imports of commodities which are based on the year 1999-2000. SD = Standard Deviation and CV = Coefficient of Variance.

Source: The source of the table is author's calculation and the data required is obtained from Handbook of Statistics on Indian Economy (Various Issues), Reserve Bank of India.

Table 7: Descriptive Statistics of Annual Growth Rates (%) in Unit Value indexes of MajorImports

Items	Descriptive Statistics	Years				
		1991-92 to 1995-96	1996-97 to 2000-01	2001-02 to 2005-06	2006-07 to 2010-11	2011-12 to 2015-16
Food & food articles	Mean	35.7	1.9	1.0	15.5	10.1
	SD	50.7	27.1	8.2	19.8	9.2
	CV	141.9	1455.7	794.4	127.8	91.6
Beverages & tobacco	Mean	13.2	3.0	4.5	9.7	19.9
	SD	19.3	20.2	14.5	26.5	28.0
	CV	146.3	671.6	324.4	273.7	141.1
Crude materials, inedible, except fuels	Mean	16.2	0.9	11.8	9.4	5.6
	SD	27.2	8.1	35.7	18.9	6.3
	SD	167.9	920.6	301.9	200.5	111.9
Mineral fuels, lubricants, etc.	Mean	6.1	21.6	16.3	11.8	7.8
	SD	5.9	41.4	22.8	14.7	13.0
	CV	97.3	191.6	140.0	125.1	166.7
Animal & vegetable oil, fats & waxes	Mean	31.2	-0.3	16.5	59.0	4.2
	SD	32.4	36.6	51.0	96.8	13.2
	CV	103.7	-11997.7	308.6	164.3	314.2
Chemicals & related products	Mean	16.9	-0.4	8.3	3.7	9.3
	SD	18.9	8.6	20.0	15.8	9.2
	CV	111.9	-2323.9	242.0	426.0	99.1
Manufactured goods classified chiefly by material	Mean	16.7	3.5	4.2	5.2	8.5
	SD	22.3	11.3	9.9	3.6	9.3
	CV	133.2	324.3	237.8	69.6	109.6
Manufactured goods classified chiefly by material	Mean	7.2	9.8	-1.3	17.8	42.5
	SD	42.1	17.5	21.3	34.4	71.5
	SD	580.1	178.3	-1584.0	193.1	168.1
Miscellaneous & manufactured articles	Mean	-2.2	-10.0	38.7	-12.3	9.5
	SD	35.6	17.4	25.7	19.4	10.7
	CV	-1617.4	-174.6	66.3	-157.7	111.8

Notes: Annual growth rates of unit value indexes of imports for major imports are calculated from the respective unit value indexes of major imports of commodities which are based on the year 1999 2000. SD = Standard Deviation and CV = Coefficient of Variance.

Source: The source of the table is author's calculation and the data required is obtained from Handbook ofStatistics on Indian Economy (Various Issues), Reserve Bank of India.

OBSERVATIONS AND CONCLUDING REMARKS

The proper study on the behaviour of terms of trade over time is critically important in evolving appropriate trade policy. The analysis carried out by employing various ratios, growth rates and descriptive statistics on various dynamics of terms of trade can be organised on certain critical observations for a proper understanding of various analytical issues in the following manner.

First, it is clearly evident from our analysis that there is an improvement in the income barter terms of trade while there are inconclusive trends or movements in gross and net barter terms of trade. This has happened despite there being a continuous and persistent rise and upward trends in all indexes of imports and exports (both quantum and unit value). The unique upward movement in the income terms of trade is primarily because of the rise in the quantum indexes of exports even when gross and net barter terms of trades have been moving in tandem with one another while their trends are inconclusive over time in our study. Probably this is a reason why imports have sharply risen over time. Similarly the variability for GBTOT and NBTOT are much higher as compare to ITOT and this would cause the difference in the behavioural movements between GBTOT and NBTOT, and that of ITOT.

Second, quantum indexes of exports was always higher than that of quantum indexes of imports except for very few years, whereas the unit value of imports had been larger than the unit value of exports during our study. There is an interesting element of truth in this observation as the unit value worked against the external balance and quantum indexes have moved somewhat favourably. On account of variability, allthe indexes of exports and imports have shared high fluctuations and inconsistencies. Perhaps this resulted in the resting point of variability and inconsistency on GBTOT and NBTOT.

Third, the variability examined for the growth rates of exports and imports in terms of unit value and quantum indexes suggest that the comparative volatility is higher for imports than exports in unit values and it is reverse, meaning that the variations in exports are observed to be larger than that of imports, for quantum indexes. Therefore larger quantum variability in exports is a more serious case than comparative higher variability observed in the unit value for imports. Markets for exports are unstable and hence it is not quite easy to estimate stable export function and thereby identify its determinants.

Fourth, analysis of growth rates of export indexes for different commodity groups on their quantum indicates that export variabilities are higher in cases of most of the major exportcommodity groups. Symmetrically, the same inferences on variations can be noticed in the unit value indexes of major exports. Although instability cannot be completely analysed with the help of the methods that

we have used in our study, they exemplify greater of amount of analytical insight into instability of exports across various commodity groups. It can also be observed that it is very difficult to reduce volatility and variability in aggregate exports without properly addressing the highvariabilities in the annual growth for exports of major product categories.

Fifth, the mean estimates of annual growth rates of imports for major commodity groups are comparatively higher than that of export categories. But, considerable variability persists in most of the commodities in imports also. Some extreme variation is noticed in some commodity groups where markets for imports are also unstable and fluctuating. Estimation of strong growth of imports for major import groups indicates that the imports dependency for both consumption and investments are very strong and particularly import of crude oil, machinery and equipment, and food articles continue to occupy strong space. This only clarifies some lacuna in import polices which are not addressed properly to account for market failure associated with allocative and technical efficiencies.

Last, the variability and instability in exports and imports finally are reflected in inconsistent changes in the trade and current account balances. Proper understanding of nature and behaviour of terms of trade would certainly articulate policy actions for the maintenance of prudent current account balance. More serious case can be of higher export variably than that of imports, although both are very crucial for maintenance of smooth trade balance. Export instability is largely determined by exogenous factors but the firm-level issues such as market expansion, reaping the benefits of economies of scales in reorganising resources toward export promotion, obtaining some level-playing ground in the international arena and strategy can be crucial for export-promotion though public investment and technical supports including proper export promotion measures and policies may be the area of concerns for the Government. However, variability in imports also needs to be minimized through both short-term discretionary polices and long term optimal regulations for the requirements of imports for development.

In summing up, it is important to note that any situation other than favourable movements in the terms of trade adversely affects economic growth and inflation. Larger macro economy is subjected to unviable and unstable changes if there are external shocks through balance of payments which are the outcomes of behavioural variations in the terms of trade. Therefore, the unfavourable and volatile movements in India's terms of trade need to addressed comprehensively to attain smooth and consistent long term growth in the balance of payments and external sector.

A caveat can be placed on growth rates, graphs and descriptive statistics to draw some meaningful conclusions on the way the various measures of terms of trade have behaved. One might curiously be tempted to take a note of the very basic applied statistical estimates presented here for analysing the complex phenomena on dynamics of terms of trade and its implications thereof without

carrying out more complex econometric modelling. But this serious note presented with the aids of evidences here gives lucid and comprehensive understanding on the issue narrated. However, one is free to model the process and examine it econometrically.

NOTES

1. Substantial portion had been gold imports. In fact, it was argued that the current account deficit minus gold imports was around 2.5percent of GDP.

2. The summary information presented in this section is calculated from the various official published sources which are mentioned in our study pertaining to information on data.

3. The classification is analysed from the Hand Books of Statistics on Indian Economy, RBI.

4. The aim here is not to equate variability with instability as different measurements can throw different dimensions on instability, but we are only arguing that some amount of instability is captured by descriptive statistical measures.

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