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From the Editor's Desk...

One of the main issues mentioned in the editorial of the last issue of the journal was, the issue of the trade wars. That issue still continues to be in focus. The topic which is being most debated, in the domain of international economics. The Trump Government announced tariff increases which is not within the ambit of WTO framework. Discriminatory tariffs on imports of about $50 billion from China under section 301 of the US trade Act is one such example which betrays Trump's deep seated antipathy for the watch dog of the world trade. That is the reason why now a days we find newspapers suffused with articles and editorials, that express their apprehensions whether the existence of WTO is under threat. Many countries strongly feel that such a development is not at all good for the world that has moved more and more towards globalization in the past two decades. Canada invited 12 countries, which included Japan and Brazil to Ottawa and reaffirmed the importance of multilateral trading system. The meeting emphasized the importance of WTO. It remains to be seen how things pan out in next one year. Whether countries who are steadfast in believing the significance of WTO, continue to protect the sanctity of WTO or will there be a full scale trade war, threatening the very existence of globalization itself?

In case of India, the depreciation of rupee has engaged everyone's attention. Some experts opined that depreciation of rupee should not be too much of a cause of concern. They are of the opinion that the rupee is trying to find its correct value and RBI should not intervene much. This opened up the old debate of whether the central bank of a country should be concerned only with price stability? Or should it also be concerned about stability of the currency? However, the general concern was about the capital outflows from the country, as a result of increase in interest rates by Federal Reserve of US, which in turn, would have an adverse impact on the current account deficit of India. Of course, the rise in oil prices was a matter of grave concern. It remains to be seen how OPEC behaves with regard to prices. As this issue goes into print, there was a great news for India. The 'Ease of Doing Business' report published by World Bank every year, gave a rank of 77. This prompted some experts to say that, probably this was an acknowledgement of Modinomics. This is indeed a remarkable improvement from 142nd rank in 2014.

In this issue of the journal, we have as usual made an attempt to select those articles that would be a value addition to all those who want to read good literature on issues pertaining to international economics. The papers in this issue discuss topics such as, BRICs and CIVETS, forecasting India's exports, the causal relationship between FDI and exports, to name a few. We are sure the readers of this journal will find these articles immensely useful. The book review in this issue is of a book written by Yanis Varoufakis, titled, 'Talking to My Daughter About the Economy-A Brief History of Capitalism'. The book explains some complex economic concepts, in a very interesting way.

We request our regular contributors to continue to show the same enthusiasm in contributing articles. We further request our readers, to keep sending review of books that talk about issues pertaining to international economics.

Dr G Rajesh

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After BRICS, CIVETS as Emerging Markets

Ratna Vadra*

Abstract

As world economy shifts both economically and politically new power blocs of countries such as BRICS, CIVETS, MIST, Next 11 emerge. While most of these blocs are rather conceptual (except for BRICS), nevertheless they provide hypothetical and financial scenarios both for businesses and organizations. As emerging markets these countries are still struggling many issues including human rights, labor issues, poor environmental regulations, and widespread corruption. Coined in 2009, the CIVETS refers to Colombia, Indonesia, Vietnam, Egypt, Turkey, and South Africa as a new group of frontier emerging markets with young and growing populations and dynamic economies. The CIVETS economic bloc is composed of Columbia, Indonesia, Vietnam, Egypt, Turkey, and South Africa, all of which are part of the Asia-Pacific region and represent a large number of population and economy of the region. This paper examines CIVETS as new emerging markets. It also analysis trade and commodities that are traded the most between India and the CIVETS block and suggest the options to expand trade.

Keywords: Emerging Markets, CIVETS, India

Introduction

Emerging markets are nations with social or business activity in the process of rapid growth and industrialization. Currently, there are 28 emerging markets in the world, with the economies of China and India considered to be by far the two largest. Examples of emerging markets include China India, some countries of Latin America (particularly Argentina, Brazil· Chile, Mexico, Colombia and Peru), some countries in Southeast Asia, most countries in Eastern Europe, Russia, some countries in the Middle East (particularly in the Persian Gulf Arab States), and parts of Africa (particularly South Africa). In the 2008 Emerging Economy Report ·The Center for Knowledge Societies defines Emerging Economies as those "regions of the world that are experiencing rapid informationalization under conditions of limited or partial industrialization." It appears that emerging markets lie at the intersection of non-traditional user behavior, the rise of new user groups and community adoption of products and services, and innovations in product technologies and platforms.

* Assistant Professor, Economics and International Business, IMT, Ghaziabad and can be reached at rvadra@imt.edu

Emerging Economies are those regions of the world that are experiencing rapid changes under conditions of limited or partial industrialization. This framework allows us to explain how the non-industrialized nations of the world are achieving unprecedented economic growth using new energy, telecommunications and information technologies**. The Emerging Economy Report** is an essential tool for business innovation. It focuses on India, China, Indonesia, South Africa, Kenya, Egypt and Brazil. It uses diverse methodologies and different kinds of data to build the world's most comprehensive planning tool for corporate strategy, marketing and product and service innovation. According to World Bank (1992),emerging economies are Hungary, Czech Republic, Poland, Slovakia, Romania, Slovenia, Estonia, Lithuania, Latvia, Russia, Belarus, Ukraine, Greece, Turkey, Republic of Korea, China, Malaysia, Thailand, Indonesia, Philippines, Vietnam.

Since the beginning of the 1990s foreign direct investment (FDI) has become the most important source of foreign capital for emerging market economies (EMEs). The increasing reliance of emerging markets on FDI is often seen as an extremely welcome for development. Many positive implications are there. The import of improved management techniques and of more advanced technologies as well as the related easier access to international financial markets is among the commonly advantages associated with FDI. FDI is also expected to be a relatively stable long-term commitment on behalf of a multinational enterprise (MNE). Thus they have significant benefits for the recipient countries in terms of economic growth and reduced external vulnerability.

As the world economy is shifting from West to East and North to South, world economists are in an ongoing attempt to classify certain countries and regions for financial investment and economic growth purposes. Terms such as G-7, G-20, BRIC, and the Next Eleven have certainly helped to achieve this. However, the changes in the world economy, where many G-7 countries have either been in a recession, or even worse, in an economic crisis, are main reasons why new approaches to financial outlook were needed to capture the evolving nature of the world economic map. The fields of finance and economics also invented other country groupings such as the CIVETS (Colombia, Indonesia, Vietnam, Egypt, Turkey and South Africa), the Next 11 (Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, Turkey, South Korea and Vietnam), and MIST (Mexico, Indonesia, South Korea and Turkey) to highlight the promising potential of these countries for investment and growth (O'Neill, 2011)

This paper first provides an overview of CIVETS and then explore each individual CIVETS country. The paper further highlights trade scenario between India and CIVETS economies.

The paper concludes with future of CIVETS countries. The past decade was of BRICS. The next decade could belong to the CIVETS – Colombia, Indonesia, Vietnam, Egypt, Turkey and South Africa – whose rising middle class, young populations and rapid growth rates make the BRICs look dull in comparison. The CIVETS are six favoured emerging markets countries – Colombia, Indonesia, Vietnam, Egypt, Turkey and South Africa. These countries are favoured for several reasons, such as "a diverse and dynamic economy" and "a

young, growing population". The acronym CIVETS was coined by Robert Ward, Global Director of the Global Forecasting Team of the Economist Intelligence Unit (EIU) in late 2009 and was further disseminated by Michael Geoghegan, President of the Anglo-Chinese HSBC, in a speech to the Hong Kong Chamber of Commerce in April 2010. Michael Geoghegan has called these countries "the new BRICS" because of their potential as second-generation emerging economies. Emerging markets will grow three times as fast as developed countries this year", adding that the centre of gravity of the world was moving towards the East and the South Asia and Latin America. Yi, Y., Qi, W., & Wu, D. (2013) The main findings are that at the country group level, there is no significant difference between CIVETS and BRICs in knowledge-based economy performance, scientific research quality and scientific research structure and that the number of scientific research papers is the clear gap between them. The paper is organized as follows. Section 1 is on introduction of CIVETS block. Section 2 reviews the literature on CIVETS block. Section 3 discusses Characteristics of CIVETS block. Section 4 presents the data characteristics, trade of India with CIVETS block. Section 5 concludes.

Literature Review

Since the coining of the CIVETS as a group is quite new, academic research on CIVETS are very less. Ten years after Brazil, Russia, India and China were dubbed the BRICs, any early mover advantage for investing in those economies has long gone. The so-called CIVETS group of countries – Colombia, Indonesia, Vietnam, Egypt, Turkey and South Africa – are being touted as the next generation of tiger economies, these nations all have large, young populations with an average age of 27. (Greenwood, J. (2011). Calderón-Martínez, A. & Ruiz-Conde, E. (2015) in his paper investigate the BRIC and CIVETS economies from a new perspective, focusing on the analysis of one element linked to the knowledge economy. Putting aside the leadership position, India and China are over and above the rest of the BRIC countries, meanwhile in the case of the CIVETS countries Indonesia has a relevant position. Delaunay, Christian; Torrisi, C Richard, (2012) in his paper discussed about Vietnam has emerged as an alternative smaller emerging economy market for FDI in the last five years, attracting both domestic market seeking and export oriented FDI. Vietnam continues to attract significant East Asian and OECD investors.

Objectives of the Study

The objectives of the study are to:

- Analyse CIVETS as new emerging markets
- India's trade with the CIVETS economies and examine the prospects of growth in trade with the block
- Analyse the commodities that are traded the most between India and the CIVETS block and suggest the options to expand trade

Research Methodology

The study on India's trade with CIVETS is based on secondary data sources. The data in this study has been collected from sources such as Centre for Monitoring Indian Economy (CMIE); Ministry of Commerce and Industry, Government of India. The other source of data information has been Economic Survey of India and India Stats. The statistical methods of trade shares as percentage comparisons, growth rates, and balance of trade have been computed. India's trade intensity with CIVETS is compared by taking its trade share as a ratio of its trade with the world.

CIVETS as Emerging Market

In this section we will point out certain factors which makes CIVETS countries attractive destination for trade and investment.

Colombia is a small market, but has always been a dynamic economy with some key industries like fresh flowers, oil and coffee. Colombia has substantial oil, coal and natural-gas deposits. Foreign direct investment totalled $6.8 billion in 2010, with the U.S. its principal partner. Colombia is emerging as an attractive destination for investors. Improved security measures have led to a 90% decline in kidnappings and a 46% drop in the murder rate over the past decade, which has helped per-capita gross domestic product double since 2002.

Indonesia is the world's fourth-most populous nation in world .Indonesia has the lowest unit labour costs in the Asia-Pacific region and a government ambitious to make the nation a manufacturing hub. The largest of the CIVETS, Indonesia has a huge rising population and has already benefited from investment by the U.S.A, China and Japan. Vietnam has been one of the fastest-growing economies in the world for the past 20 years, with the World Bank projecting 6% growth this year rising to 7.2% in 2013. Its proximity to China has led some analysts to describe it as a potential new manufacturing hub. Egypt's many assets include fast-growing ports on the Mediterranean and Red Sea linked by the Suez Canal and its vast untapped natural-gas resources. Egypt has a big, young population—82 million strong and with a median age of 25. Egypt has a well-educated, prosperous population in its Nile Valley cities, much of the country remains poor and the country has a high level of debt (80% of GDP). The political future beyond the rule of President Hosni Mubarek is cloudy, and the country could face religious turmoil.

Turkey is located between Europe and major energy producers in the Middle East, Caspian Sea and Russia, Turkey has major natural-gas pipeline projects that make it an important energy corridor between Europe and Central Asia Turkey is a dynamic economy that has trading links with the European Union but without the constraints of the euro-zone or EU membership. Turkey remains a promising regional centre which has benefited from relative stability and ties to the West. Membership in the European Union would be a plus point for turkey. South Africa has strong companies, a well-developed business infrastructure and can serve as a gateway to southern Africa. Many see the nation as a gateway to investment into the rest of Africa.

Attraction of CIVETS as Emerging Markets

Soaring Young Population

The CIVETS have large populations that are both young and increasing. Columbia's population is 45 million, Indonesia's is 248 million, Vietnam's is 91.5 million and they all have a median age of 28. Turkey has a population of 80 million and a median age of 28.5. South Africa has a population of 49 million and a lower median age of 25, while Egypt has a population of 84 million and has a median age of 24, the lowest of the group. A contrast between the CIVETS and the U.S. and the UK, which have a median age of 37 and 40 respectively. The CIVETS populations have an average age of 27 to 28, with median ages of 28 in Colombia, 28.2 in Indonesia, 28 in Vietnam, 25 in Egypt, 28.5 in Turkey and 25 in South Africa. By comparison, the average age in the UK and US is 40, and 44.9 in Germany. Indonesia is the fourth most populous nation in the world with 245 million people, and that figure is projected to increase to 313 million by 2050, which would give the archipelago a larger population than the US has today. Hence, not only does the country boast a vast pool of cheap, educated labour, but enormous potential as a consumer market. The remaining CIVETS are all in the world's 30 most populous countries, with Egypt's booming population (82 million) making it the largest Arab country. Needless to say, by 2050, the young, rapidly increasing CIVETS populations will form a stark contrast to the ageing populations of the West Due to their young populations, digital technologies and communication are expected to play on important role in these countries.

Strong Economic Growth

Most of the CIVETS countries has strong economic growth since 2011 and are showing strong signs for the future. In 2011 Indonesia's GDP real growth rate was 6.4 percent, Vietnam's was at 5.8 percent and Columbia's was at 5.7 percent. This compares favorably to the U.S.A which only had 1.5 percent growth. The Economist expects the CIVETS countries to have healthy yearly growth rates of around 4.9 percent for the next 20 years, which is more than double that of the G7 countries, which are predicted to only have around 1.8 percent growth. Despite the political uncertainty in Egypt, its economy is still predicted to grow this year.

Internet Usage on the Rise

Internet usage in the CIVETS is high and increasing rapidly. According to Internet World Stats Indonesia has 55 million Internet users, which represents only 22.4 percent of their population. Vietnam has almost 31 million Internet users, 34 percent of the country, while Columbia has 25 million users, representing almost 56 percent of the population. The CIVETS countries currently have 176 million Internet users – more than any European country on its own – and that number is set to rise. Compared to Western countries, there is a huge amount of untapped potential. Entering the market early and establishing a presence could help your company become a trusted brand for a new generation. Localization opportunities in the CIVETS are there for the taking. It is best to approach these new emerging markets with an open mind and with some flexibility to evolve with them. As the

Colombian, Indonesian, Vietnamese, Egyptian, Turkish and South African nations reinvent their nations into attractive hubs for global trade, you should be ready to meet their needs and capitalize on their growth before the competition does.

Low Labour Cost

Companies and nations attracted to CIVETS because of low labour and production costs and the countries' growing domestic markets. When asked to identify weaknesses, the survey participants cited political instability, corruption, a lack of transparency and infrastructure, and homegrown companies without much of a reputation or brand identification. When compared to the BRICS, the CIVETS are much smaller. Indonesia is, by far, the largest with 242.9 million people, followed by Vietnam with 89.5 million, Egypt (80 million), Turkey (77 million) and Colombia (44 million). By contrast, Russia has a population of 139 million, Brazil has 201 million, India 1.2 billion and China 1.3 billion. Each of the CIVETS presents opportunity and risk.

Diversified Economies

Turkey isn't the only CIVETS market to diversify its economy so as not to be overly reliant on one sector. Colombia, for example, has achieved investment-grade status by varying its export base with textiles, clothing and food processing industries developing alongside its traditional strength in oil. While Indonesia's flourishing services sector now accounts for the majority of its GDP. By contrast, South Africa, the CIVETS market arguably most reliant on commodities (gold), has shown the slowest growth with a 3.1% GDP rise in 2011.

Geo-Strategic Locations

Although geographically dispersed, the CIVETS markets are all well placed to become ripe targets for foreign investment. Indonesia, with all its commodities sources, is conveniently close to BRIC neighbours China and India. Vietnam is even closer, and its coastal position and cheap labour costs will attract many global businesses to relocate manufacturing to its shores. The Suez Canal has always been Egypt's biggest geo-strategic asset and its fast-growing ports on the Mediterranean and Red Sea are becoming increasingly important trade hubs connecting Europe and Africa. Similarly, Turkey's position between Europe and Asia, and its potential to provide an energy corridor to Asian oil and gas fields, will ensure the West continues to court it. While located at the foot of Africa along a major shipping route, South Africa has always allowed investors a path into the world's second-largest continent little wonder the Rainbow Nation has become Africa's most successful economy.

Table-1: Macroeconomic Indicators of CIVETS, 2015

Indicator	India	Columbia	Indonesia	Vietnam	Egypt	Turkey	S Africa
Population, total	1311050527.0	48228704.0	257563815.0	91703800.0	91508084.0	78665830.0	54956920.0
Population growth (annual %)	1.2	0.9	1.2	1.1	2.1	1.5	1.6
Urban population growth (annual %)	2.4	1.3	2.6	3.0	2.3	2.2	2.4

Indicator	India	Columbia	Indonesia	Vietnam	Egypt	Turkey	S Africa
GDP (current US$)	209539 8349095.5	29208015 5633.3	86193396 8740.3	1935993 79094.9	330778 550716.7	7178797 88566.8	31457194 5857.4
GDP growth (annual %)	7.6	3.1	4.8	6.7	4.2	4.0	1.3
Inflation, GDP deflator (annual %)	1.1	2.6	4.2	-0.2	10.9	7.4	4.0
Exports of goods and services (% of GDP)	19.9	14.7	21.1	89.8	13.2	28.0	30.7
Imports of goods and services (% of GDP)	22.5	24.2	20.8	89.0	21.6	30.8	31.7
Merchandise trade (% of GDP)	31.5	30.7	34.0	169.5	25.4	48.9	59.2
Net barter terms of trade index (2000 = 100)	104.4	108.3	121.8	136.3	122.4	98.3	133.1
External debt stocks, total (DOD, current US$)	479558 646000.0	11104974 0000.0	30853994 4000.0	7779827 2000.0	465846 69000.0	3979230 67000.0	13788737 7000.0
Foreign direct investment, net inflows (BoP, current US$)	689096 93352.8	11732229 173.7	20054270 303.9	1180000 0000.0	688480 0000.0	1695700 0000.0	15751700 29.6

Source: World Bank Data , 2015

The above table lists the different macroeconomic indicators for India and CIVETS nations for the year 2015. This table shows that these countries have a relatively high GDP rate and a moderate rate of Inflation. Foreign Direct Investment and Net Inflows are high into each country indicating that these countries are attractive destinations for foreign investment. Imports and Exports are at a healthy 19%-20% of GDP for each of these countries indicating that foreign trade forms a substantial part of these economies and the economic policies are in favour of foreign trade.

CIVETS Trade with India

Table-2 shows India exports to CIVETS. Table-2 shows the exports from India to CIVETS countries from period 2011-2015-16. Due to the overall decline in exports in 2015-16, exports to CIVETS countries were also affected. From the table, we can see that among the CIVET nations, Vietnam and Turkey are India's largest importers and Indonesia and South Africa have the highest growth in exports from India. If we see the Percentage share of CIVETS in India's total exports, we can see it was 7.18 percent in 2011 which increased to 8.08 percent in 2014-15 and then declined to 7.2 percent in 2015-16.

Table-2: India's exports to CIVETS, 2011-2016, US dollar

S. No.	Country	2011-12	2012-13	2013-14	2014-2015	2015-2016	%Growth
1	Colombia	892.42	912.12	1,007.51	1,105.15	888.11	-0.48%
2	Indonesia	6,677.99	5,331.30	4,850.20	4,043.32	2,819.54	-57.78%
3	Vietnam	3,719.09	3,967.37	5,441.94	6,257.88	5,266.15	41.60%
4	Egypt	2,421.89	2,897.33	1,007.51	3,025.59	2,337.65	-3.48%
5	Turkey	3,547.26	3,963.66	4,433.75	5,358.90	4,140.00	16.71%
6	South Africa	4,731.17	5,106.93	5,074.29	5,301.99	3,588.74	-24.15%
	Total	21,989.83	22,178.71	23,369.85	25,092.83	19,040.19	-13.41%
India's Total trade with world		305,963.92	300,400.58	314,405.30	3,10,338.48	2,62,290.13	
%Share		7.1871	7.3830	7.4330	8.0856	7.2592	

Source: CMIE database

Table-3: India's Imports from CIVETS :2011-2016, US dollar

S. No.	Country	2011-12	2012-13	2013-14	2014-2015	2015-2016	%Growth
1	Colombia	559.83	2,352.79	4,970.62	2,134.94	807.79	44.29%
2	Indonesia	14,765.93	14,879.49	14,748.30	15,004.64	13,131.93	-11.07%
3	Vietnam	1,722.87	2,314.78	2,594.25	3,003.35	2,560.39	48.61%
4	Egypt	3,002.40	2,553.47	2,388.96	1,741.77	1,221.20	-59.33%
5	Turkey	1,021.91	2,034.18	760.43	1,463.87	776.94	-23.97%
6	South Africa	10,971.76	8,887.89	6,075.26	6,496.52	5,948.42	-45.78%
	Total	32,044.70	33,022.60	31,537.81	29,845.08	24,446.66	-23.71%
India's Total		489,319.48	490,736.64	450,199.78	4,48,033.40	3,81,006.62	-22.14%
%Share		6.5488	6.7292	7.0053	6.6614	6.4163	

Source: CMIE database

Table-3 above shows the imports from India to CIVETS countries. From this table, we can observe that Indonesia and South Africa are the largest exporters to India from the CIVETS block. The highest growth in imports is seen from Colombia followed by Turkey. If we see the Percentage share of CIVETS in India's total imports, we can see it was 6.54 percent in 2011 which increased to 7.00 percent in 2013-14 and then declined to 6.41 percent in 2015-16.

Commodity-wise Exports of India to Vietnam and Turkey

For studying the commodity-wise exports, we have taken the countries that have the highest exports from India, which are Vietnam and Turkey.

Table-4: India's exports to Vietnam: 2011-16, US Dollar

S.No.	Commodity	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	%Growth
1	Cereals	7,71,108.66	13,41,249.93	9,35,540.09	4,51,348.64	3,961.77	-99.49%
2	Iron and Steel	90,321.07	2,52,927.37	6,22,672.21	1,77,929.63	64,477.48	-28.61%
3	Residues and Waste from the food industry	10,95,130.14	2,52,927.37	5,61,037.37	4,17,918.25	4,04,723.41	-63.04%
4	Meat	2,76,747.34	3,31,689.47	5,26,412.37	6,36,051.27	6,05,466.94	118.78%
5	Salt, Sulphur, Earths and Stone	2,02,629.27	4,02,856.32	3,12,800.75	4,43,189.37	6,35,422.48	213.59%
6	Fish and Other Aquatic Invertebrates	1,94,062.18	1,84,499.34	2,54,596.03	2,67,996.18	2,20,038.91	13.39%
7	Cotton	53,967.02	1,12,806.05	1,51,898.39	2,11,782.26	1,53,242.04	183.95%
8	Coffee, Tea and Spices	25,324.73	83,144.13	1,01,937.62	1,36,379.21	1,01,839.72	302.14%
9	Manufactured Articles	21,502.75	48,254.52	89,764.39	99,780.17	1,14,965.63	434.66%
10	Plastic Articles	78,768.57	85,467.01	88,368.50	60,330.70	74,802.88	-5.03%

Source: CMIE database

Table-4 above shows the quantity (in thousands) of products exported from India to Vietnam. The commodities that are exported most to Vietnam are Cereals and Iron & Steel followed by products from the food industry and meat.

Table-5: India's exports to Turkey: 2011-16, US Dollar

S.No.	Commodity	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	%Growth
1	Cereals	22,582.26	16,184.49	1,94,186.92	4,55,390.72	2,13,290.14	844.50%
2	Manufactured Articles	85,297.70	1,13,652.69	1,10,913.21	1,93,545.61	2,04,094.52	139.27%
3	Manmade filaments	99,600.21	1,32,642.95	1,73,355.67	1,81,519.28	1,75,206.92	75.91%
4	Articles of Stone, Plaster, Cement	1,26,085.85	1,34,280.23	1,45,979.24	1,62,961.26	1,31,544.48	4.33%
5	Plastic Articles	1,64,900.65	1,85,316.58	1,31,469.13	1,54,786.14	2,12,328.21	28.76%
6	Iron and Steel	97,474.03	1,29,882.59	1,34,139.31	1,04,374.55	94,283.37	-3.27%
7	Surgical Instruments and Apparatus	60,686.67	49,437.90	64,239.76	85,018.24	73,261.06	20.72%
8	Manmade staple fibres	76,904.05	82,399.13	95,733.02	83,774.80	93,222.43	21.22%
9	Vehicles other than Railway	38,824.34	37,456.48	47,622.31	62,080.77	59,084.52	52.18%
10	Salt, Sulphur, Cement	32,139.24	49,418.78	40,332.04	47,407.53	31,313.63	-2.57%

Source: CMIE database

The Table-5 above shows the quantity (in thousands) of products exported from India to Turkey. The products that are exported most to Turkey are Cereals, Manufactured Articles and Manmade Filaments.

India Commodity-wise Imports to Indonesia and South Africa

For studying the commodity-wise exports, we have taken the countries that have the highest imports from India, which are Indonesia and South Africa.

Table-6: India's imports to Indonesia: 2011-16, US Dollar

S.No.	Commodity	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	%Growth
1	Animal or Vegetable Fats and Oils	51,04,555.66	59,28,143.91	54,38,463.20	49,40,334.20	60,08,898.14	17.72%
2	Mineral Fuels and Mineral Oils	3,06,459.61	2,26,228.30	2,12,290.31	2,56,418.04	6,69,505.35	118.46%
3	Rubber.	76,484.27	1,40,662.07	2,03,412.45	2,53,693.87	2,78,640.74	264.31%
4	Chemical Products	1,46,685.02	1,00,149.79	1,27,405.77	1,94,753.30	2,55,794.57	74.38%
5	Iron and Steel	19,300.69	18,435.27	29,011.06	1,84,387.09	5,50,328.47	2751.34%
6	Organic Chemicals	1,13,666.40	96,770.73	1,34,876.20	1,71,410.78	1,75,243.89	54.17%
7	Pulp of Wood	2,76,043.36	2,71,624.19	2,61,752.66	1,51,683.72	1,86,715.81	-32.36%
8	Paper and Paperboard	75,787.95	61,164.25	1,07,452.93	1,34,509.44	1,64,231.96	116.70%
9	Ores, Slag and Ash	3,74,469.46	2,34,879.26	2,20,585.19	1,25,393.90	2,54,836.76	-31.95%
10	Fertilizers	84,630.00	2,89,878.02	2,89,878.02	1,25,317.00	76,288.17	-9.86%

Source: CMIE database

The Table-6 above shows the quantity (in thousands) of products imported to India from Indonesia. The main products that are imported from Indonesia are Mineral Fuels, Vegetable oils and Rubber.

Table-7: India's imports to South Africa: 2011-16, US Dollar

S.No.	Commodity	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	%Growth
1	Ores, Slag and Ash	10,30,419.72	10,76,023.02	14,09,834.88	21,79,251.13	12,68,563.54	23.11%
2	Iron and Steel	7,79,676.94	13,31,166.09	7,79,843.82	10,64,361.29	9,25,259.62	18.67%
3	Pulp of Wood	96,025.94	1,03,296.51	1,40,623.47	1,16,585.05	2,43,598.39	153.68%
4	Organic Chemicals	50,578.48	64,897.90	64,897.90	64,917.76	75,360.98	49.00%
5	Salt, Sulphur, Earths and Cement	39,323.13	27,276.86	65,741.01	52,757.35	79,205.99	101.42%
6	Inorganic Chemicals	2,29,371.88	1,01,127.65	1,19,771.06	47,379.62	75,139.18	-67.24%
7	Aluminium Articles	53,098.77	58,055.20	69,234.11	47,089.66	78,632.11	48.09%
8	Mineral Fuels and Mineral Oils	12,941.69	21,190.42	21,406.11	35,810.94	4,56,258.86	3425.50%
9	Plastic Articles	17,020.14	2,790.57	16,007.49	22,144.18	10,551.24	-38.01%
10	Chemical Products	14,221.28	13,881.52	20,494.79	15,652.76	14,635.11	2.91%

Source: CMIE database

Table-7 shows the quantity (in thousands) of products imported to India from South Africa. The main products that are imported from South Africa are Ores, Slag and Ash, Iron and Steel, Pulp of Wood.

Conclusion

CIVETS economies most likely to rise quickly in economic prominence over the coming decades. CIVETS are the next generation of "tiger economies," share fast growing, relatively diverse economies as well as large, young (under 30) populations. As a result the countries have great potential for high growth in domestic consumption. There are a number of factors that act as natural facilitators for trade between India and CIVETS countries. India is rich in items that it exports to CIVETS and it is deficient in items that are imported from CIVETS. This kind of setting paves the way for high opportunities in trade and business This paper examined the CIVETS economic bloc and provided an overview of the countries grouped as CIVETS through economic, institutional, and societal perspectives. The CIVETS are projected to experience similar levels of economics growth that will rival the development that the BRIC nations have undergone over the past 10 years (Alexander, 2011). All CIVETS countries with their large amount of youth population and vast natural resources have significant potential to make impact both locally and globally. In fact, the CIVETS countries are considered as the "second generation emerging markets characterized by dynamic, rapidly changing economies and young growing populations" (S&P, 2014).

Out of CIVETS counties, we can see highest import is of Indonesia with world followed by South Africa and Vitenam. The lowest import to world is of Columbia and Egypt amongst CIVETS economies. Import of Indonesia was US $43595 which almost doubled to US$ 80650 in 2006 and it was US$ 187294 in 2013. Out of CIVETS counties, we can see highest trade is of Indonesia with

world followed by Turkey and Vitenam. The lowest export to world is from Egypt amongst CIVETS economies. Out of CIVETS counties, we can see highest import is of Indonesia with world followed by South Africa and Vitenam. The lowest import to world is of Columbia and Egypt amongst CIVETS economies. Import of Indonesia was US $43595 which almost doubled to US$ 80650 in 2006 and it was US$ 187294 in 2013.

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An Empirical Estimation on Determinants of Rupee Exchange Rate

Manjinder Kaur*

Abstract

The study aims at exploring major determinants of Rupee exchange rate based on annual series of variables Real Effective Exchange rate of Rupee in terms of US dollar (ER), Net Foreign Exchange Assets (NFA), trade openness (TO), terms of trade (TOT), oil prices (OP) spanning over 1986 to 2016. An effort has been made to estimate long run equilibrium and short run dynamics applying Vector Error Correction Model (VECM). The analysis revealed that in the long-run, domestic currency depreciates with rise in NFA reserve levels while appreciates with rise in oil bill, trade openness and terms of trade. The results of VECM show that ER has turned as a correction factor to restore the equilibrium while NFA, TO, and OP are fuelling up disequilibrium. These findings of the study will help in formulation of vital economic policies and decisions which will hold the exchange rate of rupee to its tolerance level and reduce the volatility of Indian rupee in relation to hard currencies like US dollar.

Keywords: Real Effective Exchange Rate, Net Foreign Exchange Assets, Cointegration, Error Correction

Introduction

From early 1980s the International Monetary Fund (IMF) has adopted devaluation as a solution for developing nations like India that are constantly spending foreign currency reserves more on financing imports than foreign currency reserves earned on exports. A lower value for the home currency will raise the price for imports while making exports cheaper. Since independence, India has faced two major foreign exchange crisis and as a consequence of this two devaluations of Indian rupee. These are the crises of 1966 and 1991. Foreign exchange reserves indicate the capacity of a country to engage in trade and related activities with other countries. Sufficient stock of foreign currency reserves of a nation aids in trade with other nations and lowers transaction costs associated

* Assistant Professor, Post Graduate Department of Commerce, Guru Nanak Dev University College, Chungh, Tarn Taran, Punjab and can be reached at manjindergndu@gmail.com

with international trade and related activities. But depletion of its foreign currency reserves, leads to a spiral of destabilizing impact upon the economic and financial health of an economy. As a consequence of depletion of foreign currency reserves of a nation, its own currency is not accepted in international markets and the country has to borrow from international financial institutions. But sanction of loans to the borrowing nation will further depend upon its creditworthy. If creditworthy of the borrowing nation is poor, then international financial institutions may not sanction foreign currency loans, unless the debtor nation bows to the conditions imposed by international financial institutions. Such restrictions upon the debtor nation with respect to foreign currency loans lead to devaluation of home currency. This particularly happens when in spite of the internal political and economic policies of trade barriers and financial restrictions to stabilize the exchange rate, the market for a nation's currency is too weak to justify the given exchange rate. Thus nation will be forced to devalue its currency.

At the time of independence, Indian rupee was linked to the British sterling and its value was at par with the American dollar. There was no foreign borrowing on India's balance sheet. The government started external borrowings with the introduction of Five Year Plan in 1951 to finance welfare and development activities. After independence, India followed a fixed rate currency regime. The rupee was pegged at 4.79 against a dollar between 1948 and 1966. The country received significant financial aid from international institutions as India experienced deficits in trade and the government budget consistently. In the period of 1950 through 1966, foreign aid remained less than the total trade deficit of India except for the year 1958. Foreign aid was substantial enough to postpone the rupee's final devaluation till 1966. In 1966, foreign aid was finally cut off and India was asked to liberalise its restrictions on trade so as to get the foreign aid sanctioned again. The response was the politically unpopular step of devaluation accompanied by liberalization. But when India still did not receive foreign aid, the government withdrew its commitment to liberalization. Further, two additional factors played a role in the 1966 devaluation. The first was India's war with Pakistan in late 1965. The US and other countries that were friendly towards Pakistan, withdrew foreign aid to India, which further became a cause of devaluation. Moreover, the large amount of deficit spending required by any war effort also accelerated inflation which led to a further deviation between Indian and international prices. Another factor is the drought of 1965/1966 which was also a catalyst for the 1966 devaluation. The sharp rise in prices in this period, which led to devaluation, is often blamed on the drought, but in 1964/1965 there was a record harvest and still, prices rose by 10% (Bhatia, pp 35). In 1991, when the rupee was pegged to a basket of currencies of major trading partners, India still had a fixed exchange rate system. At the end of 1990, the government was close to default and its foreign exchange reserves had dried up to the level that India could barely finance three weeks' worth of import bill. Thus, India faced a serious balance of payment crisis in 1991 and was forced to sharply devalue its currency. At the same time the country was also in the grip of high inflation, low growth besides the depletion of foreign currency reserves. Consequently, the currency was devalued to 17.90 against a dollar. These two foreign exchange crises in India

show that following inflationary economic policies along with a fixed exchange rate regime is destructive for economic and financial health of the economy. If India had followed a floating exchange rate system instead, the rupee would have been automatically depreciated by the market and India would not have faced such financial crises.

Above mentioned two episodes of devaluation of Indian rupee has occurred in the history of India. Also Indian rupee is continuously depreciating since then. While devaluation is forced by international institutions like International Monetary Fund (IMF), depreciation is automatic and is the result of market forces of demand and supply of the currency. Depreciation refers to a fall in the value of the domestic currency which is caused by the demand for foreign currency exceeding its supply in the market. In such a situation one has to pay more than earlier to get same number of units of foreign currency. Market determined exchange rate serves the purpose of aligning the domestic economy with the world economy. As a result of this the domestic price gets linked up with those of the world price. With the liberalizations and globalization of the economy in recent years, imports are bound to increase. The lessening of restrictions on imports and lowering of tariff on imports leads to increase in imports. In the light of this the historical trend of Indian rupee can be traced as below:

Journey of Indian Rupee

- 1947 (When India became member of IMF): Rupee tied to pound, Re 1 = 1 s, 6 USD, rate of 28 October, 1945, where s = 1 sterling and USD = 1 US dollar
- 18 September, 1949: Pound devalued; India maintained par with pound
- 6 June, 1966: Rupee is devalued, Rs 4.76 = $1, after devaluation, Rs 7.50 = $1 (57.5%)
- August 15, 1971: Convertibility of USD suspended, end of Bretton Woods System. Re 7.50 = 1USD
- 1973: oil shocks, oil prices quadrupled, double digit inflation and global recession. Re 7.80 = 1USD
- January 1, 1974: Foreign Exchange regulation Act, 1973 comes into existence. Re 8.20 = 1USD
- December 9, 1974: Asian Clearing Union (ACU) established to facilitate payments. Re 8.10 = 1USD
- September 25, 1975: Exchange value of a rupee pegged to a basket of currencies. Re 8.90= 1USD
- November 1, 1975: Foreign currency (Non-Resident) account scheme introduced to encourage private remittances from abroad. Re 8.70= 1USD
- April 1977: A new series of money supply introduced. Re 8.90= 1USD
- June 3, 1978: RBI Act, amended for more effective utilization of foreign exchange reserves. Re 8.40= 1USD
- January 17, 1980: International gold prices soar to all time highs. Re 7.90= 1USD

- 1981: Inflationary pressures, adverse movement in foreign trade and hike in oil prices. Re 8.20= 1USD
- January 1, 1982: Export-Import bank of India established. Re 9.10= 1USD
- July 1, 1991: Rupee devalued in two stages. Re 23.10= 1USD
- March 1992: Liberalized Exchange Rate System (LERMS) introduced. Re 28.7= 1USD
- 1993: Unified exchange rate comes into practice. Re 31.2= 1USD
- August 1994: Rupee made convertible on current account. Re 31.4= 1USD
- November 28, 1997: A series of measures introduced in response to Asian Currency Crisis. Re 38.90 = 1USD
- May 11, 1998: Pokhran blasts, international sanctions. Re 39.80 = 1USD
- June 2000: Foreign Exchange Management Act, 1999 replaces FERA. Re 44.7 = 1USD
- September 11, 2001: Terrorist attack in US, market sentiments hit. Re 47.4 = 1USD
- September 15, 2008: Lehman Brothers file bankruptcy protection, recession follows. Re 46.10 = 1USD
- June 11, 2013: Rupee trembles to all time low. Re 59.00 = 1USD

Source: The Times of India, New Delhi dated 14th June 2013

Review of Literature

To formulate the problem precisely and pinpoint rationale for its undertaking, it seems logical to present brief review of literature which is directly or indirectly related to the problem. Brief review of studies of international and national status is presented in chronological order.

According to Jadhav (1991) depreciation may lead to inflationary potential due to higher cost of imported inputs. However, it is naive to assume that over valuation of the currency holds inflation down. Over valuation of the currency more often than not results in depreciation of the currency on the black market which has inflationary consequences precisely the same as those of an official depreciation. The 'hawala' transactions are testimony of this phenomenon. Thus, exchange rate adjustment is only one element in the package of macroeconomic adjustment measures. The total impact of this will become clear only with the implementation of other supplementary measures.

Nidugala (1997) has made an attempt to compare and contrast the experience of capital liberalization policy by Mexico and India and its impact upon macroeconomic variables, particularly the exchange rate. The main finding of the paper is that India avoided a peso type crash by following a policy of gradual liberalization of capital flows and prudent exchange rate policy and the sequencing of reforms in right direction.

Deena, Khatkhate (1998) observed that major currencies such as the dollar, yen and deutschmark, especially the dollar have fluctuated often and sharply in recent

years. This fluctuation has a significant impact on the developing economies and their foreign exchange management. This is mainly due to the fact that countries are open both on current and capital account, which creates tension when capital flows destabilize the system and thus, create macroeconomic imbalances. Further, most serious consequences arise when a developing country follows fixed exchange rate regime while at the same time exchange rates of major currencies fluctuate. As a result of this, current account deficit widens and currency depreciates.

Marjit, Dasgupta and Mitra (2000) concluded that devaluation-led export growth occurs by reducing black-market premium. During the early years of liberalization, the initial optimism regarding the growth in exports gradually vanished after some period of devaluation. As reflected in partner country's trade statistics, export growth reported in Indian official trade statistics came down to actual export growth. An explanation on the basis of this is derived for India's recent nose-diving export growth. The study based upon the period 1951-94, using US imports statistics analyzed that the impact of devaluation in 1966 and 1991 was actually significantly felt on officially reported exports to US from India.

As per EPW Research Foundation (2002), the achievements on the external account have been quite remarkable, most important being prevailing speculative forces and thus curbing of arbitrage opportunities. The accumulation of sizeable foreign currency reserves and stability in the forex market has made it possible for the authorities to carry forward the policy of cautious capital account liberalization.

Khan (2004), presented empirical evidence in his study that bank lending, and capital inflows can explain the severity of the Asian crisis of 1997 above and beyond macroeconomic fundamentals. The study found that countries which share Japanese banks as their major lender with Thailand, were the first victim in the Asian crisis which in turn experienced currency crisis. The study also found the evidenced that short-term capital inflows being volatile in nature has also been observed to be a major cause of the Asian crisis.

Coleman, Cuestas, and Mourelle (2011), which investigated the importance of real oil price as a determinant of real exchange rates for a pool of African countries and suggest that the shocks in the real price of oil are important determinants of real exchange rates.

A plethora of studies are available regarding impact of currency depreciation on various macroeconomic variables and current account deficit. But as far as Indian rupee is concerned, there is dearth of empirical work to examine long run equilibrium and short run dynamics among variables like Real Effective Exchange rate of Rupee in terms of US dollar (ER), Net Foreign Exchange Assets (NFA), trade openness (TO), terms of trade (TOT), oil prices (OP) which will provide a solid test of various determinants of Indian rupee exchange rate. Thus, present study will focus on existence of this gap and empirical analysis will be performed to explore the causes and impact of depreciating rupee. The study will further provide a clue to manage foreign exchange reserves of India, export and import levels and thus augment real growth of the economy by reducing current account deficit.

Objectives of the Study

The study will focus on achievement of following objectives:

- To empirically examine long run relationship among net Foreign Exchange assets, trade openness, terms of trade, oil prices on rupee exchange rate.
- To examine the short term causal relationship among net Foreign Exchange assets, trade openness, terms of trade, oil prices on rupee exchange rate.
- To determine long run equilibrium correction factors among net Foreign Exchange assets, trade openness, terms of trade, oil prices on rupee exchange rate.

Database

To achieve the objectives of the study annual series of variables like Real Effective Exchange rate of Rupee in terms of US dollar (ER), Net Foreign Exchange Assets (NFA), trade openness (TO), terms of trade (TOT), oil prices (OP) covering a period from 1986 to 2016 have been considered. Exchange rate (ER) of Indian rupee vis-à-vis trading partner countries currencies has been considered. Data on both nominal effective exchange rate (NEER) and real effective exchange rate (REER) are available on the website of Reserve Bank of India (RBI). REER is an indicator that captures the effect of movements of the home currency against a basket of trading partner currencies. The movements of the nominal effective exchange rate (NEER) and real effective exchange rate (REER) are indicators of changes in external competitiveness. NEER is simply the weighted average of nominal exchange rates of the home currency in terms of foreign currencies. If the dollar appreciates/depreciates in different proportions vis-a-vis India's major trading partner currencies, movements in merely the dollar/rupee exchange rate would not provide an accurate measure of external competitiveness of home currency. No doubt NEER indicate a stable exchange rate and it is a better indicator than spot exchange rates. However, it can be a misleading variable of competitiveness during times of high inflation. REER is considered a better indicator of external competitiveness due to the fact that weighted average of nominal exchange rates is adjusted for price differentials between domestic and foreign countries and is thus based upon the purchasing power parity (PPP) concept. That is, REER is the weighted average of NEER adjusted by the ratio of home country prices to foreign country prices. Hence, REER has been considered as exchange rate (ER) and applied in the model considering log values of ER.

NFA is net Indian foreign assets expressed as a fraction of Gross Domestic Product (GDP). NFA are the difference between international assets and liabilities of India. Series of NFA has been obtained from the web site of RBI and considered in logarithmic form. Tremendous growth of capital inflows in the post-liberalisation era have led to accumulation of foreign liabilities. Foreign capital inflows exert an upward pressure on the exchange rate. Hence, the expected sign of NFA is expected to be negative, that is, a decrease in NFA leads to REER appreciation and thus rupee depreciation and vice-a-versa.

Trade openness (TO) is the aggregate of exports and imports expressed as a percentage of GDP for which the relevant data has been obtained from the web site of Reserve Bank of India (RBI). The expected sign of trade openness is positive.

Terms of trade (TOT) are the unit value index of exports expressed as a percentage of unit value index of imports for which the relevant data has been obtained from the website of Reserve Bank of India (RBI). The expected sign for terms of trade is positive.

OP is the oil price measured by the international oil price for which the data has been obtained from World Bank website www.data.worldbank.org. India is the major importer of crude oil. Increased usage of modern technology in various sectors of the economy and ever rising crude oil price in the international market could be the most obvious causes behind this surge in import bill of crude oil. The series on international oil prices has been taken in logarithmic form. Since, an increase in the price of oil increases the demand for foreign currency (in order to make payment for the import) then the domestic currency theoretically should depreciate. If this coefficient is positive and statistically significant it will imply that the increase in the price of oil depreciates the domestic currency.

Methodology

To examine the objectives of the paper vector error-correction model (VECM) has been applied. VECM proceeds in four steps:

VECM is applied if series are non-stationary at levels. Thus first step in estimation of VECM is to test the order of integration for the variables under study. The order of integration for the variables has been determined on the basis of Augmented Dickey Fuller unit root test both with and without trend and intercept. To ascertain the order of integration is the pre requisite for almost all the econometric models and same has been determined for all the models using Augmented Dickey Fuller (1979) unit root test. A data series is stationary if its mean and variance are constant (not changing) over time and the value of covariance between two time periods depends only on the distance or lag between the two time periods and on the actual time at which the covariance is computed. The correlation between a series and its lagged values are assumed to depend only on the length of the lag and not the starting point of the series. A series observing these properties is called a stationary time series. It is also referred to as a series that is integrated of order zero I(0). The unit root test checks whether a series is stationary or not. For this the following types of Augmented Dickey Fuller (ADF) regression has been applied:

$$\Delta Y_t = \alpha_1 Y_{t-1} + \sum_{m=1}^{n} \beta_m \Delta Y_{t-m} + \mu_t \quad \text{.....(1)}$$

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum_{m=1}^{n} \beta_m \Delta Y_{t-m} + \mu_t \quad \text{.....(2)}$$

Where, μ_t is white noise. The equation (1) is without intercept but equation (2) is with intercept. The additional lagged terms have been included to ensure that errors are uncorrelated. The following hypotheses have been tested by applying unit root tests:

H_o : Y_t is not I (0) i.e., [Y_t is not integrated of order zero].

H_1: Y_t is I (0) i.e., [Y_t is integrated of order zero].

If the calculated ADF statistics are insignificant then the null hypothesis (H_o) is accepted and the series are taken as non-stationary or not integrated of order zero. Hence, unit root exists. Alternatively, if the calculated ADF statistics are significant then the alternate hypothesis (H_1) is accepted and the series are taken as stationary or integrated of order zero. Hence, unit root does not exist.

Secondly, lag length for cointegration test and VECM has been determined following Akaike Information Criteria (AIC).

Thirdly, long-run relation among the variables has been determined on the basis of Johansen (1988) and Johansen and Juselins (1990) multivariate cointegration test. The techniques have been described briefly as below:

If the linear combination of variables is I (1) it implies the existence of long-run relationship between economic variables. Statistically, long-run relationship means cointegration for which non-stationarity at levels for the variables in the system is the prerequisite test. Also, all the variables in the cointegrating equation must have the same order of the integration. To determine the existence of long-run relationship between foreign investment and macroeconomic variables viz., Index of Industrial Production (IIP), Wholesale Price Index (WPI) and Exchange Rate of Indian Rupee in terms of U.S. $ (ER), vector auto regressive (VAR) model developed by Johansen (1988) and further extended by Johansen and Jusiluis (1990) has been applied.

To formulate the model Z_t = ($REER_t$, $NFAs_t$, TO_t, TOT_t, OP_t)t = 1. ---- T, represents a vector of the variables under study and the same is generated by a p^{th} order vector auto regressive (VAR) model.

$$\begin{bmatrix} ER_t \\ TO_t \\ TOT_t \\ NFA_t \\ OP_t \end{bmatrix} = \alpha_1 \begin{bmatrix} ER_t \\ TO_t \\ TOT_t \\ NFA_t \\ OP_t \end{bmatrix} + \alpha_2 \begin{bmatrix} ER_t \\ TO_t \\ TOT_t \\ NFA_t \\ OP_t \end{bmatrix} + \text{------} \alpha_p \begin{bmatrix} ER_t \\ TO_t \\ TOT_t \\ NFA_t \\ OP_t \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \end{bmatrix} \quad \text{.....(3)}$$

Johansen (1988) states that the coefficient matrix $\Pi_{k;}$ gives the information regarding cointegrating or long-run equilibrium relationship between the variables in the system. The rank of the matrix Π_k indicates the number of co-integrating relationships existing between the variables considered in the co-integrating equation. In the present study for four variables viz., foreign investment, index for industrial, wholesale price index and exchange rate of Indian rupee in terms of U.S. $, rank should be $\pi_k \leq 3$ since k=4. In other words, the rank r must be at most equal to k-1, so that $r \leq k-1$ and there are k-r stochastic trends. If the r=0, then there are no co-integrating vectors and k stochastic trends implying absence of long-run relationship.

The trace statistic has been computed to test the null hypothesis of r co-integrating relations against the alternative hypothesis of r+1 co-integrating relations and is specified below:

$$LR_{trace}(r/k) = -T \sum_{i=r+1}^{k} \log(1-\lambda i)$$

Where λ_{r+1}, _____ λ_k are the smallest squared canonical correlation or eigen value. Further, maximum eigen value statistic has also been calculated to determine number of cointegrating vectors (r) in the following manner:

$$LR_{\max}(r/r+1) = -T\log(1-\lambda_{r+1})$$

where: r = 0, 1,2,....., k-1

Where λ_{r+1} is the $(r+t)^{th}$ largest squared canonical correlation or eigen value. The null hypothesis is r co-integrating vectors against alternative hypothesis of r+1 co-integrating vectors.

Finally, to explore various determinants of Rupee exchange rate In terms of US dollar Vector Error Correction Model (VECM) has been applied. Vector Error Correction Model (VECM) will help in determination of long-run relationship along with short-run dynamics among non-stationary variables under analysis. For this five variable Vector Error Correction Model (VECM) consisting of To achieve the objectives of the study annual series of variables like Real Effective Exchange rate of Rupee in terms of US dollar (ER), Net Foreign Exchange Assets (NFAs), trade openness (TO), terms of trade (TOT), oil prices (OP) has been constructed by means of following equations:

$$\Delta ER_t = a_0 + \sum_{i=1}^{k} \alpha_i \Delta ER_{t-i} + \sum_{j=1}^{k} \alpha_j \Delta NFA_{t-j} + \sum_{l=1}^{K} \alpha_l \Delta TO_{t-l} + \sum_{m=1}^{k} \alpha_m \Delta TOT_{t-m} + \sum_{n=1}^{k} \alpha_m \Delta OP_{t-m} + \phi_1 ecm_{t-1} + \in_{1t} \text{ ..(4)}$$

$$\Delta NFA_t = a_0 + \sum_{j=1}^{k} \alpha_j \Delta NFA_{t-j} + \sum_{l=1}^{K} \alpha_l \Delta TO_{t-l} + \sum_{m=1}^{k} \alpha_m \Delta TOT_{t-m} + \sum_{n=1}^{k} \alpha_m \Delta OP_{t-m} + \sum_{i=1}^{k} \alpha_i \Delta ER_{t-i} + \phi_1 ecm_{t-1} + \in_{2t} \text{ ..(5)}$$

$$\Delta TO_t = a_0 + + \sum_{l=1}^{K} \alpha_l \Delta TO_{t-l} + \sum_{j=1}^{k} \alpha_j \Delta NFA_{t-j} + \sum_{m=1}^{k} \alpha_m \Delta TOT_{t-m} + \sum_{n=1}^{k} \alpha_m \Delta OP_{t-m} + \sum_{i=1}^{k} \alpha_i \Delta ER_{t-i} + \phi_1 ecm_{t-1} + \in_{3t} \text{ ..(6)}$$

$$\Delta TOT = a_0 + \sum_{m-1}^{k} \alpha_m \Delta TOT_{t-m} + \sum_{j-1}^{k} \alpha_j \Delta NFA_{t-j} + \sum_{l-1}^{K} \alpha_l \Delta TO_{t-l} + \sum_{n-1}^{k} \alpha_m \Delta OP_{t-m} + \sum_{i-1}^{k} \alpha_i \Delta ER_{t-i} + \phi_1 ecm_{t-1} + \in_{4t} \text{ ..(7)}$$

$$\Delta OP_t = a_0 + \sum_{n=1}^{k} \alpha_m \Delta OP_{t-m} + \sum_{j=1}^{k} \alpha_j \Delta NFA_{t-j} + \sum_{l=1}^{k} \alpha_l \Delta TO_{t-l} + \sum_{m=1}^{k} \alpha_m \Delta TOT_{t-m} + \sum_{i=1}^{k} \alpha_i \Delta ER_{t-i} + \phi_1 ecm_{t-1} + \in_{5t} \text{ ..(8)}$$

where ecm_{t-1} is one time lagged residual from cointegration among Real Effective Exchange rate of Rupee in terms of US dollar (ER), Net Foreign Exchange Assets (NFAs), trade openness (TO), terms of trade (TOT), oil prices (OP) in levels.

According to Granger (1988) based on equations (4), (5), (6), (7) and (8) the null hypothesis that NFA_t, TO_t, TOT_t, and OP_t does not Granger cause ER_t is rejected not only if the coefficients on the NFA_t, TO_t, TOT_t, OP_t and ER_t are significantly different from zero, but also if the coefficient on ecm_{t-1} is significant. Further, in these five equations ‘$_s$ represent short-run causal impact while ‘$_s$ represent the long-run impact. Moreover, the significant error-correction term (ecm_{t-1}) implies existence of cointegration and negative values of ϕ’$_s$ signify that the model is stable and any disequilibrium will be corrected in the long-run.

Empirical Analysis

Table-1: Augment Dickey Fuller Unit Root Test for ER, NFA, TO, TOT, OP

Variables	Levels	1st Difference
ER	-0.82	-4.23*
NFA	-1.13	-4.31*
TO	-1.58	-4.50*
TOT	-2.54	-6.30*
OP	-3.21	-4.42*

*significant at 1% level of significance. **significant at 5% level of significance.

Firstly, Augmented Dickey- Fuller (1979) unit root test has been performed on all the series to examine the order of integration. The results for unit root test are presented in Table-1. It is clear from table that on the basis intercept all the variables are integrated of order I(1). All series turn out to be insignificant in unit root test equation with and without trend and intercept at levels whereas these variables are significant at their first differences and thus integrated of order I(1). Hence, these series fulfil the condition of 'same order of integration' to perform Johansen (1991) multivariate co-integration test.

Table-2: Johansen's Co-integration Estimates

H_o	H_a	Trace statistics	5% critical value of trace statistics	P-values for trace statistics	Max. Eigen Value	5% critical value of Max-Eigen Value	P-values for Max-Eigen Value
r=0	r≥1	83.80**	69.81	0.0026	41.20**	33.87**	0.0056
r≤1	r≥2	42.59	47.85	0.1426	20.11	27.58	0.33333
r≤2	r≥3	22.48	29.79	0.2723	12.70	21.13	0.4799
r≤3	r≥4	9.78	15.49	0.2979	8.42	14.26	0.3369

**indicates significant at five per cent level of significance.

The Johansen co-integration test results are obtained on the basis of this lag length one and 'with intercept' but 'no trend' and are presented in Table-2. Table reveals that as per both trace statistic as well as Max- Eigen value statistic, there is one co-integrating equation normalising on exchange rate (ER):

ER= 6.02 – 13.89** NFA + 0.77**TO + 2.55** TOT + 2.62E-05**OP – CE (1)
(5.20) (3.15) (3.74) (8.03)

Note: t-values are shown in parenthesis. ** indicates significant at five per cent level of significance.

The co-integrating equation (CE1) normalised on ER shows that in the long-run, NFA coefficient is negative and significant while all other variables TO, TOT and OP have positive and significant impact on ER. This implies that accumulation of NFA have appreciating affect on ER while TO, TOT and OP have depreciating affect on ER. In other words, domestic currency (Rupee) depreciates with rise in NFA reserves while appreciates with rise in net oil bill, trade openness and favourable terms of trade. Since, cointegration has been confirmed among the variables considered, VECM model has been applied to determine the short run dynamics. After having determined number of co-integrating vectors (or equations), VECM has been estimated to obtain short-run dynamics. The number of co-integrating vectors results in corresponding number of residual series and hence Error-Correction Terms (ECTs), which can be embodied, as exogenous variables appearing in their lagged levels, in VECM. The results of VECM are presented in Table-3.

The results of VECM reveal that adjustment coefficient for Exchange Rate of Rupee (ER) in ECT on ER is negative and significant. The negative adjustment coefficient implies that 05 percent of the disequilibrium is corrected annually, which is fairly low. Similarly, adjustment coefficients of NFA, TO, and OP in ECT on REER are significant but positive which implies these variables are driving the system against the equilibrium and a cause behind the enlarged disequilibrium.

Undoubtedly ER, NFA, TO and OP are endogenous variables but ER is the only endogenous factor which tends to correct equilibrium and that too at a very slow speed. Further, TOT has exhibited as exogenous variable in terms of its contribution towards equilibrium since its coefficient in ECT has turned out insignificant. While analysing short run dynamics it has been observed that only NFA exhibited significant impact on ER while all other variables, namely, TO, TOT and OP have shown insignificant influence on ER in short run. The explanatory power of REER, NFAs, TO and NOI as dependent variable is high on the basis of adjusted R^2 (32%, 27%, 32% and 72% respectively).

Table-3: Vector Error Correction Estimates

Error Correction:	D (ER))	D(NFA)	D((TO)	D(TOT)	D(OP)
ECT	-0.05** [-3.12]	0.010** [2.23]	0.10 [4.08]	0.02** [0.88]	12028.60** [6.69]
D(ER (-1))	-0.06 [-0.24]	0.08 [1.26]	0.19 [0.55]	0.00 [-0.01]	17633.50 [0.72]
D(ER (-2))	0.37 [1.56]	0.01 [0.08]	0.22 [-0.65]	0.64** [2.30]	-5886.45 [-0.244]
D(NFA (-1))	-0.61 [-0.89]	0.52** [2.79]	-0.88 [-0.90]	-1.53** [-1.92]	-165312.2** [-2.39]
D(NFA (-2))	2.04** [2.38]	-0.84** [-3.63]	-3.11** [-2.54]	0.13 [0.13]	-541717.3** [-6.30]
D(TO (-1))	-0.21 [-1.15]	0.06 [1.27]	0.55** [2.13]	-0.10 [-0.51]	50065.73** [2.75]
D(TO (-2))	0.21 [1.19]	-0.007 [-0.15]	-0.04 [-0.19]	0.03 [0.15]	-3507.54 [-019]
D(TOT(-1))	0.15 [0.73]	-0.07 [-1.23]	-0.39 [-1.30]	-0.09 [-0.40]	-25106.5** [-1.18]
D(TOT(-2))	0.04 [0.20]	0.01 [0.23]	0.13 [0.45]	-0.09 [0.40]	14180.34 [0.70]
D(OP (-1))	2.41E-06 [1.48]	-6.35E-07 [-1.43]	-3.36E-06 [-1.45]	1.53E-06 [0.81]	0.2902 [1.77]
D(OP (-2))	-2.51E-06 [-1.61]	1.17E-06** [2.76]	4.06E-06** [1.82]	2.12E-06 [1.16]	0.30785** [1.96]
C	0.03 [0.87]	-0.000 [-0.10]	0.06 [1.20]	-0.032 [-0.80]	1358.00 [0.388]
R-squared	0.53	0.49	0.54	0.39	0.80
Adj. R-squared	0.32	0.27	0.32	0.12	0.71
F-statistic	2.49***	2.18***	2.53***	1.42	8.92**

Figures in brackets are t-values. **significant at 5% level of significance. ***significant at 10% level of significance.

But explanatory power of TOT is low since adjusted R^2 square is only 12%. But over all explanatory power of VECM is high because here the basic purpose is to determine interactions among system variables.

Table-4: Diagnosis Analysis

Desired Test	Statistic values	P-Values
Heteroscedasticity Test	Chi-Square = 359.05	P =0.13
Serial correlation test	LM Statistic= 15.72	P =0.92

Table-4 shows that in estimated model for estimating determinants of ER, there is no heteroscedasticity and serial correlation since Chi-Square and LM statistic are insignificant. Hence, model has been correctly specified.

Conclusion

All series have been found to be insignificant in unit root test equation with intercept at levels whereas these variables are significant at their first differences and thus integrated of order I(1). Hence, these series fulfil the condition of same order of integration to perform Johansen multivariate co-integration test to determine long run equilibrium among variables considered. The long run cointegration test revealed that in the long-run, NFAs coefficient is negative and significant while all other variables TO, TOT and OP have positive and significant impact on ER. This implies that domestic currency (Rupee) depreciates with rise in NFAs reserve levels while appreciates with rise in oil bill, trade openness and favourable terms of trade. The results of VECM revealed that adjustment coefficient for Exchange Rate of Rupee (ER) in ECT on ER is negative and significant. The negative adjustment coefficient indicates that 05 percent of the disequilibrium is corrected annually, which is fairly low. Similarly, adjustment coefficients of NFA, TO, and OP in ECT on REER are significant but positive which implies these variables are a cause behind the enlarged disequilibrium. Furthermore, the study estimated that ER, NFA, TO and OP are endogenous variables but ER is the only endogenous factor which aims at correction to disequilibrium but speed of correction to disequilibrium is quite low. Further, TOT has proved as exogenous variable in terms of its contribution towards equilibrium since its coefficient in ECT has turned out insignificant. As far as short run dynamics are concerned, only NFA exhibited significant impact on ER while all other variables, namely, TO, TOT and OP have shown insignificant influence on ER in short run. Hence, all the variables considered are vital from the point of view of long run economic implications since NFA, TO, TOT and OP all exert a significant impact upon ER in the long run and that too with correct sign. These findings of the study highlighting causes behind depreciation and appreciation of rupee will help in formulation of such economic policies and decisions which will hold the exchange rate of Indian rupee to its tolerance level, reduce the volatility of Indian rupee in relation to hard currencies like USD. These economic policies will in turn help in globalization of Indian economy without deterring its home currency and macroeconomic stability.

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Global Economic Integration of India's Economy: Trends, Channels and Facilitating Factors

Dilip Saikia[1]
Nivedita Goswami[2]

Abstract

It has been a quarter century since India had embarked on the phase of globalisation through a series of macroeconomic reforms started in 1991. In this paper we have analysed the extent and trends of India's economic integration and discussed the channels through which the process of economic integration has been spread and the factors that have facilitated the integration process in the country. The results show that the pace of economic integration in India has accelerated only in the post-2001 period and international trade in goods and services has played a significant role in the integration process. The paper also unveils that India still continues to maintain significant restrictions in international trade and capital flows, which limits its economic integration with the world.

Keywords: Economic Reforms, Trade, Capital Flows, Migration and Remittances, Globalisation Index

Introduction

Globalisation, the process of integration of economies with the world, has become a buzzword nowadays. The process of globalisation is so intense that now almost all countries in the world have been in the phase of globalisation. Today, nations are more integrated and more dependent on the global economy than ever before. Although the process of globalisation started long ago, at least since the industrial revolution, the momentum has unprecedentedly geared up during the last quarter of the twentieth century (Nayyar, 2006), especially since the early 1990s as almost all the developing countries have opened up their economies by that time (McMillan & Rodrik, 2011).

India had embarked on the phase of globalisation through a series of liberalisation policies as a part of its big-bang economic reforms started in 1991. It has been 25 years since India had opened up its economy for the world economy. How globalised is the Indian economy today? How does India compare with her comparators in terms of globalisation? What are the channels of India's integration with the rest of the world? What are the factors that have facilitated India's economic integration? This paper aims to address these questions relating to integration of Indian economy by analysing the trends of economic integration of Indian economy, the channels through which the process of economic integration has been disseminated, and the factors that have facilitated the integration process.

1 Assistant Professor, Department of Commerce, Darrang College, Tezpur, Assam, and can be reached at dilip.gu@gmail.com

2 Associate Professor, Department of Economics, Gauhati University, Guwahati, Assam, and can be reached at nivedita@gauhati.ac.in

The paper is arranged in seven sections. The next section surveys the indicators of globalisation and the global trends of economic integration. It is followed by an examination of the extent of India's economic integration. The subsequent sections analyse the channels of India's economic integration, the facilitating factors, and the drivers of India's economic integration. The final section sums up the findings of the paper.

Globalisation: Indicators and Global Trends

The term 'globalisation', in a general sense, refers to increasing worldwide integration of economic, cultural, political, religious, and social systems. The focus of this paper is, however, only on the economic dimension of globalisation. Economic globalisation refers to 'a process associated with increasing economic openness, growing economic interdependence and deepening economic integration in the world economy' (Nayyar, 2006).

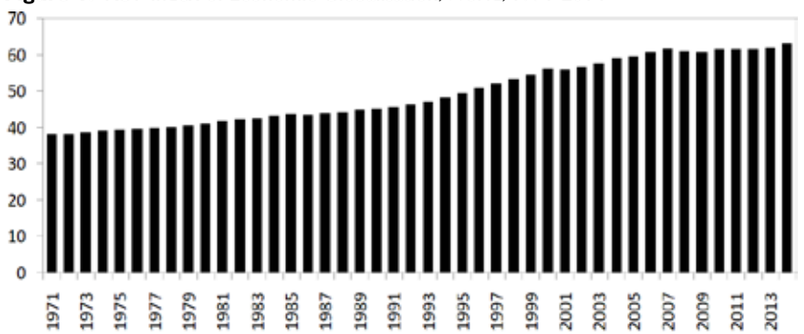
In the literature, several indicators have been developed to measure globalisation. The trade openness index, expressed as the ratio of total trade in goods and services to gross domestic product (GDP), is one of the widely used indicators of outward orientation. Others also used export ratio, expressed as the ratio of export to GDP, and ratio of foreign investment to GDP to respectively measure trade openness and financial openness. The KOF globalisation Index, developed by Dreher (2006) and Dreher *et al.,* (2008), may be considered to be the most comprehensive summary index of globalisation (Samimi, Lim & Buang, 2012). The KOF globalisation index, constructed by the KOF Swiss Economic Institute, Zurich, is a composite index combining three dimensions of globalisation, namely economic, social, and political. As the focus of this paper is on economic globalisation, we have considered the KOF index of economic globalisation, which tracks and assesses changes in key components of global economic integration, incorporating such measures as trade and capital flows (such as foreign direct investment (FDI), portfolio investment, and income payments to foreign nationals) and restrictions, such as import barriers, mean tariff rate, taxes on international trade, and capital account restrictions.[1] The latest version of the KOF Globalisation Index 2017 estimated the index up to the year 2014.

1 The KOF index of economic globalisation is computed as a weighted index of two variables namely, actual flows and restrictions, with 50 percent weight each. The sub-index of actual economic flows is constructed as a weighted index of four variables namely, trade, FDI stocks, portfolio investment, and income payments to foreign nationals (all variables are expressed as percentage of GDP), with 22, 27, 24, and 27 percent weight respectively. The sub-index of restrictions is constructed as a weighted index of four variables namely, hidden import barriers, mean tariff rate, taxes on international trade (percent of current revenue), and capital account restrictions, with 23, 28, 26, and 23 percent weight respectively. The weights are determined by employing principal components analysis. The variable hidden import barriers is expressed as an index, developed by Gwartney, Hall & Lawson (2015), based on survey data from the World Economic Forum's Global Competitiveness Report. The variables mean tariff rate and capital account restrictions are also expressed as indices developed by Gwartney *et al.,* (2015). The index of mean tariff rate is constructed by assigning a rating of 10 to countries with no tariff and lower ratings as the mean tariff rate increases, with the rating declines toward zero as the mean tariff rate approaches 50 percent. The index of capital account restrictions includes 13 different types of capital controls (based on the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions), and is constructed by subtracting the number of restrictions from 13 and multiplying the result by 10. To construct the sub-indices, each of the variables is transformed to an index on a scale of one to 100, where 100 is the maximum value and one is the minimum value, with higher values denote greater globalisation. The final index takes values between one and 100, where higher values denote greater globalisation.

The KOF index shows that the pace of economic globalisation was quite slow during the 1970s and 1980s and then accelerated during the 1990s and the first decade and a half of the 21st century (Figure-1). The index remained around 40-45 during 1970s and 1980s and then gradually increased from 45.7 in 1991 to 56.2 in 2001 and to above 60 during the period 2006 to 2014. In 2014, Singapore, Ireland, Luxembourg, and Netherlands were the most globalised countries, whereas Nepal, Ethiopia, Sudan, and Burundi were the least globalised countries.

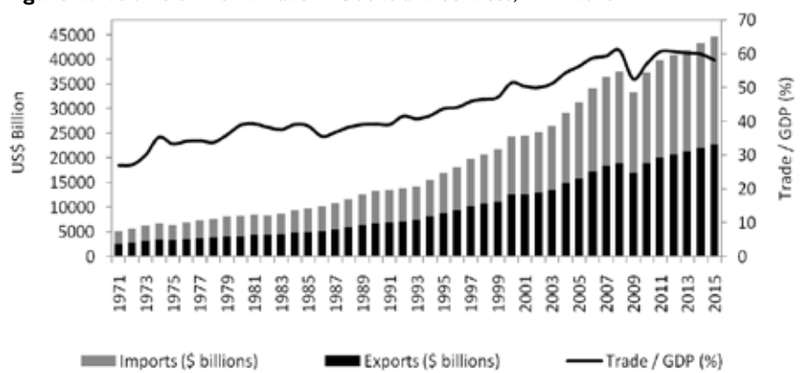
The volume of total global trade in goods and services more than doubled from $5.2 to $13.5 trillion between 1971 and 1991, and then more than tripled between 1991 and 2015 to reach $44.7 trillion (Figure-2). The volume of exports increased from $2.6 trillion in 1971 to $22.8 trillion in 2015, whereas volume of imports increased from $2.6 trillion to $21.9 trillion during the same period. The share of the global trade to GDP has increased from 27 percent in 1971 to 39 percent in 1991 and then peaked to 61 percent in 2008 before declined to 53 percent in 2009 in the wake of global financial crisis, and then rose to 58 percent in 2015.

Figure-1: KOF Index of Economic Globalisation, World, 1971-2014



Source: KOF Globalisation Index 2017, retrieved from www.globalization.kof.ethz.ch

Figure-2: Volume of World Trade in Goods and Services, 1971-2015



Source: Compiled from World Bank (2017a).

The global FDI inflows increased from $13.3 billion in 1970 to $154 billion in 1991 and to $1.9 trillion in 2007 and then declined to $1.2 trillion in 2009 due to global financial crisis, but then increased to $1.8 trillion in 2015. The global FDI stock increased from $701 billion in 1980 to $2.5 trillion in 1991 and to $25 trillion in 2015, which is about 35 percent of world GDP (UNCTAD, 2017).

The global stock of migrants (the people living outside their country) rose from 175 million in 2000 to 247.2 million in 2013, which is 3.4 percent of the world population. The global stock of migrants is estimated at 251 million in 2015. The worldwide flow of remittances has increased from $101.3 billion in 1995 to $601.3 billion in 2015, of which the developing countries received $440.5 billion (World Bank, 2016).

Extent of India's Economic Integration

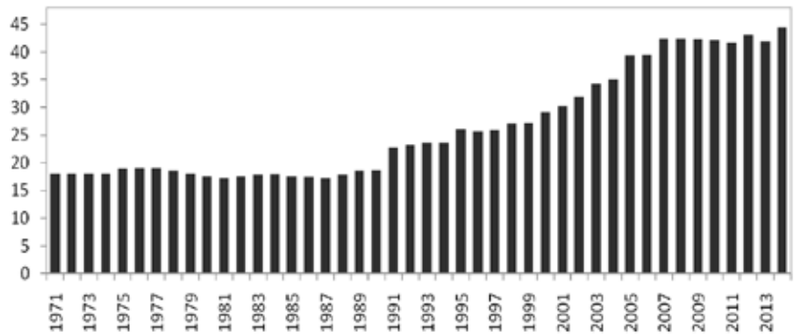
We now turn to the extent of economic integration of India's economy. Figure-3 depicts the KOF index of economic globalisation of India for the period 1971 to 2014. It shows that the pace of India's economic integration was almost stagnant during the 1970s and 1980s. However, once India embarked on economic reforms in 1991, it has made successive progress in the index. The index, which averaged at 18 during the 1970s and 1980s, gradually increased from 22.7 in 1991 to 30.2 in 2001 and to 44.4 in 2014. India ranked 144th out of the 164 countries for which the index has been estimated in 2014, compared to 142nd rank (out of 156 countries) in 1991 and 114th rank in 1971 (out of 128 countries). More or less a similar trend is discernable if we consider the KOF index of overall globalisation, which apart from economic globalisation also considers the social and political aspects of globalisation; though India is more globalised in terms of the overall index. The overall globalisation index averaged at 26 during the 1970s and 28 during the 1980s, and then gradually increased from 31.9 in 1991 to 45.2 in 2001 and to 52.4 in 2014 (KOF Swiss Economic Institute, 2017).

Figure-4 provides a pictorial description of India's trade openness over the period 1971 and 2015. It is apparent that India has witnessed significant trade openness only after economic reforms of 1991 and then it geared up in the last decade. The trade-GDP ratio was averaged at a very low level of 11.4 percent during 1970s and 13.6 percent during 1980s, which slightly increased to 21.4 percent during 1990s and then significantly increased to 40.4 percent during 2000s. In 1991 the trade-GDP ratio was 16.7 percent and then it gradually increased to 25.5 percent in 2001 and to 55.6 percent in 2011; but then it declined to 42.2 percent in 2015. The exports to GDP ratio has slowly increased from 3.6 percent in 1971 to 8.3 percent in 1991 and to 12.3 percent in 2001 and then jumped to 25.4 percent in 2013 before declined to 20 percent in 2015. The imports to GDP ratio has also gradually increased from 3.9 percent in 1971 to 8.3 percent in 1991 and to 13.2 percent in 2001, and then jumped to 31.1 percent in 2011 before declined to 22.3 percent in 2015.

Albeit the substantial progress in opening up the economy since the initiation of economic reforms in 1991, India has been behind not only the developed economies but also many of her comparator emerging economies. Table-1

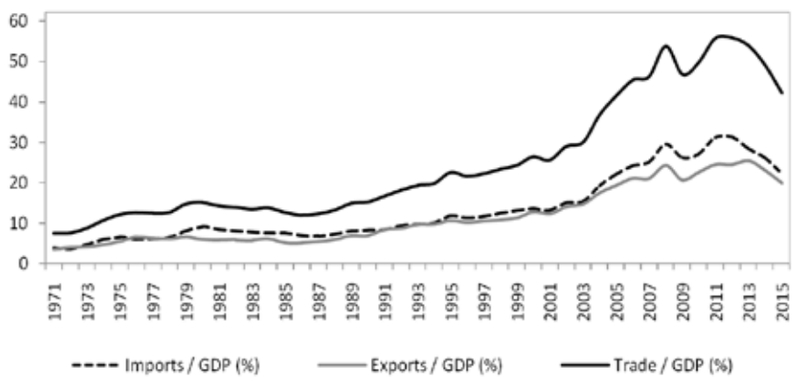
provides a comparative account of India's global integration in relation to select developed and emerging economies. The trade openness, measured in terms of trade-GDP ratio, of many emerging economies such as Chile, Korea Republic, Malaysia, Mexico, Singapore, South Africa, and Thailand and almost all the developed economies (except Australia, Japan, and United States) are higher than India. Argentina, Brazil, and China are the only emerging economies which are less opened compared to India in 2015. Similarly, in terms of the KOF index all these selected emerging and developed economies are ahead of India. While for emerging economies like Singapore the index is more than double compared to India, other emerging economies such as Chile, Malaysia, South Africa, Thailand, Mexico, and Korea Republic are well above India in the index in 2014.

Figure-3: KOF Index of Economic Globalisation, India, 1971-2014



Source: KOF Globalisation Index 2017, retrieved from www.globalization.kof.ethz.ch

Figure-4: India's Trade Openness, 1971-2015



Source: Compiled from World Bank (2017a).

Table-1: Trends in Globalisation, Select Countries

Country	KOF Index of Economic Globalisation					Trade Openness Index #				
	1971	1981	1991	2001	2014	1971	1981	1991	2001	2015
Emerging Economies										
India	18.1	17.3	22.7	30.2	44.4	7.5	14.3	16.7	25.5	42.2
Argentina	32.3	39.1	41.6	55.3	38.3	12.6	14.3	13.8	21.9	22.9
Brazil	38.8	42.1	41.8	55.2	52.3	14.6	19.2	16.6	26.9	27.0
Chile	36.3	48.9	52.7	73.0	80.2	23.1	43.2	60.2	61.4	60.2
China	23.9	26.8	37.9	51.1	52.8	4.9	14.9	26.7	39.1	40.5
Korea, Republic	29.9	39.3	40.9	57.1	63.1	38.3	69.3	51.3	63.9	84.8
Malaysia	58.5	63.6	67.1	73.2	77.9	79.8	111.3	159.3	203.4	134.2
Mexico	34.1	38.6	52.8	53.2	66.0	16.4	23.3	35.6	48.5	72.8
Singapore	81.0	90.3	94.4	94.6	97.8	259.4	399.9	323.8	352.7	326.1
South Africa	54.2	55.3	51.0	67.4	68.9	48.0	58.7	39.2	54.8	62.5
Thailand	22.2	29.7	37.3	60.3	71.2	34.8	54.0	78.5	120.3	126.8
Developed Economies										
Australia	44.0	47.2	64.4	74.6	76.2	25.6	31.7	32.3	44.1	41.0
Belgium	73.9	78.1	87.4	93.9	90.1	84.9	109.4	117.7	138.7	164.2
Canada	62.8	70.2	70.5	82.5	79.1	40.5	52.1	49.2	78.4	65.5
France	49.3	58.1	70.1	78.1	79.4	31.7	45.1	42.7	54.3	61.4
Germany	55.2	61.0	72.6	82.7	78.1	30.9	44.3	48.0	62.0	86.0
Italy	46.4	51.0	61.2	75.9	73.4	30.5	45.4	34.0	50.2	57.0
Japan	33.6	40.3	54.1	55.6	63.5	20.3	28.1	18.2	19.8	35.6
Netherlands	68.0	82.1	86.6	93.0	93.1	85.8	105.4	105.7	121.0	154.1
Norway	57.0	67.7	76.2	80.8	73.4	72.1	78.4	70.7	73.3	69.3
Sweden	43.2	54.7	76.4	87.1	85.5	44.0	56.8	52.0	81.3	86.4
Switzerland	61.8	75.5	82.3	89.7	82.8	60.0	84.8	79.1	96.2	114.1
United Kingdom	53.8	74.6	80.6	87.0	83.0	41.5	48.0	44.1	52.0	56.9
United States	53.2	59.0	65.2	71.8	71.6	10.7	19.4	19.7	22.8	28.0

Note: # Trade openness index is expressed as trade-GDP ratio.
Source: Trade-GDP ratio is compiled from World Bank (2017a) and KOF Index of economic globalisation is compiled from KOF Globalisation Index 2017, retrieved from www.globalization.kof.ethz.ch

Channels of India's Economic Integration

There are various channels through which the process of economic integration disseminates across the countries of the world. According to the Organisation of Economic Co-operation and Development (OECD), economic globalisation can be characterised with four main streams– flow of goods and services across national frontiers, flow of capital among nations, movement of labour across countries, and flow of technology and knowledge (OECD, 2005). This section discusses how effective these channels have been for the integration of India's economy with the world economy.

Trade in Goods and Services

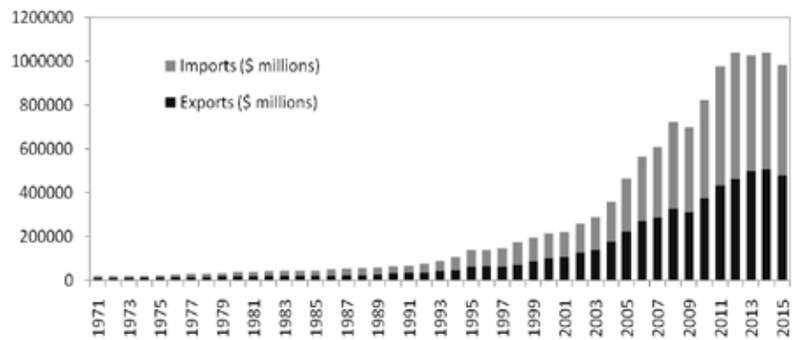
The opening of the economy has led to a rapid increase of India's trade. The volume of total trade in goods and services has gradually increased from $20.3 billion in 1971 to $68.2 billion in 1991 and to $222.5 billion in 2001, and then jumped to $1049 billion in 2014, before declined to 981.7 billion in 2015 (Figure-5). The massive increase in the last two decades has been largely contributed by

the rise in imports, which increased from $33.5 billion in 1991 to $116.9 billion in 2001 and to $576.1 billion in 2012, but then declined to 502.4 billion in 2015, while exports increased from $34.6 billion in 1991 to $105.6 billion in 2001 and to $506.5 billion in 2014, but then declined to $479.3 billion in 2015.

India's share in the world trade has gradually increased from as low an average value as 0.4 and 0.5 percent during 1970s and 1980s respectively to 0.9 percent in 2001 and to 2.5 percent in 2012, but then declined to 2.2 percent in 2015 (Figure-6). This is to note that India's share in world imports and exports was almost equal during the 1970s and though the share in imports exceeded the share in exports during the 1980s, both the shares had become equal by 1991 (0.5 percent). However, by 2001 the share in imports increased to 1.0 percent compared to 0.8 percent share in exports and then in 2012 the share in imports increased to 2.9 percent compared to 2.2 percent share in exports. However, the gap has been closed down by 2015 owing to sharp decline in India's share in imports compared to that in exports between 2012 and 2015.

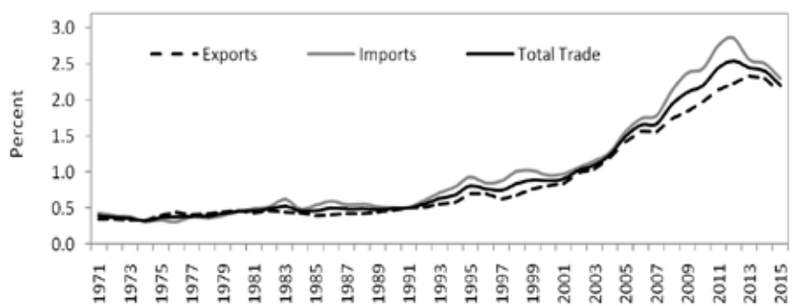
The growth in the volume of trade has been accompanied by increase in the number of India's trading partners in the post-reforms period. The number of India's export partners rose from 165 in 1988 to 212 in 2001 and to 220 in 2015, whereas number of import partners rose from 122 in 1988 to 179 in 2001 and to 215 in 2015 (WITS, 2015).

Figure-5: India's Trade in Goods and Services (in constant 2010, $ millions), 1971-2015



Source: Compiled from World Bank (2017a).

Figure-6: India's Share in World Trade, 1971-2015



Source: Compiled from World Bank (2017a)

An important aspect of India's integration with the world economy is through growing trade in services. Unlike the merchandise trade, the growth of services exports was higher than that of imports, particularly in the post-2001 period. Table-2 shows that the volume of both exports and imports of services doubled during 1981-1991 and more than tripled during 1991-2001, and then the volume of exports increased nine-fold during 2001-2014, while that of imports just quadrupled during this period. The share of services exports in global exports increased six-fold over the period 1991 and 2014 and that of imports just less than tripled during the same period. Although the share of total services trade in trade in goods and services remained at around 21-23 percent during 1991 to 2014 (though increased between 1998 and 2007, with an average of 28.3 percent), the share of services trade in GDP tripled from 4 to 14.5 percent during 1991-2014.

Table-2: India's Services Trade, 1981-2014

	1981	1991	2001	2011	2014
Services exports ($ millions)	2797	4925	17337	138528	157196
Services exports (% of world exports)	0.7	0.5	1.0	3.1	3.0
Services imports ($ millions)	3249	5945	20099	77758	81119
Service imports (% of world import)	0.6	0.6	1.2	1.8	1.6
Trade in services (% of trade in goods and services)	21.1	21.7	28.1	21.6	22.9
Trade in services (% of GDP)	3.1	4.0	7.6	14.5	14.5

Source: Compiled from World Bank (2017a).

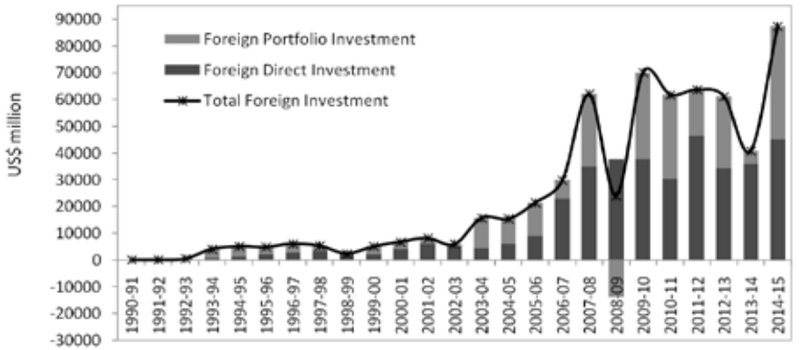
International Capital Flows

The deregulation of foreign capital was part of the economic reforms 1991. Unlike the controlled policy regime, which treated FDI just as another form of foreign savings to plug the domestic savings gap, the liberalised policy regime has recognised the other advantages of FDI such as knowledge spillover, trade, and investment (Virmani, 2003) and subsequently it had adopted a more liberal and transparent FDI policy. FDI up to 100 percent is allowed under the automatic route in most sectors except those due to sensitivities and security concerns, such as arms and ammunition (Kumar, 2015). As a result, the post-reforms period has seen substantial increase in foreign investment in India. Figure-7 shows the trends in FDI and foreign portfolio investment (FPI) for the post-reforms period. The inflow of total foreign investment into India has slowly increased from merely $103 million in 1990-91 to $8.2 billion in 2001-02 and then hiked to $62.1 billion in 2007-08 before declined to $24 billion in the subsequent year due to the negative effects of the global financial crisis. The economy, however, recovered quickly and foreign investment has increased to $87.4 billion in 2014-15.

An important aspect of foreign investment in India is that a significant proportion of it has been FPI. During 2014-15, the share of FPI in total net foreign investments was above 48 percent. The inflows of FPI has been, however, quite volatile; it rose from $6 million in 1990-91 to 27.3 billion in 2007-08 before became negative in 2008-09 in the wake of global financial crisis, and then rose to $42.2 billion in 2014-15. On the other hand, the inflows of FDI gradually increased from $97 million in 1990-91 to $9 billion in 2005-06 before surged to $22.8 billion in 2006-

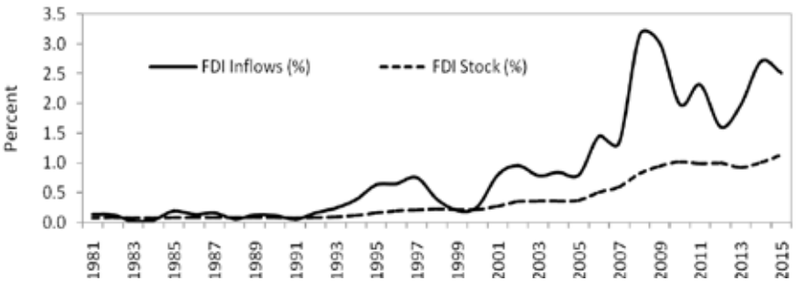
07 and to $45.1 billion in 2014-15. The stock of FDI in India stood at $282.3 billion in 2015, compared to $1.7 billion in 1991. As a result, India's share in world FDI flows and stock has significantly increased in the post-reforms period (Figure-8).

Figure-7: Foreign Investment in India (in $ millions)



Source: Compiled from RBI (2017).

Figure-8: India's Share in World FDI, 1981-2015



Source: Compiled from UNCTAD (2017).

Another emerging trend with respect to FDI in India is its emergence as a major source of outward FDI (OFDI). India ranked among the top ten outward-investing Asian emerging economies in terms of the value of annual outflows during 2000-2008 and was the tenth-largest outward-investing economy among all the emerging economies in terms of stock of OFDI in 2008 (Pradhan & Sauvant, 2010). The flows of OFDI from India had been limited in the first decade and a half of the reforms period, but it has remarkably increased since 2006 (Table-3). The flows of OFDI from India has increased from $6 million in 1990 to $1.4 billion in 2001 and then peaked to $21.1 billion in 2008 before declined to $16.1 billion in 2009 in the wake of global financial crisis and remained depressed at $7.5 billion in 2015. The stock of OFDI has significantly increased from $124 million in 1990 to 2.5 billion in 2001 and to $139 billion in 2015, which is 6.6 percent of India's GDP. India's share in world OFDI flows rose from 0.2 percent in 2001 to 1.5 percent in 2009 before declined to 0.5 percent in 2015, whereas the share in OFDI stock gradually rose from bellow 0.1 percent in 2001 to 0.6 percent in 2015 (Table-3).

The growth in the volume of OFDI has been accompanied by a rapid rise of Indian multinational enterprises (MNEs) since the 1990s. With the liberalisation of trade and FDI policies – both inward and outward – during the 1990s and subsequent decades, an increasing number of Indian firms resorting to outward investment in order to access new technologies, skills, and managerial expertise from the developed countries. The number of outward-investing Indian MNEs rose from just 11 in the period 1961-69 to 146 in the period 1980-89 and then jumped to 1257 in the period 1990-99 and to 2104 in the period 2000-07 (Pradhan & Sauvant, 2010).

Table-3: Outward Foreign Direct Investment from India, 1981-2015

Year	Volume ($ millions)		Percentage of GDP		Percentage of World	
	OFDI Flows	OFDI Stock	OFDI Flows	OFDI Stock	OFDI Flows	OFDI Stock
1981	2	80	0.001	0.04	0.004	0.01
1990	6	124	0.002	0.04	0.002	0.006
1995	119	495	0.03	0.14	0.03	0.01
2000	514	1733	0.11	0.38	0.04	0.02
2001	1397	2532	0.29	0.53	0.24	0.04
2002	1678	4071	0.33	0.80	0.34	0.06
2003	1876	6073	0.31	1.01	0.35	0.07
2004	2175	7734	0.31	1.11	0.24	0.07
2005	2985	9741	0.37	1.20	0.36	0.08
2006	14285	27036	1.55	2.94	1.06	0.18
2007	17234	44080	1.43	3.67	0.80	0.24
2008	21142	63338	1.78	5.34	1.24	0.40
2009	16058	80839	1.21	6.11	1.46	0.43
2010	15947	96901	0.96	5.85	1.15	0.47
2011	12456	109509	0.68	6.01	0.80	0.51
2012	8486	118072	0.46	6.46	0.65	0.52
2013	1679	119838	0.09	6.45	0.13	0.49
2014	11783	131524	0.58	6.46	0.89	0.53
2015	7501	138967	0.36	6.58	0.51	0.55

Source: Compiled from UNCTAD (2017).

Migration and Remittances

With the opening up of the economy there has been an unprecedented increase in labour out migration from India and the workers' remittances have become an important source of external finance for India in the post-reforms period. Table-4 shows the annual flow of emigrants from India during 1990-2014. Although there were ups and downs in the annual flow of emigrants during 1990-2000, there has been steady increase in the annual flow of emigrants in the post-2000 period. The stock of emigrants from India has increased 10 million in 2005 to 11.4 million in 2010 and to 13.9 million in 2013. In 2013, India ranked top among the emigration countries, surpassing Mexico (13.2 million emigrants) which placed at the top rank during 2005-2010 (World Bank, 2016).

The inflow of remittances remained around $2.5 billion during 1981 to 1990 and then significantly increased to $14.3 billion in 2001 and to $70.4 billion in 2014 (Table-4). India ranked top among the remittances-receiving countries during 1995 to 2014 (except in the years 1998, 2004, and 2005). In 2014, India is far ahead of the next ranked countries (such as, Philippines [29.7 billion], Mexico [25.7 billion], and France [24.6 billion]) except China which ranked second with 63.9 billion remittances (World Bank, 2016). The share of remittances in India's GDP has been declined from 1.2 to 0.7 percent during 1981 to 1990 and then steadily increased to 2.7 percent in 2000 and to around 3-4 percent over the period 2001 and 2014. Remittances have also provided considerable support to India's balance of payments, with its share in current account receipts at around 16-18 percent during 2000-2003 and around 11-14 percent during 2004-2014 (Table-4).

Table-4: Migration and Remittances Flows in India, 1981-2014

Year	Annual flow of emigrants	Remittances		
		$ billions	% of GDP	% of Current receipt
1981	-	2.3	1.2	-
1990	139861	2.4	0.7	9.2
1995	415334	6.2	1.7	12.5
2000	243182	12.9	2.7	16.6
2001	278664	14.3	2.9	17.5
2002	367663	15.7	3.0	16.4
2003	466456	21.0	3.4	17.5
2004	474960	18.8	2.6	12.1
2005	548853	22.1	2.7	11.4
2006	676912	28.3	3.0	11.6
2007	809453	37.2	3.1	11.8
2008	848601	50.0	4.2	14.0
2009	610270	49.2	3.7	14.2
2010	641356	53.5	3.2	12.0
2011	626565	62.5	3.4	11.8
2012	747041	68.8	3.8	13.0
2013	816655	70.0	3.8	12.7
2014	804878	70.4	3.5	12.6

Source: Compiled from World Bank (2017a) and Annual Reports of Ministry of Overseas Indian Affairs (various years).

Trade in Technology

An important and more dynamic aspect of India's global integration is through trade in technology and knowledge based services. Table-5 provides a summary of India's trade in technology-intensive goods and services for the period 2000-2015. It shows that the share of high-technology products in India's exports is very low; an average share of 6.9 percent of manufactured exports during 2000 to 2015. India's share in the world high-technology exports is just 0.8 percent in 2015, compared to 0.2 percent in 2000. The share of ICT goods in India's exports has come down from 1.7 to 0.9 percent over 2000 and 2015. This signifies India's failure to make a place in the fast-growing high value added segments

of manufacturing, such as electronic and telecom equipment (Kumar & Joseph, 2007). In fact India's import of ICT goods has gone up from 5.5 to 8.6 percent of imports over the same period, which is straining India's merchandise trade balance. Contrarily, the share technology-intensive services in India's services exports has gradually increased from 55 to 67.3 percent over 2000-2015. India's share in world exports of ICT services climbed gradually from 5.8 percent in 2000 to 11.7 percent in 2015. This is primarily because of India's emergence as a hub of software development and other IT-enabled services, given the advantage of her huge stock of scientific and technical manpower and significantly lower wage rates (Sikdar, 2015; Kumar, 2015).

Table-5: India's Technology Trade, 2000-2015

Year	High-technology exports (% of manufactured exports)	ICT goods exports (% of total goods exports)	ICT goods imports (% of total goods imports)	ICT services exports (% of services exports)	ICT services exports (% of World)
2000	6.3	1.7	5.5	55.0	5.8
2001	7.0	2.0	5.9	59.5	7.9
2002	6.2	1.6	7.0	61.5	7.6
2003	5.9	1.6	8.4	61.0	7.9
2004	6.0	1.4	8.3	65.3	9.0
2005	5.8	1.1	7.6	67.2	8.3
2006	6.1	1.1	7.6	68.3	9.5
2007	6.4	1.1	7.4	68.1	10.1
2008	6.8	1.0	4.1	69.3	11.1
2009	9.1	3.5	7.8	66.3	10.6
2010	7.2	2.0	6.3	64.1	12.3
2011	6.9	2.2	6.0	61.8	12.3
2012	6.6	2.0	5.3	65.9	12.0
2013	8.1	1.6	5.8	67.3	12.2
2014	8.6	1.0	6.3	65.5	11.1
2015	7.5	0.9	8.6	67.3	11.7

Source: Compiled from World Bank (2017a) and UNCTAD (2017).

Facilitating Factors of India's Economic Integration

There are several factors that have been playing a facilitating role to promote and foster globalisation. These factors include economic liberalisation, reduction in tariff, simplification of trading procedures, technological progress, and growth of telecommunication and internet. This section discusses how these factors have facilitated economic integration of India's economy with the rest of the world.

Economic Liberalisation

After pursuing a closed and heavily regulated policy regime for more than four decades after independence, India embarked on a comprehensive economic reform in 1991 to shift its economic policy towards greater integration with the world economy and to increase competitiveness of the economy. The reform measures were mostly directed towards the industry and external sector. The reform measures

towards the external sector involve dismantling import licensing system, removal of all non-tariff barriers on import of intermediate and capital goods, reduction of tariff levels, removal of export restrictions, broadening and simplification of export incentives, elimination of the trade monopolies of the state trading agencies, devaluation of Indian rupee, and full convertibility of the Indian rupee for foreign exchange transactions (Virmani, 2003; Panagariya, 2005; Tendulkar & Bhavani, 2007). Besides trade liberalisation, there has been gradual liberalisation of FDI policy for both inward and outward FDI; a system of automatic for FDI proposals fulfilling various conditions (e.g. with ownership levels of 50, 51, 74, and 100 percent) was introduced and subsequently 100 percent foreign ownership was allowed in manufacturing except those such as defense-related sectors, and new sectors such as mining, banking, telecommunications, and various services were opened up for FDI (Wignaraja, 2012).

These post-1991 reforms had a significant impact on integration of Indian economy with the rest of the world. Analysing the impact of economic reforms on global economic integration of Indian economy Kumar (2015) concludes, 'The reforms pursued since 1991 have led to much deeper integration of the Indian economy with the global economy in terms of rising share of merchandise trade and an even more dramatic transformation of services trade and India's emergence as one of the most attractive destinations for FDI, as well as an important source of FDI outflows.'

Reduction in Tariffs and Non-Tariff Barriers

The tariff rates in India have been among the highest in the world and the decade of 1980s had experienced substantial increase in tariff rates (Rodriguez & Rodrik, 1999; Virmani, 2003; Tendulkar & Bhavani, 2007). Import duties as percentage of import has increased from 29.3 percent in 1974-75 to 41.9 percent in 1984-85 (Rodriguez & Rodrik, 1999). The import-weighted average tariff rates increased from 38 percent in 1980-81 to 87 percent in 1989-90 and the tariff revenue as a proportion of imports went up from 20 percent to 44 percent during the same period. In the year 1990-91, the highest tariff rates, simple average tariff rates, and import-weighted average tariff rates stood at 355 percent, 113 percent, and 87 percent respectively (Panagariya, 2005).

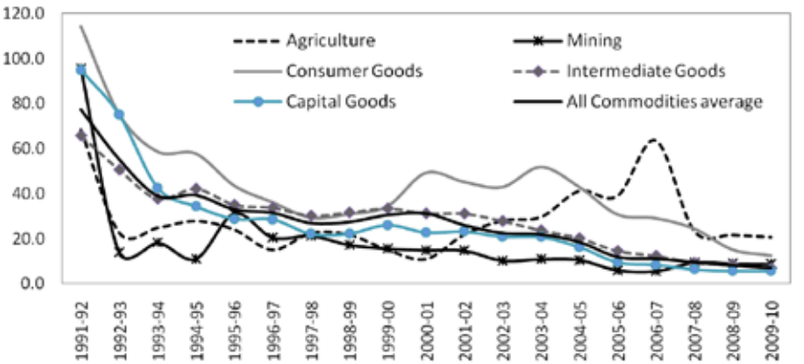
After liberalisation, the maximum tariff rates has come down to 150 percent in 1991-92 (Goldar, 2005) and then it declined in subsequent years to 40 percent in 1999-2000 and to 10 percent in 2007-08, after which there was no change in maximum tariff rates (Singh, 2017). Accordingly, the simple average tariff rates (all commodities) has declined from 128 percent in 1991-92 to 32.1 percent in 2001-02 and to 11.8 percent in 2009-10, while the import-weighted tariff rates (all commodities) has declined from 77.2 percent in 1991-92 to 25.9 percent in 2001-02 and to 7 percent in 2009-10 (Figure-9). The reduction in overall tariffs has been accompanied by drastic reduction in industrial tariffs. The import-weighted tariff rates for the consumer goods has declined from 114 percent in 1991-92 to 12.5 percent in 2009-10, whereas that for the intermediate goods and capital goods declined from 65.6 to 6.8 percent and 94.8 to 5.6 percent respectively during the same period. The import-weighted tariff rates for agricultural goods declined from

68.3 percent in 1991-92 to 10.7 percent in 2000-01, but then sharply increased in subsequent years to 63.5 percent in 2006-07 before declined to 20.5 percent in 2009-10 (Figure-9). The post-reforms period has also seen significant reduction in the dispersion of tariff rates; the standard deviation of tariff rates (all commodities) fell from 41 in 1991-92 to 12.2 in 2009-10 (Government of India, 2014).

The trade liberalisation also reduced the non-tariff barriers imposed on imports of goods. In 1991, the quantitative restrictions were removed on as many as 6161 tariff lines out of the total of 10,000 tariff lines. The tariff lines on restricted import list further reduced to 2314 in April 1998, to 1183 in 1999, and to 479 in 2001 (Tendulkar & Bhavani, 2007).

Despite the significant reductions in both tariff and non-tariff barriers since 1991, the tariff rates and non-tariff barriers in India are among the highest in the world. India's tariff rates remained high compared to most of the Asian economies such as Philippines, Malaysia, Indonesia, Korea, China, Sri Lanka, Thailand, Vietnam, and Bangladesh (Athukorala, 2008). As per the World Trade Indicators 2009-10 (World Bank, 2010), India ranked among the top 20 percent of countries with the most restrictive tariff regimes. The Global Enabling Trade Report 2016 prepared by the World Economic Forum (WEF-GATF, 2016) placed India at 122nd rank (out of 136 countries) in terms of tariff rates (13 percent), at 85th rank in terms of complexity of tariffs, and at 122nd rank in terms of share of duty free imports (only 13.4 percent).

Figure-9: Trends in Import-Weighted Average Import Duty Rates in India



Source: Government of India (2014).

Simplification of Trading Procedures

The export and import procedures, which are also the outcome of trade policies, have significant impact on trade between countries. The excessive documents requirement to import and export, burdensome customs procedures, and inefficient port operations all lead to extra trading costs and delays for exporters and importers. Research found that exporters in developing countries gain more from a 10 percent drop in their trading costs than from a similar reduction in the tariffs applied to their products in the global markets (World Bank, 2015). How supportive the trading procedures in India are for international trade?

Table-6 provides a summary of ease of trading across borders in India. It is evident that trading across borders has become easier and faster over the years. The number of essential documents required to export and import of goods from and to India has declined from 10 and 15 respectively in 2006 to five and seven respectively in 2017.[2] As a result, the transaction time in the export and import processes has significantly declined. The time required to clear the export and import procedures in India has declined from 36 and 43 days respectively in 2006 to six and 14 days respectively in 2017.[3] Despite this decline the required documents and transaction time in export and import processes in India are among the highest in the world. The cost to export and import,[4] however, rose over the period 2008 to 2015 and then declined between 2016 and 2017.

Table-6: Ease of Trading Across Borders in India

	2006	2008	2010	2011	2012	2013	2014	2015	2016	2017
Documents to export (number)	10	8	8	8	8	9	9	7	8	5
Documents to import (number)	15	9	9	9	9	11	11	10	10	7
Time to export (days)	36	18	17	17	16	16	16	17	7	6
Time to import (days)	43	21	20	20	20	20	20	21	17	14
Cost to export (US$ per container)	-	820	945	1055	1095	1120	1170	1332	950	505
Cost to import (US$ per container)	-	910	960	1025	1070	1200	1250	1462	1254	709
Trading across borders (Rank)	-	79	94	100	109	127	132	126	133	143

Source: Compiled from Doing Business (various issues), World Bank.

However, the export and import procedures in India are among the complex trading procedures in the world. It is evident from the fact that India stands at the 143 (out of 190 countries) in the World Bank's ranking of ease of trading across borders in 2017 (slipped from 79th out of 178 countries in 2008), which is far behind its comparator emerging economies, such as, Singapore (41st rank),

2 In 2017, the essential documents to export were: bill of lading, commercial invoice, packing list, customs export declaration, and terminal handling receipts, whereas the documents to import were: bill of entry, bill of lading, commercial invoice, packing list, import general manifest, certificate of origin, and cargo release order (World Bank, 2017b).

3 The time to export/import is the time necessary to comply with all procedures required to export/import goods. Time is recorded in calendar days. The time calculation for a procedure starts from the moment it is initiated and runs until it is completed (World Bank, 2015).

4 The cost to export/import measures the fees levied on a standard (20 foot) container in U.S. dollars. All the fees associated with completing the export/import procedures, such as, costs for documents, administrative fees for customs clearance and technical control, customs broker fees, terminal handling charges, and inland transport are included in the cost measure. The cost measure does not include tariffs or trade taxes (World Bank, 2015).

Thailand (56th rank), Malaysia (60th rank), Mexico (61th rank), and China (96th rank). In the overall ease of doing business index, India stands at 130 out of 190 countries in 2017 (slipped from 116 out of 155 countries in 2006). The complexity of export and import procedures in India is further reflected in India's very poor rank in the Enabling Trade Index (ETI) prepared by the World Economic Forum (WEF-GATF, 2016).[5] Out of the 136 countries for which the index was prepared for 2016, India ranks at 102 in the overall ETI, 135 in market access, 75 in efficiency and transparency of border administration, 60 in availability and quality of infrastructure, and 76 in operating environment. Further disaggregating the market access reveals that India ranks 135 in domestic market access, while ranks 117 in foreign market access. This signifies that the other trading nations find it difficult to export to India due to the higher import restrictions imposed by India and that the Indian traders also faced higher restrictions in the foreign markets.

Technological Progress

Technological progress is undoubtedly one of the main drivers of globalisation. Technological development facilitates the globalisation process by supplying infrastructure for trans-world connection. The advancements in transportation and communication technologies have made transportation of goods, services, and factors of production and communication of useful knowledge and technology faster and much cheaper across long distances. The reduction in transportation and communication costs owing to technological innovation has reduced the impact of distance on trade, allowing more buyers and sellers to participate in global markets (Mussa, 2000; Bown, Lederman, Pienknagura & Robertson, 2017). The information and communication technology (ICT) revolution is perhaps the biggest contributing factor in accelerating the pace of globalisation in the last three decades or so. ICT developments, especially high speed internet and mobile telephony, have underpinned the rapid growth of global supply chains by making production coordination across borders easier and the growth of services trade, including the off shoring of service activities, such as data processing, research and development, and business processes to the lower-cost locations around the world (WTO, 2013). The invention of World Wide Web (WWW) and development of secure and reliable platforms for international online payments (such as, SWIFT) has propelled e-commerce and international financial activities, with 24-hour access to global markets and trading systems (Garrett, 2000). In a cross country study of 56 countries, Freund & Weinhold (2003) find that a 10 percent increase in web users leads to about 1 percent increase in merchandise trade. A large number of studies also provide evidence for the positive effects of ICT in attracting FDI in developed as well as developing countries (Addison & Heshmati, 2003; Gholami, Lee & Heshmati, 2005).[6]

5 The ETI captures the various dimensions of enabling trade, categorised them into four sub-indices: (i) Market access, measuring the tariff regime; (ii) Border administration, assessing the quality, transparency, and efficiency of border administration in the country; (iii) Infrastructure, measuring the availability and quality of transport infrastructure and services necessary for trade; and (iv) Operating environment, measuring the regulatory environment and physical security (WEF-GATF, 2016).

6 However, it is worthwhile to note that the relationship between technological progress and trade is a two-way relationship. International trade also affects technological progress through its effect on the incentive to innovate and through technology transfers (WTO, 2013).

The measurement of technological development is difficult. Widely used measures of technological development include total factor productivity (TFP), research and development (R&D) expenditure, and patent and intellectual properties applications (Keller, 2010). TFP measures an economy's efficiency in transforming inputs into outputs and its rate of growth measures technological progress. Studies on TFP in Indian manufacturing provide ambiguous results on the trends of TFP growth in the post-reforms period; some studies show acceleration of TFP growth (e.g. Unel, 2003; Deb & Ray, 2014), while others find deceleration of TFP growth (e.g. Balakrishnan, Pushpangadan & Babu, 2000; Trivedi, Lakshmanan, Jain & Gupta, 2011; Kathuria, Raj & Sen, 2013).

Table-7: Technological Development in India

Indicators	1991	1996	2000	2005	2010	2014
R&D expenditure (% of GDP)	-	0.63	0.74	0.81	0.80	-
Patent applications (by residents)	1267 (0.16)	1661 (0.16)	2206 (0.17)	4721 (0.30)	8853 (0.48)	12040 (0.48)
Trademark applications (by residents)	19980 (1.61)	38109* (2.17)	67262 (2.69)	73308 (2.47)	172120 (4.82)	200140 (4.10)
Industrial design applications (by residents)	-	-	-	3407 (0.68)	4416 (0.54)	6168 (0.60)
Scientific and technical journal articles	-	-	20874 (2.14)	33090 (2.33)	65916 (3.46)	93349* (4.27)

Notes: Figures in the parentheses represent percentage to the world. * Data for the previous year.
Source: Compiled from World Bank (2017a).

Table-7 shows some of the indicators of technological development in India for the post-reforms period. It is evident that India's R&D expenditure was just 0.8 percent of GDP in 2010, which was lower than its comparator emerging economies such as Singapore, China, Korea Republic, Brazil, and Malaysia, and all the developed economies World Bank (2017a). The number of patent applications by Indian residents rose by almost ten-fold between 1991 and 2014. India's share in total patent applications of the world also rose from 0.16 to 0.46 percent during this period. According to WTO (2013), India ranks 14 in the world in 2010 in terms of number of patent applications, compared to its rank 27 in 1995. Similar rise is also noticed in case of number of trademark applications and scientific and technical journal articles by Indian residents in the post-reforms period, in which India has about 4.1 and 4.3 percent shares, respectively, in the world in 2014. However, in case of industrial design applications by Indian residents the improvement has been quite slow.

Growth of Telecommunication and Internet

The telecommunication industry of India is one of the fastest growing and the second largest in the world by number of telephone users, after China. The number of telephone subscribers (both fixed and mobile phone) in India has increased from 2.3 million in 1981 to 5.8 million in 1991 and to 1.15 billion in 2016 (Table-8); an average annual growth rate of about 9 percent during 1981-1990 and over 25

percent during 1991-2016. Teledensity has slowly increased from as low a value as 0.32 per 100 people in 1981 to 0.66 in 1991 and to 4.25 in 2001 and then rose sharply to 90.9 in 2016. The phenomenal growth of the telecommunication sector in the last one and a half decade is almost entirely due to the rapid expansion of the mobile phone since its launch in the country in 1995, which is evident from the radical rise in the ratio of mobile to fixed lines subscribers from less than 0.01 in 1995 to 46.2 in 2016. The number of mobile phone subscribers has increased at an average annual growth rate of 69.5 percent over 1995-2016 compared to 4 percent growth rate of fixed line subscribers; in fact the number of fixed line subscribers recorded negative growth during 2006 to 2016.

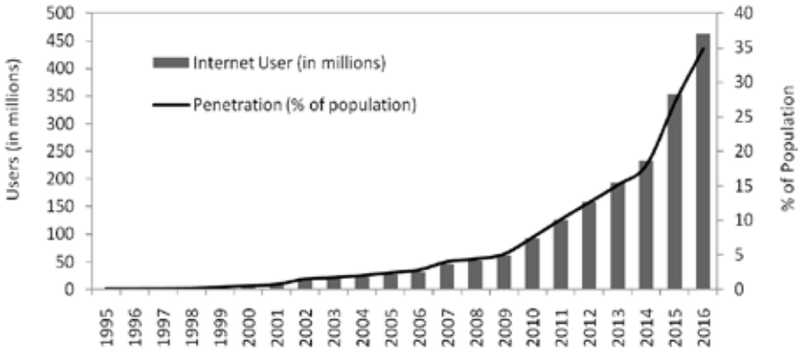
Internet services in India were launched by the state-owned Videsh Sanchar Nigam Limited (VSNL) on 15 August 1995. Today, India has the second-largest internet user-base in the world, after China. The pace of growth of internet was very slow in the first decade due to narrow-band connections having low speeds and by the end of 2004 the number of subscribers reached 22.25 million (Figure-10). The formulation of broadband policy by the government in 2004 somewhat accelerated the internet in the country, but again growth was limited owing to the predominantly use of wired-line technologies and the number of subscribers reached 92.3 million in 2010. The auction of 3G and 4G spectrum by the government in 2010 leading to a very highly competitive and vibrant wireless broadband market in the country has resulted in an unprecedented increase in the number of subscribers which reached 462.12 million as on April 2016, of which 159.76 million were broadband subscribers. The number of fixed broadband subscribers has increased from 1.37 million to 18.14 million over the period 2005 and 2016. The internet penetration rate (subscribers as percentage of population) has gradually increased from as low a value as 0.5 percent in 2000 to 10 percent in 2011 and to 34.8 percent in 2016. The penetration rate of fixed broadband has increased from 0.12 to 1.37 percent over the period 2005 and 2016.

Table-8: Trends in Number of Telephone Subscribers in India, 1981-2016

Year	Number of Subscribers (in millions)			Tele-density	Ratio of Mobile to Fixed Lines
	Fixed Lines	Mobile	Total		
1981	2.30	-	2.30	0.32	-
1991	5.81	-	5.81	0.66	-
1995	11.98	0.08	12.05	1.26	0.01
2001	38.54	6.54	45.08	4.25	0.17
2002	41.42	13.00	54.42	5.05	0.31
2003	42.00	33.69	75.69	6.92	0.80
2004	46.20	52.22	98.42	8.86	1.13
2005	50.18	90.14	140.32	12.45	1.80
2006	40.77	166.05	206.82	18.09	4.07
2007	39.25	233.62	272.87	23.54	5.95
2008	37.90	346.89	384.79	32.76	9.15
2009	37.06	525.09	562.15	47.23	14.17
2010	35.09	752.19	787.28	65.30	21.44
2011	32.84	893.86	926.70	75.89	27.22
2012	30.94	864.72	895.66	72.42	27.95
2013	29.03	886.30	915.34	73.10	30.53
2014	27.00	944.01	971.01	76.61	34.96
2015	25.52	1001.06	1026.58	80.05	39.23
2016	24.40	1127.37	1151.78	89.90	46.20

Source: Compiled from World Bank (2017a) and Telecom Regulatory Authority of India (retrieved from www.trai.gov.in).

Figure-10: Internet Users in India, 1995-2016



Source: Compiled from World Bank (2017a) and Internet Live Stats (www.InternetLiveStats.com)

What Drives India's Economic Integration?

From the discussion in the previous sections, it seems to be clear that since the starting of economic reforms in 1991 there has been rapid expansion of international trade, increase in inflows and outflows of foreign investments, rise in inflows of remittances, and exports of IT-enabled services, which have enormously contributed to integration of India's economy with the world. There are also a set of factors, such as, liberalisation of economic and trade policies, simplification of trading procedures, technological progress, telecommunication boom, etc., which have facilitated the globalisation process. Which of these factors have been playing significant role in the process of globalisation of Indian economy? To examine the relative importance of the various factors we have performed a regression analysis of the KOF index of economic globalisation on a set of factors discussed above. It is to be noted that our selection of the variables for the empirical analysis is constrained by the availability of consistent time series data. The following regression model in first difference form has been used to analyse the drivers of globalisation of Indian economy.

$$\Delta KOF_t = \alpha + \beta_1 \Delta KOF_{t-1} + \beta_2 \Delta KOF_{t-2} + \beta_3 \Delta TRADE_t + \beta_4 \Delta FDI_t + \beta_5 \Delta FPI_t + \beta_6 \Delta REM_t + \beta_7 \Delta ICTS_t + \beta_8 \Delta ICTG_t + \varepsilon_t \quad (1)$$

where, subscript t denotes time period, Δ denotes first difference, and α, β, and ε are interpreted in the usual way. KOF is KOF index of economic globalisation, TRADE is total of exports and imports of goods and services (as percentage of GDP), FDI is stock of inward and outward FDI (as percentage of GDP), FPI is inflows of FPI (as percentage of GDP), REM is inflows of remittances (as percentage of GDP), ICTS is total of exports and imports of ICT services (as percentage of GDP), and ICTG is total of exports and imports of ICT goods (as percentage of GDP).

We have tested the time series properties of the variables and found that the variables are non-stationary in level form, but stationary in first difference. The

autocorrelation function (ACF) and partial autocorrelation function (PACF) of the first differenced series KOF confirms that the series follows second order autoregressive process (results are not reported but are available on request). Therefore, two lagged variables (ΔKOF_{t-1} and ΔKOF_{t-2}) have been included in the regression model.

The empirical analysis has been carried out for the period 1982–2014.[7] However, due to unavailability of data for certain variables for the entire time period, we have performed the analysis for different sub-periods; for instance, the period 1992–2014 to include the variable FPI and the period 2001–2014 to include the variables ITCS and ICTG. The results of empirical analysis are reported in Table-9.

Table-9: Regression Results of KOF Index of Economic Globalisation

Variables	1982-2014	1992-2014		2001-2014
	I	II	III	IV
ΔKOF_{t-1}	-0.25	-0.32	-0.29	-0.20
	(0.188)	(0.213)	(0.210)	(0.316)
ΔKOF_{t-2}	0.49***	0.68***	0.44	1.07***
	(0.185)	(0.216)	(0.280)	(0.217)
$\Delta TRADE_t$	0.15*	0.16*	0.27**	0.28*
	(0.090)	(0.084)	(0.118)	(0.135)
ΔFDI_t	-0.45*	-0.58**	-0.52**	-0.97**
	(0.255)	(0.248)	(0.246)	(0.275)
ΔFPI_t			0.58	
			(0.444)	
ΔREM_t	0.45	0.36	0.71	1.94*
	(0.651)	(0.659)	(0.699)	(0.895)
$\Delta ICTS_t$				-2.85
				(2.741)
$\Delta ICTG_t$				-2.03
				(1.296)
Constant	0.669**	0.78**	0.72*	0.96*
	(0.313)	(0.388)	(0.382)	(0.442)
Observations	31	21	21	12
F statistics	2.19*	3.09**	2.99**	4.60**
Adjusted R^2	0.165	0.343	0.373	0.696
DW statistics	2.254	2.884	2.745	2.826

Notes: Figures in parentheses are the standard errors. ***, ** and * indicate significance at 1, 5 and 10 percent levels of significance, respectively.

Source: Author's estimation.

7 Note that our data begin in 1981. However, we have lost one time point due to converting the variables into first differenced series. This is the reason the period of our analysis is started in 1982. Further, we have lost another two time points due to inclusion of the two lagged variables. Therefore, our analysis includes only 31 data points for the entire study period, and similarly, two less data points in each sub-period.

As expected the trade variable has positive impact on globalisation of Indian economy. The coefficient is significant for all the time periods, implying that higher the expansion of international trade, the higher is the global economic integration. The most surprising part of the results is the negative and significant impact of FDI (both inward and outward) on globalisation, especially in the post-reforms period. The inflow of FPI has positive impact, but the coefficient is not significant. The inflow of remittances has strong and significantly positive impact on globalisation, especially in the post-2001 periods. The two variables relating to technology trade namely, trade in ICT services (ICTS) and ICT goods (ICTG), turn out to be statistically insignificant. This could be because of the very meager size of India's trade in ICT services and ICT goods, which is about 2.9 and 1.6 percent of GDP respectively in 2014.

Conclusion

The objective of this paper has been to analyse the trends of economic integration of Indian economy and to discuss the channels through which the process of economic integration has been disseminated and the factors that have facilitated the integration process. The pace of economic integration of India's economy was virtually stagnant throughout the 1970s and 1980s owing to the controlled and restrictive trade policy regime during those decades. The first decade after 1991 economic reforms has witnessed a quite slow (but steady) progression towards economic integration and then the period post-2001 has seen acceleration in economic integration before the pace was being halted following the 2008 global financial crisis. The trade-GDP ratio rose from 16.7 percent in 1991 to 54 percent in 2011 and declined to 42.2 percent in 2015, whereas the KOF index of economic globalisation rose from 23 in 1991 to 30 in 2001 and to 44 in 2014. Albeit this progress, India has been behind many of its comparator emerging economies, such as, Chile, Korea Republic, Malaysia, Mexico, Singapore, South Africa, and Thailand.

The results suggest that international trade and international migration of workers have played a significant role in integration of the Indian economy with the world, whereas FDI (both inward and outward) has, unexpectedly, a negative impact. A number of factors have been facilitating increasing global integration of the Indian economy; the most notable among them are the liberalisation of trade policy regime following economic reforms, lowering the tariff rates, reduction of non-tariff barriers, simplification of trading procedures, technological progress, and growth of telecommunication sector. Although it is widely believed that the post-1991 economic reforms have greatly transformed the business environment in the country into a market friendly one, India still continues to maintain significant restrictions in international trade and capital flows, which limits its economic integration with the world. Most prominently, the failure to improve the ease of doing business especially trading across borders, failure to expand the technology-intensive manufacturing sector, low level of R&D and innovation, and low penetration of internet particularly the fixed broadband segment are some of the factors that have been impeding the pace of global integration of

Indian economy. Hence, there is a need to further liberalisation of external sector policies, particularly policies relating to trade (such as tariff barriers, quantitative restrictions, trading procedures, etc.), capital flows, financial sector, exchange rate, and on and so forth to facilitate the global integration process.

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Technological Intensity of Exports of India and China: A Comparative Assessment

Nidhi Bagaria[1]
Saba Ismail[2]

Abstract

The paper analyzes and compares the composition and comparative advantage of manufacturing exports of India and China in terms of technology intensity for the period 1992-2016. The study tests whether India and China are specializing in the types of goods that are exported by rich countries, i.e. high and medium technology manufactures, as export of such goods help in faster growth of the economy. Composition has been looked at by segregating entire manufacturing exports into four categories using Lall (2000) classification on the basis of their technological characteristics. SITC-3 digit data has been used for the analysis. Specialization has been analyzed using Revealed Comparative Advantage Index. This paper finds that there is a sharp decline in the share of low-technology manufactures followed by resource-based manufacturers in China, whereas in India, exports are dominated by resource based manufactures and low-technology manufactures. China has high comparative advantage in commodity groups like - high-technology manufactures, low-technology manufactures-other than textile, garment and footwear and medium-technology manufactures - engineering. Hence the study reveals that both composition of exports and structure of comparative advantage differs between these two countries, despite both being labour intensive in nature. The study concludes that China is comparatively more specialized in the types of goods that are exported by rich countries.

Keywords: Composition of Exports, Specialization, Revealed Comparative Advantage, Technological Structure

Introduction

It is important to examine the technology structure of exports of an economy to ascertain the level of development. It has been observed that within manufactures, technology intensive products are growing faster and primary products are losing their shares in world trade (Lall, 2000). It is also widely believed that higher the level of technological intensity of exports, higher benefit accrues to exporting country (Lall, 2005). Specializing in some products will bring higher growth than specializing in others, "everything else being the same, countries that specialize in the types of goods that rich countries export are likely to grow faster than countries that specialize in other goods" (Hausmann *et al.,* 2007).

1 Research Scholar, Department of Economics, Jamia Millia Islamia, New Delhi, India and can be reached at nidhi365@gmail.com

2 Assistant Professor, Department of Economics, Jamia Millia Islamia, New Delhi, India & corresponding author and can be reached at sismail@jmi.ac.in

Schumpeterian growth theory stresses the role of structural change in long run growth. Countries which increase the share of technology-intensive sectors in their economic structures benefit more from technological learning and innovation. In addition, they are more able to respond to changes in the international markets and to compete in sectors whose demand grows at higher rates (Mario, *et al.,* 2011).

As India and China are among the fastest growing economies, it is important to analyze the technological content of exports of these two countries. Some studies are available analyzing the technological content of exports of China and India. Lall and Albaladejo (2004) examines competitive performance of China's exports in terms of technology and market, they found that major market share loss has been incurred in low-technology products. China and its neighbors are experiencing rise in high-technology products, whereas Wang and Cheng (2004) while examining the competitiveness of high-tech exports concluded that China's high-tech exports remain at the disadvantageous position because of its inferior competitiveness. On the contrary Yang and Zhu (2008) examines China's international competitiveness for the period 1978 to 2006 and concluded that its technological structure has been greatly optimized and its international competitiveness has improved. Amiti and Freund (2010) found that China's export structure has changed in terms of skill intensity; share of agriculture and soft manufacturers has declined whereas share of hard manufactures has grown.

Lall (1999) analyzed the possibility for India's manufacturing exports and found that India's export structure is majorly dominated by low-technology products hence its prospect is not very encouraging, rather it suits to sustained growth. Alessandrini *et al.,* (2007) examined the pattern of international trade specialization in Indian manufacturing trade since mid-1980s and it is stated that low-technology sector still dominates the categories of high degree trade specialization while high-technology sector is import dependent. Bin (2015) while analyzing the structural transformation of Indian exports, stated that India has good potential to expand exports in high-tech and medium- technology exports and suggested that India should diversify into those products which are having high-income potential. Sufaira (2016) found that since 1991, several changes have taken place in the composition of India's exports, now most important goods are engineering goods, chemical and textiles.

Devadason (2008) stated that India and China's trade composition differs substantially. China's exports comprise of mainly finished goods whereas India's exports comprise of intermediate goods. Qureshi and Wan (2008) found that India specialize in low-technology products whereas export structure of China is changing with the export share of skill-intensive and medium to high-technology products increasing and those of labour-intensive products decreasing. Rui (2009) while studying technology sophistication of exports of India and China found that technology level of exports of both the countries is rising and they are reaching more towards optimum level. It has also been pointed out that China is much ahead in the improvement of the technical structure of exports compared to India. Devadason (2012) found that export composition of China and India differ substantially, China's exports mainly comprise of finished goods, whereas India's exports mainly comprise of intermediate goods. Tandon (2016) stated that

though merchandise export is important for both the countries, there is a huge gap between the performances of two economies in terms of their world share. The export performance is based on the competitive advantage which is further based on differences in resource endowment.

To the best of our understanding there is no study available analyzing and comparing the composition and comparative advantage of manufacturing exports of India and China in terms of technology intensity for the period 1992-2016. Based on the above background the present study undertakes an analysis of composition and comparative advantage of India and China over the period 1992–2016 in the global market across four different technological categories of exports i.e. resource-based (RB), low technology (LT), medium technology (MT) and high technology (HT). The paper is organized as follows. Section 2 provides the data and research methodology used in this study. Section 3 presents the empirical results of the study and conclusion is presented in section 4.

Data and Methodology

The analysis is based on SITC-3 digit level data, classifying exports into four categories based on technological characteristics using Lall (2000)[1] classification. Data source is UN-COMTRADE and data is extracted from World Integrated Trade Solution (WITS) database. The analysis is made for the time period 1992 to 2016.

Composition: Composition of exports of India and China has been analyzed using Lall classification. Lall (1999) has categorized manufacturing exports in four headings i.e. resource-based (RB), low technology (LT), medium technology (MT) and high technology (HT), on the basis of resource base, labour-intensity, scale-intensity, differentiated and science-based manufactures. Further sub-categorization has been made within these four categories: resource based is further classified into two subcategories "agro based" and "others"; low tech is further classified into two subcategories "textile, garment and footwear" and "other products"; medium tech is further classified into three subcategories "automotive", "process" and "engineering" and high tech is classified into "electronic and electrical" and "other".

Revealed Comparative Advantage: Revealed comparative advantage index has been used as an indicator of country's export potential. It is assumed to "reveal" the comparative advantage of a country provided that the commodity pattern of trade reflects the inter-country differences in relative cost and non-price factors.

It is defined as a country's share of world exports of a commodity divided by the commodity's share in total world exports (Balassa 1965). The index formula is as follows:

$$RCA_{ij} = \frac{\left(\frac{X_{ij}}{X_{wj}}\right)}{\left(\frac{X_i}{X_w}\right)}$$

1 For detailed classification see Lall, S., 2000. 'The Technological structure and performance of developing country manufactured exports, 1985-98' Oxford development studies, 28(3), pp.364-366.

Where X_{ij} denotes export of product j from country i, X_{wj} denotes export of product j from the world w, X_i denotes the total exports of country i and X_w denotes the total world exports. This index compares the share of a sector in a country's total exports with the share of the same sector in world's total exports. A value of RCA greater than unity indicates that the country specializes in a product j whereas a value of less than unity implies that the country has a revealed comparative disadvantage in product j. First, we calculate the comparative advantage for all the products at SITC- 3 digit level, later the products are mapped to the different technological categories based on Lall (2000) classification.

Empirical Results

Composition of India's Exports: Table-1 depicts the composition of India's exports. Table-2 elaborates it further and provides a detailed analysis of the composition of India's exports in terms of technology intensity.

Table-1: Composition of India's Manufacturing Exports in Terms of Embodied Technology

Year	1992	1996	2000	2004	2008	2012	2016
Resource-based manufactures	33.94	31.48	34.42	37.13	45.29	42.92	35.08
Low technology manufactures	49.85	47.93	46.65	39.28	25.67	27.87	30.17
Medium technology manufactures	11.83	14.16	12.94	16.93	20.81	20.04	23.53
High technology manufactures	4.37	6.43	5.98	6.66	8.23	9.17	11.23

Source: Authors' calculation using WITS database

As can be seen from Table-1, India's exports are dominated by resource-based manufactures and low technology manufactures which together account for 83.80 percent of total manufactured exports in 1992 and 65.24 percent in 2016. The composition has changed overtime; the contribution of resource-based manufactures has marginally increased whereas the share of low technology manufactures has sharply decreased over time. The share of medium technology manufactures and high technology manufactures has more than doubled from 1992 to 2016, though they together contribute to only 34.76 percent of total manufactured exports in 2016.

Table-2: Composition of India's Manufacturing Exports in Terms of Embodied Technology in Detail

Year	1992	1996	2000	2004	2008	2012	2016
Resource-based manufactures: agro-based	3.75	4.85	3.07	2.97	3.58	3.57	4.12
Resource-based manufactures: other	30.19	26.64	31.35	34.16	41.72	39.35	30.95
Low technology manufactures: textile, garment and footwear	41.53	38.36	35.45	23.58	14.71	12.92	16.89
Low technology manufactures: other products	8.32	9.57	11.21	15.71	10.95	14.95	13.28

Year	1992	1996	2000	2004	2008	2012	2016
Medium technology manufactures: automotive	3.27	3.31	2.31	3.26	3.52	4.67	6.34
Medium technology manufactures: process	4.71	6.52	6.32	7.93	8.95	7.64	7.57
Medium technology manufactures: engineering	3.85	4.32	4.31	5.74	8.34	7.73	9.62
High technology manufactures: electronic and electrical	1.57	3.09	2.38	2.79	3.23	3.59	2.79
High technology manufactures: other	2.81	3.34	3.60	3.86	5.01	5.58	8.43

Source: Authors' calculation using WITS database.

Table-2 reveals that increase in the share of resource based manufacture has been due to the growth of other than agro-based products whereas a decrease in the share of low technology manufactures is due to decrease in the share of the sub-category "textile, garment and footwear". The share of all three sub-categories of medium technology manufactures has increased over the time, but the highest growth has observed in engineering goods. Increase in the share of high technology manufactures is mainly due to growth in other than "electronic and electrical" goods.

Composition of China's Exports: The composition of China's manufacturing exports by technological intensity is presented in Table-3. It can be seen in Table-3 that a sharp decline has taken place in the share of low technology manufactures from 59.38 percent in 1992 to 32.22 percent in 2016; the decline is observed in the share of resource-based manufactures from 12.05 percent in 1992 to 8.41 percent in 2016. Medium technology manufactures share has increased steadily over time from 18.16 percent in 1992 to 25.70 percent in 2016. Sharp rise has been observed in the share of high technology manufactures i.e. from 10.41 percent in 1992 to 33.67 percent in 2016.

Table-3: Composition of China's Manufacturing Exports in Terms of Embodied Technology

Year	1992	1996	2000	2004	2008	2012	2016
Resource-based manufactures	12.05	12.06	9.51	8.60	8.89	8.46	8.41
Low technology manufactures	59.38	51.11	44.89	34.44	32.10	32.37	32.22
Medium technology manufactures	18.16	20.15	21.28	22.72	25.46	25.05	25.70
High technology manufactures	10.41	16.68	24.32	34.23	33.55	34.12	33.67

Source: Authors' calculation using WITS database.

Table-4 elaborates it further and provides a detailed analysis of the composition of China's exports in terms of technology intensity. It evaluates the share of subcategories of four main categories of exports in china's manufacturing exports, during the period 1992 to 2016. It is observed that the decline in resource based

manufacture is majorly because of decline in agro based commodities whereas if we look at composition of low technology manufactures, the decline is majorly because of decline in the share of "textile, garment and footwear." The improvement in share of medium technology manufactures is because of growth in share of engineering goods. Within high technology manufactures highest growth has been observed in "electronic and electrical" products.

Table-4: Composition of China's Manufacturing Goods in Terms of Embodied Technology in Detail

Year	1992	1996	2000	2004	2008	2012	2016
Resource-based manufactures: agro-based	5.92	5.83	4.13	3.45	3.08	3.37	3.42
Resource-based manufactures: other	6.13	6.24	5.38	5.16	5.81	5.08	4.99
Low technology manufactures: textile, garment and footwear	41.79	33.50	27.76	19.91	15.98	15.78	15.67
Low technology manufactures: other products	17.59	17.61	17.13	14.53	16.12	16.60	16.55
Medium technology manufactures: automotive	1.08	1.04	1.65	1.84	2.61	2.56	2.72
Medium technology manufactures: process	5.48	6.47	6.08	6.00	6.14	5.54	5.33
Medium technology manufactures: engineering	11.59	12.63	13.55	14.87	16.72	16.95	17.64
High technology manufactures: electronic and electrical	7.55	14.07	21.68	31.65	30.45	30.69	30.56
High technology manufactures: other	2.86	2.61	2.63	2.59	3.10	3.43	3.12

Source: Authors' calculation using WITS database

Technology-wise Comparative Advantage of India: It can be seen through Table-5 that India's RCA in "resource-based manufactures: agro-based", "medium technology manufactures: process" has increased significantly whereas RCA significantly declined in "low technology manufactures: textile, garment and footwear", "resource-based manufactures: other than agro-based". "High technology manufactures: electronic and electrical"; "medium technology manufactures: automotive" and "medium technology manufactures: engineering" constitute a small part of total commodities having comparative advantage in both the years.

Table-5: India's RCA in 1992 And 2016 in Technology Terms

Label	1992		2016	
	No. of commodities having RCA>1	%	No. of commodities having RCA>1	%
Primary products	16	25	21	23.60
Resource-based manufactures: agro-based	4	6.25	9	10.11
Resource-based manufactures: other	12	18.75	14	15.73
Low technology manufactures: textile, garment and footwear	18	28.13	17	19.10
Low technology manufactures: other products	7	10.94	10	11.24
Medium technology manufactures: automotive	2	3.13	1	1.12
Medium technology manufactures: process	3	4.69	10	11.24
Medium technology manufactures: engineering	0	0.00	3	3.37
High technology manufactures: electronic and electrical	1	1.56	2	2.25
Unclassified products	1	1.56	2	2.25
Total	64	100	89	100

Source: Authors' calculation based on WITS Comtrade database

Technology wise Comparative Advantage of China: In this, we look at the comparative advantage of different product categories based on technology intensity between 1992 and 2016. RCA is calculated at SITC- 3 digit level and then the groups are mapped to different technological categories based on Lall (2000) classification.

It can be seen from the following Table-6 that comparative advantage in primary products and resource-based manufactures: agro-based has decreased over time whereas comparative advantage in "low technology manufactures: other than textile, garment, and footwear", "medium technology manufactures: process", "medium technology manufactures: engineering" and "high technology manufactures: electronic and electrical" has increased. In 2016, highest RCA is observed in "low technology manufactures: other than textile, garment and footwear".

Table-6: China's RCA in 1992 and 2016 in Technology Terms

Label	1992		2016	
	No. of commodities having RCA>1	%	No. of commodities having RCA>1	%
Primary products	27	29.35	5	5.15
Resource-based manufactures: agro-based	10	10.87	5	5.15
Resource-based manufactures: other	8	8.70	10	10.31
Low technology manufactures: textile, garment and footwear	17	18.48	18	18.56
Low technology manufactures: other products	14	15.22	20	20.62
Medium technology manufactures: automotive	1	1.09	1	1.03
Medium technology manufactures: process	4	4.35	8	8.25
Medium technology manufactures: engineering	4	4.35	19	19.59
High technology manufactures: electronic and electrical	7	7.61	11	11.34
Total	92	100	97	100

Source: Authors' calculation based on WITS Comtrade database

Conclusion

As it is widely believed that countries that specialize in the type of goods that rich countries export are likely to grow faster than the countries that specialize in other products. This paper finds that there is sharp decline in the share of low-technology manufactures followed by resource-based manufacturers in China. Whereas in India, export is dominated by resource based manufactures and low-technology manufactures. Sharp rise has been observed in the share of high-tech products in China's exports, India has also experienced rise in share of high-tech exports between 1992 and 2016 but the growth is more impressive in China than in India. It has been further found that both in China and India, within high-tech products, highest growth has been observed in "electronic and electrical" products.

Comparing the comparative advantage structure of India and China, it is observed that in high-technology manufactures, China possesses comparative advantage in eleven commodities, whereas India possesses only in two commodities in 2016. Similarly, within low-technology manufacture- other than textile, garment and footwear China possesses comparative advantage in twenty commodities whereas India possesses in ten commodities. In medium technology manufactures-engineering China possesses comparative advantage in nineteen commodities whereas India possesses comparative advantage in only three commodities. In other categories there is not much difference in the number of commodities having comparative advantage between two countries. Hence it can be concluded that high share of high-tech manufactures – electronic and electrical and medium technology manufacture – engineering in China is backed by high comparative advantage in this category. In India large share of "resource based manufactures-other than agro-based" and "low-technology manufactures-textile, garment & footwear" is backed by high comparative advantage in these categories.

Finally, the study concludes that China possesses comparative advantage in high-tech products while India lags behind in high-tech products. It may be the result of high processing trade and rapidly growing foreign direct investment in China (Gilboy, 2004; Branstetter and Lardy, 2006). In view of this it is suggested that India should focus on such policy changes which boosts investment in high and medium technology manufactures.

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Forecasting India's Total Exports: An Application of Univariate Arima Model

Smriti Prasad[1]
Manesh Choubey[2]

Abstract

The present study is an attempt to forecast the total export (at constant 2010 US $) of India for twenty years by applying relevant univariate time series ARIMA model. The data was collected from 1960 to 2016 using World Bank National Accounts data, and OECD National Accounts data files. Augmented Dickey Fuller (ADF) test and Phillip-Perron (PP) test has been used to test stationarity of the series. Several possible ARIMA models has been run with reference to the fitted autocorrelation function (ACF) and partial autocorrelation function (PACF) and relevant model, that is in this case ARIMA (0, 1, 3) has been selected using minimum Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) and forecast has been carried out together with upper and lower 95, 90, 80 percent confidence interval from year 2017 to 2036. The residual ACF and PACF have been used for diagnostic check of the forecast. The forecast reveals that the future export will be rising in next twenty years.

Keywords: Forecasting, Time-series Modelling, ARIMA, Total Export, India

Introduction

India is a developing country and it has a strong affinity to be counted amongst developed countries like Norway, Australia, Switzerland etc. In general, by economic development we mean economic growth tandem with well being of the society. So, in order to have economic development of a country economic growth is necessary. There are various theories related to economic growth. According to classical economist like Adam Smith free trade, competition and private property right can lead to economic growth and hence economic development. Even David Ricardo argued that free trade can lead to specialisation in production which will increase in national income. It is seen that from the time of classical school of thought export has been referred to as engine of growth. By export we mean selling goods and services which is produced in home country and is sold

1 Ph.D Scholar, Department of Economics, Sikkim University, Tadong, Gangtok and can be reached at smritiprasad2@gmail.com

2 Professor, Department of Economics, Sikkim University Tadong, Gangtok and can be reached at mchoubey@cus.ac.in

to foreign countries. Neo classical school of thought also had a similar opinion regarding export to promote economic growth. During the period of 1970-85 the four East Asian Tigers namely Hong Kong, Tiwan, Republic of Korea and Singapore became very popular by applying export led growth hypothesis (ELGH) and achieving sustained and high economic growth rate (World Bank, 1993). Even today there is lots of literature that support ELGH. Dash (2009), Ozturk and Acaravci (2010), Chandra (2003), Doraisami (1996) Kaushik and Klein (2008) are some of the recent studies that support ELGH. So, we can say that export is one of the important factors that lead to economic growth of a country. Increase in export leads to proper capacity utilisation, economies of scale, technological progress, creates employment, increases labour productivity, proper allocation of scare resources; relax the current account pressure for foreign capital goods, increases total factor productivity (World Bank,1993). On the other hand decrease in export leads to negative consequences. Even risk and uncertainties in investment arise due to fluctuation in export of a country. If the future amount of export of a country is forecasted then this risk and uncertainty will be reduced and proper economic decisions can be taken and to forecast future export is the aim of this work.

The rest of the paper is organised as follows. The next section deals with a brief review of literature related to forecasting through time series ARIMA model. It is followed by the data and methodology. The subsequent section gives the results and discussions of the forecasting which is done using the relevant ARIMA model and diagnostic check and the final section gives the conclusion.

Literature Review

There are several research works which uses ARIMA models on different time series data in order to forecast future values of the variable. A review of such literature is given as follows.

Kumar & Anand (2014), used ARIMA (2, 1, 0) in order to forecast sugarcane production in India for a period of five years using a time series data from 1951 to 2012 and predicted that there will be an overall increase in production by 3% year on year.

Paul *et al.,* (2013), used seasonal autoregressive integrated moving average (SARIMA) in order to forecast meat and meat products export using a monthly data from November 1992 to December 2011. The forecast shows that there is significant increase in trend of meat and meat products export from India.

Emang *et al.,* (2010), tried to forecast for a period of six quarters using quarterly data from March 1982 to June 2009 on export demand of moulding and chipboard volume (m^3) from Peninsular Malaysia. In order to forecast export demand of moulding and chipboard they used seasonal ARIMA model, ARAR algorithms model and Holt-Winters Seasonal model. Out of these models seasonal ARIMA (1, 0, 4) X (0, 0, 1, 0) was chosen as the best model for forecasting because it had lowest forecast errors such as RMSE, MAPE, MAE. The forecast shows that the volume of export will exceed 150000 m^3.

Rajaraman & Datta (2003), using the Index of Agricultural Production (IAP) tried to forecast through ARIMA model, the agricultural outcomes for five states,

namely, Punjab, Karnataka, Andhra Pradesh and Uttar Pradesh. They used data from 1950-51 to 2000-2001 for this analysis.

Rafiq, Yun & Ali (2016) tried to forecast, using data ranging from the year 1972 to 2015, the trend analysis of trade balance of Pakistan. The best fit model for forecasting was ARIMA (1, 1, 1). The forecast revealed that future will be chronic.

Kumar & Gupta (2010), using data from year 1974-75 to 2007-08 tried to forecast Punjab's industrial goods export for a decade with the help of ARIMA (2,1,1) model. The results reveal that as compared to past three decade the growth in export will decline.

Iqbal, Hussain & Mahmood (2014), tried to forecast trade behaviour of major food crops such as, cotton lint, rice milled and sugar refined, in four leading SAARC countries namely, Bangladesh, India, Pakistan and Sri lanka for seven years (2011-2017) using time series ARIMA model. 40 years data (1970-2010) for India, Pakistan and Sri lanka was collected and 38 years (1972-2010) data for Bangladesh from Food and Agriculture Organization (FAO). The results reveal that India's future export of cotton lint, rice milled and sugar refined remains optimum while Pakistan holds second rank in export of these products and in case of Bangladesh and Sri lanka export of above mentioned products in future will remain low.

Data and Methodology

Annual data on exports of goods and services (constant 2010 US$) from 1960 to 2016 has been collected from 'World Bank National Accounts data, and OECD National Accounts data files[3]. "Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments."(World Bank).This data has been converted to million US $ form for convenience in calculation.

In order to forecast future exports a time series analysis needs to be done. The variable export depends on its past or lagged values of itself and a stochastic error term. Hence univariate ARIMA modelling has been used. One important point to be noted is that before executing any time series analysis the time series data is supposed to be stationary. There are different test for stationarity diagnosis, like Augmented Dickey Fuller Test, Dickey Fuller Test and Phillip-Perron test. If data is stationary then we can proceed, on the other hand if it is not, then we difference it and make stationary. ARMA model of the differenced series is called ARIMA model. Model specification is given below.

In an ARIMA model we have p= order of autoregressive terms, d= order of integration and q= order of moving average terms. This model is written as ARIMA (p, d, q) model.

3 http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators#.

If y_t is export at time t, then p^{th} order Autoregressive process can be written as follows:

$$(Y_t - \delta) = \alpha_1(Y_{t-1} - \delta) + \alpha_2(Y_{t-2} - \delta) \dots\dots + \alpha_p(Y_{t-p} - \delta) + u_t \dots\dots\dots\dots\dots (i)$$

Where, δ= mean of Y

u_t= white noise error term

Now, given Y_t, a q^{th} order Moving Average process can be written as follows:

$$Y_t = \mu + \beta_0 u_t + \beta_1 u_{t-1} + \dots . \dots + \beta_q u_{t-q} \dots\dots\dots\dots (ii)$$

Where, μ= constant

u = white noise error term

Now, ARIMA (p, d, q), that is ARMA (p, q) of I(d) (differenced 'd' times) series is written as follows:

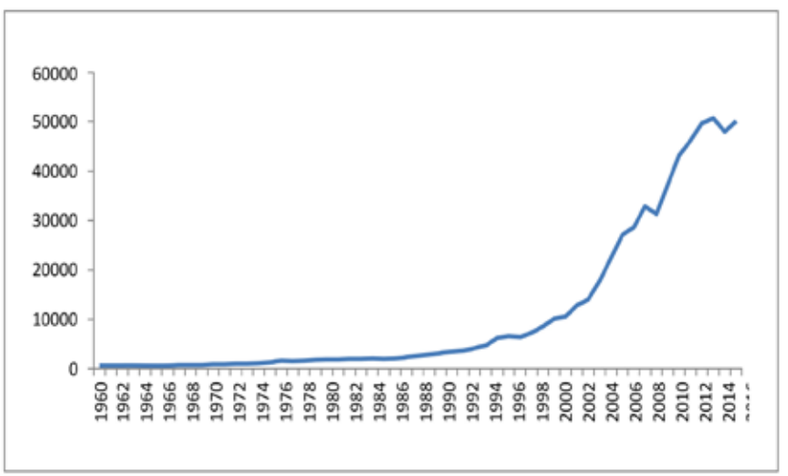
$$Y_t = \theta + \alpha_1 Y_{t-1} + \alpha_2 Y_{t-2} + \cdots . + \alpha_p Y_{t-p} + \beta_0 u_t + \beta_1 u_{t-1} + \cdots + \beta_q u_{t-q} \dots (iii)$$

Where, θ= Constant term.

Results and Discussions

Figure-1 shows a time series plot of Indian export from 1960 to 2016. It is clearly visible from this figure that up to the year 1990 there has been very slow growth in exports but after that the exports increased rapidly up to 2016. The descriptive statistics shows that the range of the variable is 50169 million US $ in which minimum value is 512 million US $ and maximum value is 50682 million US $. The mean value is 11011.86 million US $, Standard deviation is 15672.284 million US $, Variance is 245620478.4, Skewness is 1.573, kurtosis is 1.088 and co-efficient of variation is 142.32 percent. In order to forecast the future values of export, ARIMA model has been used.

Figure-1: Exports of Goods and Services (constant 2010 US million$)



Source: 'World Bank national accounts data, and OECD National Accounts data files

Test for Stationarity

The first step in the process of forecasting is to check whether the data on Indian exports is stationary or not. From Figure-1 it is clearly visible that there is an upward trend in the data. Apart from this, Augmented Dickey – Fuller (ADF) Unit-root test and Phillip-Perron (PP) Unit-root test has been conducted to check whether the data is stationary or not. From the Phillip-Perron Unit –root test it is observed that p-value for $(t) = 0.99$ and same for Augmented Dickey-Fuller test is 0.97. This shows that our data is non-stationary. To make it stationary the data is differenced once. Now, again the tests for stationarity is executed and ADF unit-root test shows that p-value for $(t) = 0.06065$ and PP unit-root test shows that p-value for $(t) = 0.01$. So we can conclude that after differencing the series once, it has become stationary so now we can proceed with this data.

Identification of ARIMA Model

The next step in the process of forecasting is to determine the value of autoregressive term (p) and moving average term (q).This can be done with the help of Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF). Figure-2 given below show the plot of correlogram (ACF) of the differenced Indian export data up to lag 17. From this correlogram in Figure-2 it is seen that there are some lags which exceed the significant limits but after lag 7 ACF tail off to zero. ACF helps us find the order of moving average (q).

Figure-2: ACF of the first differenced series

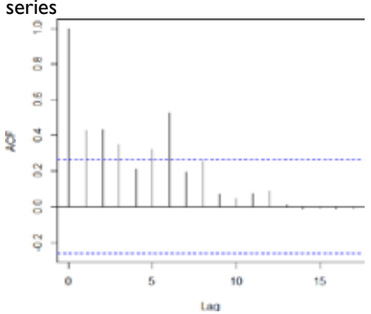
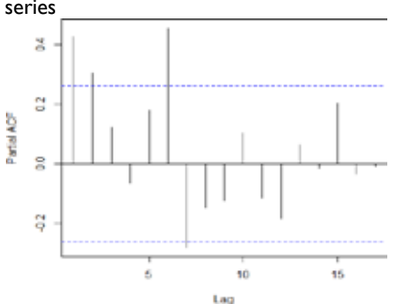


Figure-3: PACF of the first differenced series



Again Figure-3 shows the plot of partial correlogram (PACF) upto seventeen lags which helps to find the order of autoregressive terms (p). From this partial correlogram in figure-3 it is observed that PACF at three lags exceed the significance limits and after lag six the PACF hovers around zero.

Estimation and Diagnostic Check

With these correlograms we make several possible combination of order of autoregressive term (p) and moving average term (q) and run the ARIMA model. The model with lowest AIC (Akaike Information Criterion) and BIC (Bayesian Information Criterion) values will be chosen for forecasting. The Table-1 given

below shows different ARIMA models, its parameters, AIC, BIC, Root Mean Square Error (RMSE) and Maximum absolute percentage error (MAPE).

Table-1: Parameters, AIC, BIC, RMSE, MAPE of the fitted ARIMA model

ARIMA Models	Constant	AR 1	AR 2	AR3	MA1	MA2	MA3	AIC	BIC	RMSE	MAPE
ARIMA (1,1,0)	890.1658	0.4268						984.9	14.72	1417.18	18.746
ARIMA (1,1,1)	834.9033	0.905			0.6548			980.28	14.8	1423.941	16.274
ARIMA (0,1,1)	893.2755				0.293			989.2	14.74	1423.089	20.09
ARIMA (2,1,0)	833.7739	0.2734	0.3297					981.26	14.8	1417.754	15.686
ARIMA (2,1,1)	602.823	0.8501	0.8501		-0.615			982.24	14.89	1431.612	15.712
ARIMA (2,2,1)	52.0478	0.01901	0.1778		-1			964.53	14.92	1453.102	10.045
ARIMA (2,2,2)	52.022	0.195	0.1769		-1.005	0.005		966.53	15.97	1525.111	8.822
ARIMA (2,1,2)	908.15	0.5962	-0.394		-0.323	1		973.53	14.65	1222.211	16.716
ARIMA (0,1,2)	844.3877				0.1291	0.7229		976.37	14.67	1326.35	14.348
ARIMA (1,1,2)	859.8392	0.2712			-0.049	0.7104		976.59	14.75	1335.076	13.865
ARIMA (1,2,0)	8.6374	-0.5373						969.87	14.95	1583.768	9.502
ARIMA (0,2,1)	37.42				-0.789			963.12	14.82	1482.194	8.739
ARIMA (0,2,2)	55.952				0.8267	-0.173		964.45	14.85	1446.042	7.797
ARIMA (0,1,3)	913.93				0.2849	0.8441	0.562	937.52	14.66	1276.027	14.006
ARIMA (1,1,3)	915.3402	0.0298			0.2668	0.8467	0.5469	975.5	14.8	1315.348	13.697
ARIMA (1,2,3)	50.611	0.1416			-1.002	0.6922	-0.69	959.51	15.01	1462.668	7.717
ARIMA (3,1,3)	788.327	-0.266	-0.122	0.579	-0.618	-1.02	-0.05	969.26	14.75	1241.561	18.812

Source: Author's estimate

From the Table-1 it is observed that ARIMA (0, 1, 3) is the suitable model for forecasting because it satisfies the criteria of minimum AIC and BIC. ARIMA (0, 1, 3) can be also written as ARMA (0, 3) model of first order differenced time series data. In ARMA (0, 3) there is zero auto regressive term (p= 0) and three moving average term (q= 3). So, basically ARMA (0, 3) model is a Moving Average (MA) model of order three of the series and it can be written as follows.

$$Y_t = \mu + \beta_0 u_t + \beta_1 u_{t-1} + \beta_2 u_{t-2} + \beta_3 u_{t-3} \dots \dots \dots \dots \dots (iv)$$

Where μ (913.93) is a constant and u is the white noise stochastic error term. Y_t is our dependent variable that is total export. $\beta_0, \beta_1, \beta_2 and\ \beta_3$ are the parameters to be estimated. Here Y at time t is equal to a constant plus a moving average of the current and past error terms.

Forecasting Using ARIMA (0, 1, 3)

Now using this model, Table-2 gives the forecast values of total Indian export for the upcoming twenty years and its 95% Lower Confidence Limit (LCL) and 95% Upper Confidence Limit (UCL), 90% LCL and UCL and 80% LCL and UCL.

Table-2: Twenty year forecast of total export along with upper and lower 95, 90, 80 percent confidence interval

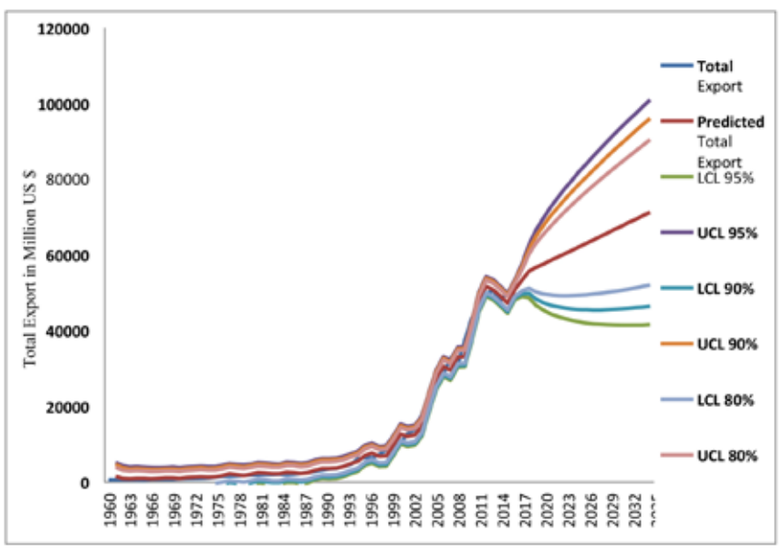
Year	Predicted Total Export	LCL (95%)	UCL (95%)	LCL (90%)	UCL (90%)	LCL (80%)	UCL (80%)
2017	50825.38	48188.17	53462.59	48624.44	53026.31	49119.44	52531.31
2018	53363.99	49055.38	57672.59	49768.15	56959.82	50576.87	56151.11

Year	Predicted Total Export	LCL (95%)	UCL (95%)	LCL (90%)	UCL (90%)	LCL (80%)	UCL (80%)
2019	55814.35	48789.4	62839.29	49951.53	61677.16	51270.1	60358.59
2020	56728.34	46817.27	66639.4	48456.85	64999.82	50317.14	63139.53
2021	57642.32	45510.74	69773.9	47517.66	67766.99	49794.74	65489.91
2022	58556.31	44555.38	72557.25	46871.54	70241.09	49499.49	67613.14
2023	59470.3	43814.79	75125.82	46404.66	72535.94	49343.18	69597.43
2024	60384.29	43239.55	77529.03	46075.79	74692.79	49293.83	71474.75
2025	61298.28	42776.21	79820.35	45840.3	76756.26	49316.86	73279.7
2026	62212.27	42413.64	82010.9	45688.9	78735.63	49405.07	75019.46
2027	63126.26	42124.57	84127.94	45598.86	80653.66	49540.84	76711.67
2028	64040.24	41901.04	86179.44	45563.51	82516.98	49719	78361.49
2029	64954.23	41735.44	88173.02	45576.5	84331.96	49934.63	79973.83
2030	65868.22	41611.61	90124.84	45624.35	86112.09	50177.28	81559.16
2031	66782.21	41539.09	92025.33	45715.03	87849.39	50453.12	83111.3
2032	67696.2	41492.01	93900.39	45826.94	89565.45	50745.42	84646.97
2033	68610.19	41491.77	95728.61	45977.94	91242.43	51068.02	86152.35
2034	69524.18	41507.51	97540.85	46142.28	92906.07	51400.96	87647.39
2035	70438.16	41564.11	99312.22	46340.72	94535.61	51760.33	89116
2036	71352.15	41633.71	101070.6	46550	96154.3	52128.1	90576.2

Source: Authors estimate

A graphical representation of this Table is given below in Figure-4. It is observed that India's total export will be rising in next twenty years. In this period of twenty years total export increases from 50825.38 million US $ to 71352.15 million US $ that is an increase of 20,526.77 million US $

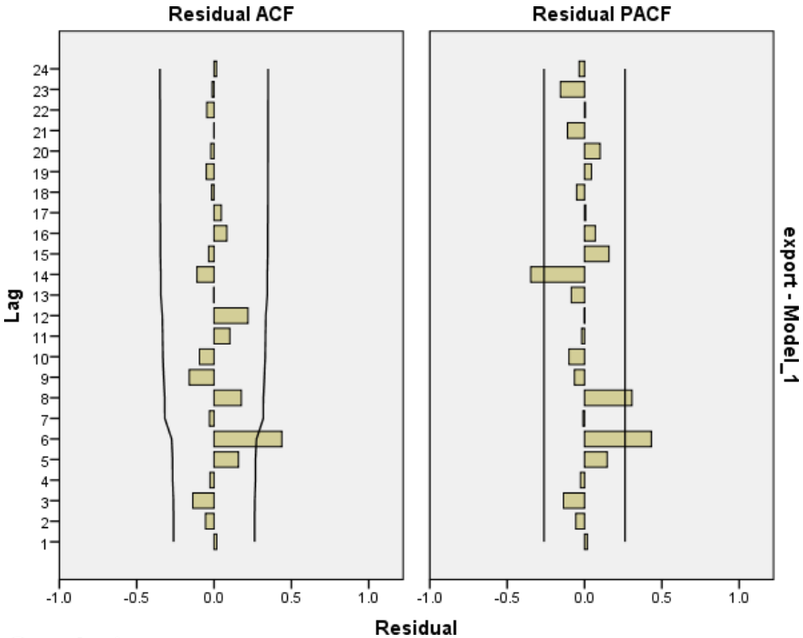
Figure-4: Twenty year forecast of total export along with upper and lower 95, 90, 80 percent confidence interval



Diagnostic Check

Figure-5 given below shows the plot of ACF and PACF of the residual from lag one to twenty-four. From the plots it is observed that ACF and PACF at lag 6 just crosses the significance limit but at all other lags ACF and PACF lies within significance limit and hovers around zero. So, it can be concluded that our selected model is a perfect fit for forecasting of total exports from India for next twenty years.

Figure-5: ACF and PACF of residual series



Conclusion

Being listed amongst developed countries is prime motive of all the developing countries and so it's true for India also. Export is an important factor that promotes economic growth. So, any fluctuation in exports increases the risk and uncertainties in investment and it hampers the process of development. This paper has tried to forecast the total export of India for twenty years. Data on export (at constant 2010 US $) has been collected from 'World Bank National Accounts data, and OECD National Accounts data files from 1960 to 2016 and is converted to million US $ form. For testing stationarity of the time series data ADF and PP test for stationarity has been used. ACF and PACF plots have been used to determine the possible values of 'p', and 'q' that is autoregressive and moving average terms respectively. Various possible ARIMA models were executed and model with lowest AIC and BIC(ARIMA (0, 1, 3)) was chosen for forecasting twenty years (2017-2036) export. Forecast was carried out together with upper and lower 95, 90 and 80 percent confidence interval. ACF and PACF of the residual were plotted

and it was diagnosed that the model is perfect fit for forecast. The forecast reveals that in coming twenty years exports will increase.

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FDI and Exports in India: Cointegration and Causality Analysis

Bipul Kumar Das*

Abstract

There has been a debate in the literature on how host country's exports respond to inward FDI. A crucial issue in this debate is whether FDI is a means of stimulating export performance of the host countries. The theories and the literature related to FDI-exports linkages suggest that FDI impacts host countries' growth and development in general through its direct, indirect and spill-over effects and exports in particular. Moreover, the literature on the topic provides both significant and insignificant effects of FDI on host countries' exports across countries. The dynamics of the influence of FDI on exports is far more complex in case of India. Against this complexity, the aim of the study is to specifically re-examine the impact of FDI inflows on exports in India with an extended period from 1970-2015.

Keywords: FDI, Exports, India, Cointegration

Introduction

There has been a long debate in the literature on how host country's exports respond to inward FDI. A crucial issue in this debate is whether FDI is a means of stimulating export performance of the host countries. FDI is widely regarded as an important resource for accelerating industrial development of a developing country since it is supposed to bring a bundle of capital, technology, skills and foreign market access (Kumar, 2005; Nagraj, 2003; DIPP); and it helps in raising productivity and uplift economic growth. FDI has also been playing an important role in promoting the exports of many South East Asian countries and countries from other region *viz.*, Latin American and Caribbean countries (Sharma, 2000; Pantin, 1990). Moreover, the direct and indirect effects of FDI provide a starting-point that FDI is likely to have a positive influence on the host country's export performance[1] (Zhang and Song; 2000). Given these advantages of FDI on host

1 Direct effects refer to exports by foreign affiliates themselves from host countries while the indirect effects, according to Caves (1996) and Helleiner (1989) as cited by Zhang and Song (2000), means the impact of FDI on export activities of local firms.

* Lecturer, Department of Commerce, Darrang College, Tezpur, Assam and can be reached at bipuldas04sep@gmail.com

countries production and exports, the developing countries have significantly eased their retractions towards FDI since the early 1980s and the trend became wider in the 1990s (Barrell and Pain, 1996). Some commonly observed growth impact of FDI inflows have been well documented in recent studies (De Mello, 1996; Borensztein, *et al.*, 1998, Balasubramanyam, 1999).

Apart from this hypothesis of FDI's positive impact on host country's production and exports, the debate continues with respect to various countries and regions of the world in different time periods. Inward FDI positively affected export in Cameroon over the period 1980-2003 (Njong and Raymond, 2001). In line with this, a significant and positive relationship between exports and FDI is found for 49 developing countries over the period 1970-2004 using a sample of panel observations (Majeed and Ahmed, 2007). Similarly, AbuAl-Foul and Soliman (2008) using 29 years data spanning 1975-2003 for four MENA countries and applying gravity equation found positive effect of FDI on both merchandise and manufacturing exports. Against these studies, Pain and Wakelin (1998) found that there is no systematic relationship between FDI and exports across countries. They derive this conclusion from the empirical evidences of 11 OECD countries from 1971 to 1992 and used panel data on manufacturing exports.

The debate continues in causal relationship between FDI and exports also. The study of Penélope Pacheco-López (2005) suggests that FDI inflows encourage exports and also performance of exports stimulates more FDI inflows. Moreover, Kutan and Vuksic (2007) in their empirical study estimated the potential effects of FDI inflows in 12 Central and Eastern European economies for the period 1996-2004. Their result suggests that the capital inflows cannot be expected to have significant and positive effect on local companies in comparison to investment by some MNCs. Against these studies; Asli and Ucal (2003) investigated the causality between export, FDI and domestic performance of Turkey by using VAR methodology. Their results are in line with the export led growth strategy but they have not found significant positive spill-overs from FDI. Furthermore, the findings do not suggest a kind of FDI led export growth linkage, hence only with more foreign capital investments flowing to Turkey FDI may have a powerful effect over output.

In the Asian context, Athukorala and Menon (1996) examined the role of MNE participation towards export-led industrialization in developing (host) countries. They found that the spread effects of FDI through backward linkage and direct technology transfer seemed limited, but increasing. Moreover, the evidence suggests that high import-intensity and limited linkages were not intrinsic features of FDI-led export expansion. Similar to this study, Xuan and Xing (2008) in their empirical analysis showed that FDI has substantially enhanced the Vietnam's exports to its source countries.

In the Indian context, Prasanna (2010) tried to explore the impact of FDI on export performance in India. Collecting data from the Reserve Bank of India his empirical finding was that inward FDI has significantly contributed to better the export performance of India and the Indian manufacturing has not contributed significantly in enhancing the export performance. But Sharma (2000) found

FDI's contribution to India's export growth is insignificant. For this study, he used annual data for 1970-98 and investigated the issue in a simultaneous equation framework. The results suggest that the demand for Indian exports increased when its export prices fall in relation with the world prices.

Thus, FDI impacts host countries' growth and development in general through its direct, indirect and spill-over effects and exports in particular. Moreover, the literature on the topic provides both significant and insignificant effects of FDI on host countries' exports across countries. The dynamics of the influence of FDI on exports is far more complex in case of India because of the following features of the economy: India has a growing developing market economy, relatively higher tariff structure, relying significantly on agricultural activities for its growth, and infrastructure bottlenecks. Against this complexity of Indian economy, the aim of the study is to specifically re-examine the impact of FDI inflows on exports in India with an extended period from 1970-2015.

The rest of the paper has been organized in the following way: theoretical background in the second section is followed by data source and methodology in the third section. Fourth section deals with the Results and discussion of the study and the paper ends with the conclusion in the fifth section.

Theoretical Background

The theory of multinational enterprise explains the reasons of a firm undertaking FDI and thus become a multinational enterprise (MNE). The theory also indicates that positive exports from the host country can be expected when the factor intensities of home and host countries are different (Kutan and Vuksic, 2007). Based on this, the theoretical explanation of the relationship between FDI and exports have been described through three theories *viz.*, product cycle theory, flying gees paradigm and new growth theory as studied by Njong (2008).

The product cycle theory suggests that a cycle emerges where a product is produced by a parent firm (or a developed country) then its foreign subsidiaries and then anywhere in the world where the cost of production of the product is the lowest (Vernon, 1966, 1971; Wells, 1968, 1969). The flying gees paradigm of Kaname Akamatsu provides somewhat different view. It was a view of Japanese scholars upon the technological development in South-East Asia viewing Japan as the leader. It is often claimed that the flying gees paradigm of comparative advantage has accurately depicted the catching-up process of regional hierarchy consisting Japan, the first-tier of Newly Industrialized Economies (NIEs), the second tier of NIEs, China and other countries in the region (Kasahara, 2004). Moreover, the new growth theory provides the theoretical basis for the positive relationship between international trade and long run economic growth and development. The theory suggests that lowering trade barriers would speed up the rate of economic growth by allowing the developing countries to absorb the advanced country's technology at a faster rate, raising the benefits from research and development, encouraging economies of scale; reducing price distortions which leads to more efficient use of domestic resources; encouraging specialization and efficiency in the production of intermediate products, and rapid introduction of new goods and services (Salvator, 2012).

Data Source and Methodology

Annual data from 1970 to 2015 for aggregate exports and total FDI inflows to India are used for the study. These data are collected from United Nations Conference on Trade and Development (UNCTAD) that are used for international best practices. The values of the variables in current prices are converted into constant prices taking 2005 as the base year. This is done to avoid the effects of prices and biases. Moreover, the data are transformed into the logarithmic (natural logarithm) values so that changes in the variables represent the relative changes or percentage changes after multiplication by 100 (Gujarati, 2011).

The first step in multivariate time series is to determine if the series under consideration are stationary or non-stationary. To check the stationarity of the time series, two popular unit root tests *viz.*, Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) tests have been used. Since we have found the two time series under consideration are non-stationary at level but stationary at first difference, we applied Engle-Granger (1987) residual based cointegration test to examine long run relationship. Then to examine the short run relationship and Granger causality between the two time series, Error Correction Mechanism (ECM) is used.

We have two time series, one is exports and the other is FDI:

$$X_t = \alpha_1 + \beta_1 T + \rho_1 X_{t-1} + u_{1t} \quad \text{.....(1)}$$

$$F_t = \alpha_2 + \beta_2 T + \rho_2 F_{t-1} + u_{2t} \quad \text{.....(2)}$$

Where, X is exports and F stands for FDI. The constant and trend terms are shown through α and T respectively and u_{1t} and u_{2t} represents the random disturbance terms for the two time series. For ADF test, the following regressions are estimated:

$$\Delta X_t = \alpha_1 + \beta_1 T + \delta_1 X_{t-1} + \theta_1 i \sum \Delta X_{t-i} + \in_{1t} \quad \text{.....(3)}$$

$$\Delta F_t = \alpha_2 + \beta_2 T + \delta_2 F_{t-1} + \theta_2 i \sum \Delta F_{t-i} + \in_{2t} \quad \text{.....(4)}$$

In equation (3) and (4), Δ represents one-time differenced term; θ represents white noise error term. The null hypothesis is that $\delta_1=\delta_2=0$, *i.e.,* both the series have unit root. ADF test is a better test than the DF test because it takes into account the presence of the correlation between the error terms by adjusting one time differenced terms of the dependent variable (Ali, 2013).

The lag length of ADF is selected on the basis of Akaike Information Criteria (AIC) taking maximum lags equal to the cube root of the number of observations. AIC provides a superior lag length in case of small sample in the manners that it minimizes the chance of under estimation while maximizing the chance of true lag length (Khim and Liew, 2004). Further, we followed a step by step procedure to include whether both trend and intercept or only intercept or no trend and no intercept in the concerned time series. First, we check both trend and intercept, if the trend is insignificant, then we check it with only intercept. If again intercept is found insignificant, then we check the unit root test without intercept and trend.

The Phillips-Perron (PP) procedure considers the following regression equation:

$$\Delta X_t = \alpha_1 + \beta_1 T + \pi_1 X_{t-1} + u_{1t} \quad \text{.....(5)}$$

$$\Delta F_t = \alpha_2 + \beta_2 T + \pi_2 F_{t-1} + u_{2t} \quad \text{.....(6)}$$

Where u is the error term and may be heteroskedastic. 'T' is the trend term. Under the null hypothesis that $\pi_1=\pi_2=0$, the PP statistics gives the same asymptotic distribution as ADF statistics. The advantages of PP over ADF are, it is robust to general forms of heteroskedasticity in the error term and the user does not have to specify the lag length to test the regression (Zivot, 2006).

Given these two non-stationary time series and stationary at first difference as suggested by the ADF and PP unit root tests, we applied cointegration test to examine the long run relationship between these two time series. That is, in the long run, whether these two time series move together or not. According to Engle-Granger procedure, if the linear combination of these two non-stationary time series gives us a stationary series then there will be a long run relationship between them. The basic equation for the cointegration test is

$$X_t = \alpha_{1t} + \alpha_2 F_t + u_t \quad \text{.....(7)}$$

$$i.e., u_t = X_t - \alpha_{1t} - \alpha_2 F_t. \quad \text{.....(8)}$$

Where X and F imply exports and FDI respectively; α is the intercept term and u is the random disturbance term; t implies the time period. According to the Engle-Granger approach, u_t in equation (8) should be stationary at level if there is cointegration relationship between X and F.

After examining cointegration, the next step is to examine the short run relationship and causality between the variables. To examine the short run relationship and causality, ECM is used. Taking into account the Exports-FDI series, the following basic equation is estimated to examine the long run equilibrium relationship and short run causality together:

$$\Delta X_t = \beta_1 + \beta_2 \Delta F_t + \beta_3 u_{t-1} + \varepsilon_t \quad \text{.....(9)}$$

Where Δ is the first difference operator, ε is the random error term and u_{t-1} is the one period lagged value represents the cointegrating equation (*i.e.*, $u_{t-1} = X_{t-1} - \alpha_1 - \alpha_2 F_{t-1}$). Change in exports (ΔX) depends on change in FDI (ΔF) and equilibrium error term. According to EG approach, β_3 in equation (9) should be negative and significant if there is causal relationship between the two in the long run.

Results and Discussion

Unit Root Test

To check the stationarity of the series, two unit root test methods have been used – Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) Test. The null hypothesis for both the variables is that the series has a unit root for both the unit root test method. If the series has unit root then the series is non-stationary, and if the series has no unit root then the series is stationary. The guidelines for rejection of the null hypotheses are that if the estimated value of the variable is greater than the critical value or if the 'p' value is less than 5 per cent (*i.e.* 0.05), we can reject the null hypothesis. Here, for ADF test MacKinnon one sided 'p'-values and for PP test MacKinnon (1996) one-sided 'p'-values are used for the rejection of null hypothesis.

The sample has been divided into three parts – one part named as sub-sample I (which represents pre-liberalization period, *i.e.* 1970-1991), second part named as sub-sample II (which represents post-liberalization period, *i.e.*, 1992-2015) and the last part named as full-sample covering the period 1970-2015.

Table-1: Unit Root Test Results

Variable	ADF Level	ADF 1st Diff.	Phillips-Perron Level	Phillips-Perron 1st Diff.	Decision
Sub-sample I (1970-1991)					
Exports	-1.65	-3.32	-1.55	-3.42	I(1)
	(0.44)	(0.03*)	(0.49)	(0.02*)	
FDI	-3.50	-3.95	-2.94	-5.90	I(1)
	(0.07)	(0.03*)	(0.17)	(0.00*)	
Sub-sample II (1992-2015)					
Exports	-0.81	-3.56	-0.81	-3.56	I(1)
	(0.80)	(0.02*)	(0.80)	(0.02*)	
FDI	-2.38	-3.94	-2.31	-3.94	I(1)
	(0.15)	(0.01*)	(0.18)	(0.01*)	
Full Sample (1970-2015)					
Exports	-2.87	-5.14	-2.00	-5.33	I(1)
	(0.18)	(0.00*)	(0.58)	(0.00*)	
FDI	-3.29	-5.62	-3.13	-11.99	I(1)
	(0.08)	(0.00*)	(0.11)	(0.00*)	

Note:

1. Figures in the brackets ( ) indicates (in ADF Test) the Mackinnon one sided 'p'-values for rejection of null hypothesis.

2. Figures in the brackets ( ) indicate (in PP Test) MacKinnon (1996) one-sided 'p'-values for rejection of null hypothesis.

3. * represents rejection of null hypothesis at 0.05 per cent or less level of significance.

From Table-1, it is obvious that the 'p' values for both the series in all samples are greater than 5 per cent at level and the estimated values are also less than the critical values. This implies that we cannot reject the series at level. Therefore all the series have unit root at level *i.e.*, non-stationary at level. When we take first difference of all the series, then the results show that the 'p' values are less than 5 per cent and the estimated values are also greater than the critical values indicating rejection of null hypothesis. The results are same for the ADF and PP unit root tests. Thus, we can declare that all the time series are non-stationary at level but stationary at first difference, thus all the time series are integrated of order one *i.e.*, I(1).

Cointegration

To examine the long run relationship under Engle-Granger (1987) residual based cointegration procedure; we derive residuals by regressing FDI inflows on exports and then check the stationarity of the derived residuals. We applied ADF unit root test to check the stationarity of the derived residuals and the ADF test statistics is compared with the critical values given by Engle and Granger (1987) as cited by Mamun and Nath (2005). Because residuals are generated from a regression equation, we can not use the standard ADF critical values. Moreover, the lag length is chosen on the basis of AIC's automatic lag selection procedure taking maximum lags equal to the cube root of the number of observations (Mamun and Nath, 2005). The cointegration results are presented in Table-2.

Table-2: Engle-Granger Cointegration Results

Sample	Long Run Equation	ADF test statistics for the Residuals (ECT)	Lag Length
Sub-sample I (1970-1991)	$X_t = 6.44 + 0.31F + u_t$ (0.00) (0.05)	-1.64	I
Sub-sample II (1992-2015)	$X_t = 5.66 + 0.62F + u_t$ (0.00) (0.00)	-2.49	I
Full Sample (1970-2015)	$X_t = 6.57 + 0.52F + u_t$ (0.00) (0.00)	--3.64*	I

Note:

* indicates significant levels at 5 per cent.
Figures within the brackets show the probability values.
The Engle-Granger Critical value at 5 per cent level of significance is (–3.37).
Lag length has been chosen on the basis of AIC's automatic lag selection procedure taking maximum lags equal to the cube root of the number of observations.

From Table-2 it is seen that there is no cointegration relationship between exports and FDI when we checked it separately for pre and post liberalization period. Because the ADF test statistics of residuals of the two sub-samples are smaller than the critical values given by Engle and Granger at 5 per cent level of significance. While the ADF test statistics of the residuals for the full sample is greater than the Engle-Granger critical values at 5 per cent level of significance. Therefore, we found a cointegrating relationship between the two for the full sample. Therefore, there is long run relationship between exports and FDI in India during 1970 to 2015.

Error Correction Mechanism (ECM)

ECM for Full Sample (1970-2015)

Since we found a long run relationship between exports and FDI for the period 1970-2015, we can examine the short run relationship and Granger causality using error correction mechanism (ECM)[2]. Before presenting the ECM results, the residual diagnostics results have been shown in Table-3 which shows the validity of the regression equation.

Table-3: Residual Diagnostics

Sl No	Test	H_0	P value	Decision
1	Normality	Normally Distributed	0.37	Cannot reject the H_0
2	Serial Correlation	No Serial Correlation	0.83	Cannot reject the H_0
3	Heteroskedasticity	No Heteroskedasticity	0.95	Cannot reject the H_0

The 'p' values in Table-3 for all the least square assumptions are greater than 5 per cent which indicates that our model satisfies all the least square assumptions. We have applied the Jarque-Berra probability values, Breusch-Godfrey serial correlation LM test and Breusch-Pagan-Godfrey test for Normality, serial correlation and heteroskedasticity test respectively. The ECM results are presented in Table-4.

2 We have not applied ECM for pre and post liberalization period since there is no cointegration relationship between exports and FDI in the same periods.

Before applying the ECM, it is necessary to choose the optimum lag length. From VAR lag length criteria we find that all the lag length selection criteria *viz*., LR, FPE, AIC, SIC, HQ[3] suggests lag 1 as the optimum lag for ECM. Therefore, we estimate the ECM result taking lag 1.

Table-4: ECM Results

Sl No	Coefficient	Coefficient Values	Probability
1	Constant	0.19	0.00***
2	D(lnX(-1))	0.12	0.42
3	D(lnF)	0.06	0.02**
4	D(lnF(-1))	0.05	0.06*
5	ECT(-1)	-0.13	0.00***
6	R^2	0.28	NA
6	F	3.80	0.01***

Note:***, ** and * denotes significant at 1 per cent, 5 per cent and 10 per cent respectively.

Table-4 represents the ECM results. Since the series are non-stationary at level, we take the differenced form of the variables to apply least square. If there is causality from FDI to exports the Error Correction Term (ECT) should be negative and significant. When it so, it means that the change in dependent variable is Granger caused by the change in independent variable. From Table-4, it is observed that the ECT is negative and significant at 1 per cent significant level. Thus, there is long run causality from FDI to exports. The coefficient value of ECT is -0.13 which indicates that it corrects the previous year's disequilibrium by only 13 per cent. Moreover, the change in lag exports corrects disequilibrium in current exports by 12 per cent but it is not statistically significant. Furthermore, the short run relationship between exports and FDI shows that change in FDI corrects change in exports by 6 per cent and change in lag FDI corrects by 5 per cent which are significant at 5 per cent and 10 per cent significant level respectively. The smaller value of the coefficients indicates weak relationship between the two in the short run.

Table-5: Wald Test

Test Statistic	Value	Df	Probability
F-statistics	4.56	(2, 39)	0.02
Chi Square	9.11	2	0.01

Table-5 shows the results of short run Granger causality from FDI to exports. Here the null hypothesis is that the coefficient of D(*ln*FDI) and D(*ln*F(-1)) is zero. It means, current year FDI and one year lagged FDI together do not Granger cause exports. The probability value of F-statistics is less than 5 per cent. We can reject the null hypothesis at 5 per cent level of significance. Hence, FDI granger causes exports at 5 per cent level of significance.

Conclusion

The study is an attempt to investigate the influence of FDI on exports in India and find an answer to whether FDI stimulates Indian exports. To examine the short run and long run relationship, time series analysis has been adopted and bivariate time series analysis have been applied. Having non-stationary series at level and stationary at same order (i.e. I(1)), there is long run relationship between aggregate exports and FDI in India during the period from 1970 to 2015. But we find no long run relationship between the two when we divided the data in to pre and post liberalization period. Moreover, the ECM for the full sample suggests the presence of causal relationship from FDI to exports, although the relationship is weak. The Wald test for short run causality shows that there is short run causality from FDI to exports. Therefore, further removal of restrictive policies towards foreign investment and opening up the economy will be more conducive for FDI inflows to realize it as a driving force for exports of the country.

The relationship between exports and FDI is not straight forward. There are many other determinants of exports besides FDI. Granger himself had warned that studies conducted through strictly bivariate framework and omitting relevant variables could result in spurious causality (Maddala and Kim 1998). Therefore, to address these issues, further research can be carry out taking multivariate framework by including more variables that affects export behavior of a country.

3 LR= sequential modified LR test statistic, FPE=Final prediction error, AIC= Akaike information criterion, SC= Schwarz information criterion, and HQ= Hannan-Quinn information criterion

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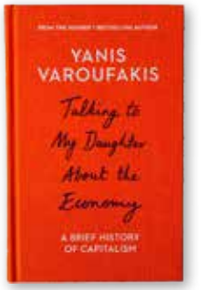
Book Review

Talking to My Daughter About the Economy – A Brief History of Capitalism



Author
Yanis Varoufakis

Reviewer
Rajesh G
Assistant Professor
Institute of Public Enterprise, Hyderabad

Anyone who has closely followed Greece crisis, which was very much in news during 2015-16, would be very much familiar with the name Yanis Varoufakis. He was always in news during the crisis. It is well known how during those turbulent days of debt crisis in Greece, he led the negotiations with Greece's creditors, as the finance minister of the country. However, it must be mentioned that apart from being an astute politician, there is another side of Yanis Varoufakis. He is a prolific writer and an economist. Some of the books written by him are, 'Global Minotaur', 'And the weak suffer what they must'. His latest book, 'Adults in the Room my battle with the European and American Establishment', succinctly gives an account of the Greece crisis.

This book, 'Talking to My Daughter About the Economy – A brief History of Capitalism, is an English translation of the book which was originally written in Greek. It followed on the heels of *Adults in the Room*. The book is published by Penguin Random House. Being an Economics faculty myself, I always search ways and means to make the subject interesting and easy to students, so that they develop interest in the subject. Students usually have a preconceived notion that Economics is boring and a tough subject. In such a scenario, it is a challenging task for any person teaching the subject, to make the class lively. This book serves as a guide to anyone teaching Economics and wanting to make it interesting. That apart this is a book for anyone who intends to understand certain concepts in economics such as markets, debt and profit etc. The author explains these concepts to his daughter Xenia. There are eight chapters, running into 199 pages to be precise.

In the first chapter he explains why there is so much inequality in the world. He explains how Europe, specially, Britain could colonize Australia, US and Africa. The author says that it is not the DNA which is responsible for that. It is not even the capability or intelligence. It was all due to geographical conditions. It was

all due to shape and location of continents. The author also very well explains the inequality within the communities, which he says is because of the fact that few people had the access to surplus and as a result rewarded with political and economic power.

The reason for the birth of market societies could not have been explained in such a lucid way, the author has explained in the second chapter. Giving simple examples from day to day life he underscores the fact that it is the commodification of everything including mother's womb, that is responsible for the emergence of the market society. It is apt to quote the author. "Little by little this commodification reaches everywhere, even a mother's womb gains exchange value when it is formally and legally rented by a couple that wouldn't be able to have children….."

In the third chapter author explains the emergence of the concept of debts, profits and redemption of debt. We could not have imagined that these concepts, while being explained, can be made so interesting. Through the characters of Mephistopheles and Dr Faustas in the Christopher Marlowe's play, the author very succinctly explains these concepts. In the same chapter taking the example of the famous character, Ebenezer Scrooge in the famous novel Christmas Carol by Charles Dickens, he explains the difficult Keynesian economics of how it is necessary to consume and spend, so that, one person's expenditure becomes another's income and finally the resultant income in the economy is many more times than the initial expenditure. The concept of 'multiplier effect' of Keynes could not have been made simpler. In the fourth chapter the emergence of banking has been explained by him in an easy to understand way.

I specially liked the fifth chapter titled 'Two Oedipal Markets', which explains the difference between the labor market and goods market. One has to actually read this chapter to believe how simple it can be made to explain the complex topics such as the characteristics of labor markets. In fact, I read this chapter twice. In the same chapter he also explains the concept of money market.

The rest of the chapters also evoke the interest of the readers, the chapters on ''Haunted Machines', 'The Dangerous Fantasy of Apolitical Money' and the 'Stupid Viruses' explain the emergence of machines in factory, the emergence of the concept of 'Depreciation' and 'Appreciation' of exchange rates.

The book ends with an epilogue, in which the author says that probably it is too dangerous to leave economics to the economists. He says it is because of the reason that he did not want to leave economics to the economists, he has become an economist. Although some may allege, this statement is too boastful, all in all, this book certainly evokes the interests of those who want to know certain concepts in economics. However, the author could have included some more chapters or some more examples to explain the concepts of GDP, Inflation and such other concepts. Of course, there cannot be any book without any limitations.

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