

Determinants of India's Services Exports

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सत्यमेव परमो धर्मः

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Determinants of India's Services Exports

ABSTRACT

Sustaining services exports is important for sustaining India's high growth rate and maintaining stability in the external sector. We analyse the factors responsible for India's performance in services exports over the past three decades. The results reveal that India's aggregate services exports are determined by world demand, exchange rate, manufacturing exports, and endowment factors (human capital, physical infrastructure stocks, and financial development). While factors such as institutions, FDI, and financial development significantly impact the export of modern services, traditional services exports are more dependent on limited factors (world demand, exchange rate, manufacturing exports, and infrastructure stocks). Since the world economy is growing at a moderate pace and this might limit the growth of manufacturing and services exports from India, India needs to focus on supply-side factors (development of human capital, infrastructure, financial sector development, institutions and broadband teledensity) to improve the competitiveness—and thereby volume—of services exports.

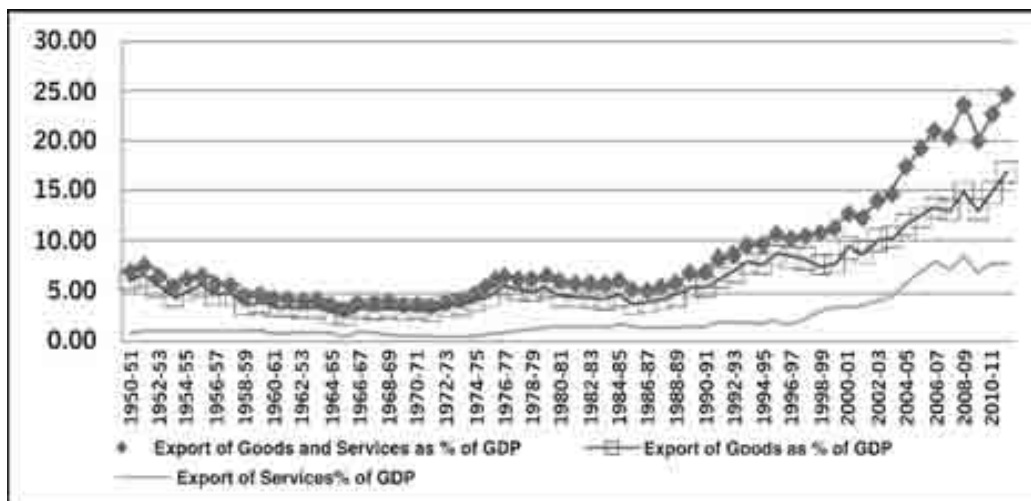
Keywords: India, services exports, determinants, human capital, infrastructure, finance

1 INTRODUCTION

Exports facilitate better resource allocation, an efficient management style, economies of scale, and efficiency of production—thereby having a favourable impact on economic growth. This has been well established in the literature (Kruger 1975; Balassa 1978; Williamson 1978; Bhagwati 1982; Srinivasan 1985; Awokuse 2003). Further, exports enable imports of essential raw materials and capital goods—thus increasing investment in the economy and thereby output (Rana and Dowling 1990). Following the export-oriented growth argument, many developing countries—particularly East Asian countries—changed their development strategy from import substitution to export promotion during the 1970s. Consequently, East Asian countries have experienced a sustained increase in exports as well as economic growth¹ over the past three decades. Several studies have established the effectiveness of trade liberalisation strategies in promoting higher economic growth in East Asian countries (Krugman 1986; Bhagwati 1988; Dornbusch 1992; Krueger 1998).

Similar to East Asia, India also followed the export-led growth strategy in the 1990s as a part of its structural adjustment programme comprising liberalisation, privatisation, and open economy policy. Empirical evidence also suggests that the export-led growth strategy has been successful in India (Dhavan and Biswal 1999; Parida and Sahoo 2007). While export was contributing only around 7 per cent of gross domestic product (GDP) until 1990–91, its contribution increased substantially over the past two decades and reached 24.64 per cent in 2011–12. At the same time, the share of services exports in GDP rose from a mere 1.39 per cent in 1990–91 to 7.73 per cent of GDP in 2011–12 (Figure 1).

Figure 1 Exports as % of GDP



¹ Except a few years following the East Asian currency crisis.

Further, the growth of India's services exports has been substantial; for example, the growth rate between 2000–01 and 2011–12 was nearly 881 per cent in current prices, which is far higher than the 140 per cent absolute increase in world total export in services during the same period (Table 1).

Table 1 Absolute increase in world total service export

Category number	Category type	% increase from 2000 to 2010
1	Transportation	128
2	Travel	77
3	Communication	72
4	Construction	191
5	Insurance	222
6	Financial	198
7	Computer and information	460
8	Royalties and fees	198
9	Other business services	203
10	Personal, cultural and recreational services	96
11	Government n.i.e.	91
(1 to 11)	Total services export	140
(3 to 11)	Other services of IMF's BoP	197

Source: UN Service Trade Data, <http://unstats.un.org/unsd/servicetrade/default.aspx>

This is in line with the Indian economy's changing growth pattern, largely supported by the contribution of the services sector. The contribution of the services sector to the GDP increased from 50 per cent in 1990–91 to 66 per cent in 2011–12. The growth of the services sector in India has also been dependent on India's services exports. The importance of services export is enhanced due to the gap created by the deficit in goods exports. Given the high trade and transaction costs in India because of poor physical infrastructure, India has been increasingly depending on services exports for maintaining its external stability and growth. Although many studies analyse the factors of total exports and manufacturing exports, hardly any study comprehensively analyses the growth and determinants of services exports in India. This study attempts to analyse India's services exports over the past three decades and empirically examine the determinants of services exports. It is hoped that scholars and policy makers in this area would find it useful.

2 TRENDS, PATTERN, AND COMPOSITION OF SERVICES EXPORTS

Export trends show that the shares of total exports and of goods exports in GDP rose from the middle of the 1980s, while the share of services exports began increasing only in the early 1990s. The shares of total exports and goods exports rose steeply during the 1980s and the 1990s while the share of services exports increased relatively faster in the 2000s (Figure 1). Growth in the export of goods and services was stronger in the 1990s and 2000s than in the 1980s. During the 2000s, goods exports grew at 14 per cent on average while services exports increased at 17 per cent on average (Table 2).

Table 2 India's export growth (decadal average)

Year	Total Export Growth	Goods Export Growth	Service Growth Export
1950–59	-0.85	-1.63	3.40
1960–69	1.89	2.50	-1.11
1970–79	8.73	7.80	14.34
1980–89	4.13	4.61	2.54
1990–99	11.94	10.72	15.71
2000–12	14.99	13.84	17.56

Source: Handbook of Statistics on Indian Economy, 2011–12, RBI

The share of exports of miscellaneous services—software, business, financial and communication services—has grown markedly over the past three decades. In the past decade the share of exports grew from 27.04 per cent during 1950–60 to around 72 per cent of the total services exports during 2001–2011 (Table 3).

Table 3 Components of services export as share of total services export (decadal average)

Period	Travel	Transportation	Insurance	G.n.i.e Receipts	Miscellaneous Receipts
1950–60	8.69	32.60	7.47	24.21	27.04
1961–70	11.11	36.79	5.27	27.87	18.96
1971–80	28.15	33.89	4.41	9.77	23.77
1981–90	34.76	17.58	2.37	2.77	42.51
1991–2000	33.46	20.52	2.30	1.90	41.81
2001–11	14.01	11.49	1.70	0.82	71.99

- G.n.i.e implies Goods Not Included Elsewhere, which includes government expenditure on administrative machinery and foreign services outside the country.
- *Source:* Handbook of Statistics on Indian Economy, 2011–12, RBI.

Far-reaching reforms during the 1990s in telecommunications, information technology (IT), and the financial sector brought about this spectacular growth. Except goods not included elsewhere (G.n.i.e), all components of services exports experienced higher growth in the past decade. The growth rate of exports of miscellaneous services was the highest during the past two decades—leading to a decrease in the share of other components in the total services exports. The disaggregated data for these components are available for only a few years² (Table 4).

Table 4 Decadal average growth rate of components of services exports

Year	Total Service exports	Travel	Transportation	Insurance	G.n.i.e.	Miscellaneous
1950–59	3.40	8.69	3.10	-0.95	5.63	0.94
1960–69	-1.11	1.56	2.82	0.47	-7.67	-2.63
1970–79	14.34	28.72	3.12	4.07	4.66	24.22
1980–89	2.54	0.84	6.88	3.17	-11.53	3.44
1990–99	15.71	8.56	9.97	10.95	51.75	21.80
2000–12	17.56	11.47	16.71	16.92	-5.05	19.57

Source: Handbook of Statistics on Indian Economy, 2011–12, RBI.

The share of miscellaneous services exports in total services exports has been growing; the most important component of miscellaneous services exports is software services exports—its share has been about 60 per cent in recent years (Table 5).

Table 5 Miscellaneous services exports and its components (% of total)

Year	Miscellaneous service exports as % of total services exports	Software services exports as % of total misc services exports	Business services exports as % of total misc service exports	Financial services exports as % of total misc service exports	Communication services exports as % of total misc service exports	Other services exports as % of total misc services exports
2000–01	60.23	64.6	9.5	0.9	2.6	22.4
2001–02	64.35	68.5	12.4	1.2	3.3	14.5
2002–03	68.68	67.3	14.4	1.4	3.9	13.0
2003–04	66.88	71.4	18.4	1.8	4.9	3.5
2004–05	70.79	57.9	16.8	1.7	4.5	19.1

² The RBI provides data for software services exports since 2000–01 and for other components since 2004–05. Therefore, it is not possible to analyse the trends of sub-sectors miscellaneous category before 2001.

Table 5 Miscellaneous services exports and its components (% of total) (contd.)

2005–06	73.02	56.0	22.2	2.9	3.7	15.2
2006–07	74.87	56.7	26.4	5.6	4.1	7.2
2007–08	74.21	60.1	25.0	4.8	3.6	6.5
2008–09	77.34	56.2	22.7	5.4	2.8	12.9
2009–10	73.84	70.3	16.1	5.3	1.8	6.6
2010–11	75.89	55.0	23.9	6.5	1.5	13.1
2011–12	71.98	60.7	25.3	5.8	1.6	6.6

Source: Handbook of Statistics on Indian Economy, 2011–12, RBI.

Note: For business service, financial service and communication service, data for the period 2000–01 to 2003–04 has been extrapolated from the subsequent data.

Business services too have been showing growth potential—its share in miscellaneous service has increased from 9 per cent in 2000–01 to 25 per cent in 2011–12. Although the share of financial services looks miniscule, it is expected that—given its share in world services exports—financial services shall become a strong contributing factor to India’s growth in services exports in the future.

2.1 India’s position in world services trade

To analyse India’s position in services trade vis-à-vis the world, we used the UN Service Trade data, which is available from 2000–11³ (see Appendix A1 for details). Three main components of the International Monetary Fund’s (IMF’s) traditional balance-of-payments data in services—transport, travel and other services—consistently increased in absolute terms from 2000 to 2008 in current value. They slumped a little in 2009 due to the recession in the world economy, but recovered in 2010 (Table 6).

Table 6 World export of services (three main components) in US\$ billion

Year	Transportation	Travel	Other services	Total
2000	341	556	679	1577
2001	337	536	694	1567
2002	362	572	771	1705
2003	409	644	911	1964
2004	510	730	1134	2374
2005	579	769	1250	2598
2006	645	847	1475	2966
2007	769	974	1809	3553
2008	895	1060	2019	3974
2009	688	934	1930	3551
2010	778	982	2021	3781

Source: UN Service Trade Data, <http://unstats.un.org/unsd/servicetrade/default.aspx>

³ Our period of analysis is 2000–10, as many countries (including India) have not reported the data for 2011.

The value of transportation export was US\$ 341 billion during 2000, US\$ 895 billion in 2008, and US\$ 778 billion in 2010—after recovering from the recession in 2009. Likewise, the total value of travel export was US\$556 billion during 2000, US\$ 1060 billion in 2008 and US\$ 982 billion in 2010. Importantly, the other service category (which includes categories 3–11 in the Extended Balance of Payments Statistics (EBOPS) of the UN) increased threefold from US\$ 679 billion in 2000 to US\$ 2019 billion during 2008 and stood at US\$ 2021 billion in 2010 after the recovery. The sub-sectors that fuelled this increase are computer and information services, insurance, other business services, financial services, and royalties and fees. Although the volume of computer and information services increased 460 per cent, the biggest impact was from other business services—it constitutes almost half of other services exports (categories 3–11), i.e., US\$ 920 billion out of US\$ 2021 billion (2010). As a percentage of total services exports, three items formed the lion's share during 2010: transport (20.6 per cent), travel (26 per cent) and other business services (24.3 per cent). The other eight sub-sectors of EBOPS shared the other 29 per cent (Table 7).

2.2 Share of India

India's share in total world services exports increased from 0.97 per cent in 2000 to 3.1 per cent in 2010 (Table 8). Its rank among all services-exporting countries rose from 26th to 10th. The share of the US, the top exporter, declined from 18 per cent to 14.7 per cent—indicating a small decrease in the concentration in world services exports as the number of countries with over 1 per cent of total service trade decreased from 25 in 2000 to 23 in 2010. India's share and rank have risen in transport, travel, insurance, finance, computer and information, royalties and licence fees, other business services, and personal, cultural, and recreational services export (Table 8). India's enhanced performance in the export of these services has been consistent since 2000.

India's share and rank declined in communication, construction, and G.n.i.e between 2000 and 2010 (Table 8). The poor performance in communication can be attributed to the world economic crisis that started in 2008, but the decline in construction and G.n.i.e has been consistent over the years and may have been compounded by the recent slowdown in growth and business sentiments. Also, in communication services, the concentration in terms of share of the top exporter has decreased. The share of the top exporter (Grenada) in 2000 was 50.6 per cent, which declined to 15.2 per cent in 2010, though the number of countries having a share of more than 1 per cent has slightly increased from 16 to 19.

The most concentrated sector in terms of share of the top exporter is licence and fees, where the share of the US was 42 per cent (in 2010). Other sectors relatively more concentrated are computer and information services (the top exporter India's share was 26.9 per cent in 2010) and finance (the top exporter USA's share was 26.3 per cent in 2010). The three most concentrated sectors having more than 1 per cent share of world

Table 7 Share of different category of world services exports over the year

Year	Transportation	Travel	Communication	Construction	Insurance	Financial	Computer and information	Royalties and fees	Other business services	Personal, and recreational services	Government n.i.e.
2000	21.6	35.3	3.7	1.8	2.0	5.7	2.4	5.3	19.3	0.8	2.1
2001	21.5	34.2	3.2	1.9	2.3	5.5	2.9	5.2	20.5	0.7	2.1
2002	21.2	33.5	2.8	2.0	3.0	5.5	3.1	5.3	20.7	0.7	2.2
2003	20.8	32.8	2.4	2.0	3.1	5.7	3.5	5.4	21.5	0.7	2.2
2004	21.5	30.8	2.4	1.9	4.3	6.0	3.8	5.7	20.8	0.7	2.1
2005	22.3	29.6	2.5	2.1	2.4	6.6	3.9	5.9	21.8	0.7	2.2
2006	21.7	28.5	2.7	2.2	2.2	7.3	4.3	5.7	22.5	0.7	2.1
2007	21.7	27.4	2.6	2.3	2.3	8.2	4.5	5.6	22.9	0.6	1.9
2008	22.5	26.7	2.7	2.7	2.3	7.4	5.1	5.6	22.8	0.6	1.7
2009	19.4	26.3	2.8	2.8	2.9	7.2	5.5	6.4	24.2	0.6	1.8
2010	20.6	26.0	2.7	2.2	2.7	7.1	5.6	6.6	24.3	0.6	1.7

Table 8 Concentration of World services exports and India's share

Year	Number of countries with share above 1%	Top exporter country	Top exporter's share	India's share	India's rank
Total World's Services Exports					
2000	25	USA	18.3	1.0	26
2010	23	USA	14.7	3.1	10
Transportation (205) export					
2000	23	USA	13.3	0.6	32
2010	26	USA	9.2	1.7	17
Travel (236) export					
2000	20	USA	18.1	0.6	30
2010	26	USA	13.7	1.7	18
Communication (245) export					
2000	16	Grenada	50.6	1.9	10
2010	19	Grenada	15.2	1.4	14
Construction (249) export					
2000	18	Japan	20.6	1.9	13
2010	18	China	17.6	0.6	24
Insurance (253) export					
2000	16	Grenada	21.3	0.9	18
2010	17	UK	23.0	1.8	12
Finance (260) export					
2000	12	USA	24.6	0.4	22
2010	13	USA	26.3	2.2	9
Computer and Information (262) export					
2000	12	USA	18.4	17.1	2
2010	13	India	26.9	26.9	1
License and fee (266) export					
2000	8	USA	61.9	0.6	24
2010	11	USA	42.9	1.7	33
Other business (268) export					
2000	22	USA	13.3	0.6	40
2010	25	USA	9.2	1.7	15
Personal, cultural and recreational (287) export					
2000	19	Turkey	20.9	0.3*	36
2010	22	UK	16.2	1.4	18
G.n.i.e (291) export					
2000	16	USA	20.1	1.9	10
2010	20	USA	24.8	0.8	28

Source: UN Service Trade Data, <http://unstats.un.org/unsd/servicetrade/default.aspx>

* Data available since 2004–05 for India.

exports are licence and fees (11 countries), computer and information services (13 countries), and finance (13 countries).

While the top exporter's share has decreased in most sectors, the number of countries with over 1 per cent of total world exports in that sector has remained stable, with only a slight increase. This reflects an important feature: competition from countries with skills is increasing for already established countries in that sector. These new competitors are eating away the shares of the top exporters. However, the new entrants into this above 1 per cent club are relatively few, with some exceptions.

We also use the Herfindahl-Hirschman Index (HHI) to measure market concentration (Appendix A.2). The concentration in total services exports has reduced from 0.059 in 2000 to 0.041 in 2010 (Table 9). While the pattern of concentration is not uniform across sectors, there is a declining trend in the HHI in travel, and royalties and fees exports over the past decade. Concentration is generally lower than 0.1 in most sectors except insurance services, financial services, computer and information services, royalties, and licence fees. In these highly concentrated services exports markets, there are variations in concentration over the decade. The concentration in the insurance and financial services exports market rose steeply in and around 2003 and fell soon after. There was a decline in travel, transport, and communication services exports concentration since 2000, but the concentration in transportation and communication, in other business services, and in personal, cultural, and recreational services rose towards the end of the decade. There was a steep rise in HHI in computer and information service from 2009 to 2010, possibly due to India's increasing influence. The case with construction is also the same with a rise since 2007, which may be because China displaced Japan as the largest exporter in this segment. Overall, concentration is not very high except in a few sectors such as licence, fees, computer, and information service, which are technology-intensive sectors. There is much scope for India in sectors such as other business services, which is less concentrated, and a high growth sector. Likewise, there is scope in financial services, royalties and licence fees where dominant players are losing their place to newly emerging exporting countries.

The analysis of the composition, trend, and patterns shows that India is doing better in certain services exports category but there is potential in many other sectors. The next step is to empirically analyse the factors that affect the services exports of India.

3 LITERATURE REVIEW

Although there exists a vast literature on the determinants of goods exports, the literature on the determinants of services exports is limited and a recent phenomenon. Therefore, the types of policies that can help support services export growth are not widely known. Increasing tradability of services allows the cross-border exchange of services such as

Table 9 Normalised HHI of concentration in world service export market

Year	Total service export	Transportation	Travel	Communications services	Construction services	Insurance service	Financial service	Computer and information service	Royalties and license fees	Other business services	Personal cultural and recreational service	Government Services n.i.e.
2000	0.059	0.042	0.071	0.057	0.084	0.101	0.140	0.105	0.404	0.056	0.092	0.091
2001	0.055	0.039	0.065	0.053	0.069	0.107	0.145	0.112	0.390	0.058	0.070	0.074
2002	0.051	0.036	0.060	0.049	0.061	0.110	0.139	0.106	0.383	0.056	0.070	0.064
2003	0.046	0.033	0.056	0.045	0.064	0.094	0.148	0.106	0.319	0.052	0.083	0.066
2004	0.044	0.033	0.046	0.043	0.060	0.266	0.154	0.108	0.270	0.052	0.084	0.073
2005	0.042	0.032	0.041	0.041	0.069	0.132	0.144	0.110	0.259	0.049	0.078	0.074
2006	0.041	0.031	0.043	0.040	0.071	0.084	0.136	0.106	0.267	0.045	0.060	0.088
2007	0.040	0.031	0.041	0.039	0.065	0.081	0.138	0.109	0.266	0.044	0.050	0.088
2008	0.038	0.031	0.040	0.037	0.068	0.076	0.134	0.106	0.238	0.042	0.051	0.068
2009	0.041	0.031	0.041	0.040	0.074	0.100	0.138	0.102	0.214	0.045	0.055	0.087
2010	0.041	0.032	0.039	0.040	0.081	0.098	0.135	0.117	0.213	0.045	0.063	0.077

Source: UN Service Trade Data, <http://unstats.un.org/unsd/servicetrade/default.aspx>

professional services that previously required the close proximity of providers and consumers (World Bank 2010).

Barcenilla and Molero (2003) estimate the determinants of services export flows for 15 European countries for the years 1976–2000. Using the traditional demand function, the study finds that foreign income is one of the important variables, with the coefficient being more than 1 for 11 countries out of 15 countries. In addition to foreign income, price and exchange rate are important variables in explaining services exports.

Grunfeld and Moxnes (2003) identify the determinants of service trade and foreign affiliate sales in a gravity model using bilateral data for the 22 Organisation for Economic Co-operation and Development (OECD) countries and their trading partners over 1999–2000. The study finds that trade barriers and corruption in the importing country have a strong negative impact on service trade and foreign affiliate sales. In addition, distance has a considerable negative impact on exports and foreign affiliate sales. The study also finds a strong home market effect in service trade, implying rich countries do not tend to import more, which may indicate that rich countries have a competitive advantage in service trade.

Kimura and Lee (2006) assess the impact of various factors on bilateral services trade relative to that on bilateral goods trade, using the standard gravity model from 10 OECD member countries to other economies (including OECD and non-OECD member countries) for the period 1999–2000. The results show that the gravity equation is applicable for services trade, but there are some differences between services and goods trade with regard to the elasticities of the explanatory variables. Among others, the study found that geographical distance, cost of transport and general economic liberalisation is important for services trade.

Using the standard gravity model, Shepherd and Marel (2010) explore the determinants of services trade for APEC member countries during 1995–2008. The study finds that market size, members in regional trade agreement, distance, restrictive regulation, and common language are major determinants of services trade. Based on the empirical evidence, the paper suggests that measures designed to reduce transport costs and improve infrastructure and network connectivity are likely to boost trade in services as well as in goods.

Similarly, using a gravity model, Shingal (2010) analyses various potential determinants of trade in services, including market size, trade in goods, the presence of an English-speaking workforce, quality of infrastructure, the openness of the trade policy regime towards the various modes of services delivery, cost of human capital, and common laws/legal systems for 25 exporting and 53 importing countries for five years over 1999–2003. Shingal's main findings are that human capital, teledensity, and trade restrictiveness variables have

the biggest impact on bilateral services trade and thus should be the policy focus if the objective is to promote services trade.

Nyahoho (2010) examines the importance of factor intensity as a determinant of trade in disaggregated services. Human capital is clearly related to exports of computer and information services. Construction services and public works, royalties and licence fees, and computer and information services are positively linked to research and development intensity.

Marel (2011) examines the determinants of comparative advantage in explaining services trade. Using a country sample of 23 OECD countries and panel fixed effects model, the study finds that factor endowments such as skilled labour force and information and communication technology (ICT)-related capital stock, institutions, and better regulatory framework are the major sources of comparative advantage in services trade.

Kaur (2011) examines the export potential in the US services sector with its Asian trade partners (Japan, China, India, Singapore, South Korea, and Hong Kong) by using the gravity model over the period 2000–08. Based on panel data analysis, the study finds that the US has export potential in services for India and Japan. Further, the US had convergence in exports with three Asian countries (Hong Kong, India, and Korea) and divergence with three Asian countries (Japan, China, and Singapore).

Eichengreen and Gupta (2012) examine the determinants of the services export performance of 60 developing countries, including India, over the period 1980–2008. The study finds that, among other factors, per capita income of exporter country, size of the market, world demand of services exports, infrastructure development, foreign direct investment (FDI), goods export, and human capital are important factors that explain services exports.

Nasir and Kalirajan (2013) examine the determinants of modern export performance of South Asian and East Asian countries over 2002–08. Estimation results show that the performance of emerging economies in South Asia and of the Association of Southeast Asian Nations (ASEAN) region in terms of the realisation of export potential is considerably lower than that of North America and Europe. The results also show that the number of graduates and the ICT infrastructure in emerging countries are among key factors for modern services exports.

Most of these studies are cross-country studies, which may not be applicable to an emerging country such as India that has been doing better in services exports. The present study tries to fill this gap by carrying out an India-specific study.

4 POSSIBLE DETERMINANTS OF SERVICES EXPORTS

Based on the above empirical studies, we find that services sector performance critically depends on human capital, world demand, exchange rate behaviour, the quality of the telecommunications network, infrastructure stocks, the quality of institutions, and inflows of FDI. In this section, we briefly discuss these factors and other potential factors.

4.1 World Demand/Income (SIMP/WY)

There exists a vast literature estimating demand/income elasticities for exports of goods but very few studies estimate the demand/income elasticity for export of services—especially for developing economies. The services export demand is also influenced by the condition prevailing in the world market. The demand for services exports increases in response to the income of the rest of the world—that is, higher the level of foreign real income, larger the demand for nations services export, *ceteris paribus*. Empirical results suggest that average long-run income elasticities are found to be approximately more than 1, but there is a wide diversity of experience (Pain and van Welsum 2004). The highest income elasticity of exports to the world is found to be for travel services, which is consistent with other studies (Huang and Viana 1995; Deardorff et al. 2000). The measurement of world demand variable has often varied across studies. Generally, three income measures are used in the literature—GNP or GDP, industrial production, and world demand for real imports of services. In this study, we consider both world demand for services imports (SIMP) and world income (WY).

4.2 Real Exchange Rate

The impact of relative price movements on exports of services depends on the size of the price elasticity. The second major factor that affects export supply capacity is the real exchange rate, which can be an important element in determining export growth, diversification, and the international competitiveness of goods produced in a country (UNCTAD 2005). A stable real exchange rate is conducive to export expansion (Mouna and Reza 2001). While an overvalued currency can undermine export competitiveness through a direct loss of price competitiveness for exporting firms, undervaluation of the currency can bolster export competitiveness (Biggs 2007), enhance the incentives for export activities, and lead to diversification of exports (Mouna and Reza 2001). The appreciation of the real effective exchange rate (REER) decreases the competitiveness of domestic exports in foreign markets, resulting in decreased demand for exports (Joshi and Little 1994; Edwards and Alves 2005). Hence, we expect a negative link between the appreciation of REER and export demand, and vice versa. International studies typically conclude that price elasticities for services are smaller than those found for merchandise trade. The overall price elasticity for services exports is typically around -0.2 to -0.4, with travel-related services being more elastic and business services relatively inelastic (Pain and van Welsum 2004).

4.3 Manufacturing Exports

It is argued that an increase in manufacturing exports leads to a higher demand for services, due to the network effect. Further, the exports of services are linked closely with and arise due to the export of goods since services such as transport, travelling, communication, and business services are used as inputs (Eichengreen and Gupta 2012; Lodefalk 2012). The use of knowledge-intensive business and of financial, transport, and communication services in manufacturing production has been found to be positively correlated with productivity and the source of comparative advantage in international trade (Hoekman and Mattoo 2008; Francois and Hoekman 2010). Therefore, a rise in manufacturing exports is expected to boost services exports.

4.4 Human Capital

Poor human capital hinders technology transfer and learning and has been shown to hamper export growth and diversification in low-income countries (Hausmann et al. 2006; Biggs et al. 1996). The empirical literature confirms that services sector performance depends crucially on human capital and the quality of the telecommunications network and institutions (Shingal 2010). A country's level of human development indicators is an important and useful indicator of how much it is likely to benefit from international trade in services. A healthier and more skilled and educated workforce is likely to contribute to productivity, competitiveness and higher exports, particularly services exports. Therefore, high human capital stock is positively related to the export capacity of the domestic economy.

4.5 Financial Development

Financial sector development is another important factor of export supply; for example, firms that can access finance at reasonable cost find it easier and cheaper to finance working capital needs (including trade finance) and investments in technical upgrading and new innovative activities, and can, therefore, export or export more (Biggs 2007; Aghion and Griffith 2005). If financial markets are underdeveloped and risks not diversified, firms' supply response is affected adversely. Therefore, it is expected that financial development is positively associated with services exports. In this study, the financial development index⁴ is based on the studies by Bandiera et al. (2000) and King and Levine (1993), and developed through principal component analysis. It includes bank branches per million population, bank credit as percentage of GDP, and M2 by GDP ratio. We also consider domestic bank credit as an alternative.

⁴ The first factor or principal component has an eigenvalue larger than one and explains over two-thirds of the total variance. There is a large difference between eigenvalues and variance explained by the first principal component and the next. Hence, we choose the first principal component for making a composite index of the combined variance of the different aspects of financial development captured by the three variables.

4.6 Infrastructure Development

One of the major factors of services exports supply capacity is domestic infrastructure, particularly telecom and communication infrastructure. To sustain the rapid growth of services exports, it is necessary to have a well-functioning infrastructure, including electric power, road and rail connectivity, telecommunications, air transport and efficient ports (UNCTAD 2005). Infrastructure can refer to the financial system that facilitates and supports trade or the education and training system that produces skilled labour. Poor infrastructure facilities characterise most South Asian countries and impede their trade, competitiveness, and sustainable development (Jones 2006; Sahoo and Dash 2010). Empirical studies also support the positive relationship between infrastructure development and services export performance (Shingal 2010; Eichengreen and Gupta 2012). Therefore, we expect a positive relationship between infrastructure stock and services exports performance. Here, we develop a infrastructure development index by taking important infrastructure variables such as air freight transport (million tons per km), electric power consumption (kWh per capita), rail density (per 1,000 population), energy use (kg of oil equivalent per capita), and total telephones lines (main line plus cellular phones) per 1,000 population.

4.7 Institutions

The quality of institutions and policies decisively determines if countries can benefit from globalisation (UNCTAD 2008; Mattoo et al. 2008). Weak and missing institutions in low-income countries have been seen as limiting the ability of firms to exploit new trading opportunities (Stiglitz and Charlton 2006; Biggs 2007), and institutional quality has been shown to be highly correlated with trade (Francois and Manchin 2006). Francois and Manchin (2006) show that export performance and the propensity to participate in the trading system depend on institutional quality. Institutions may also indirectly affect trade through their impact on other variables of trade flows, such as investment and productivity (Méon and Sekkat 2008). Kimura and Lee (2006) suggest that trade in services is positively influenced by the quality of institutions as measured by the degree of corruption, complexity of export procedures and rigidity in employment law or by the economic freedom index (Lennon 2006). Therefore, we expect this variable to have a positive sign. In our case, we use an index of economic freedom in the world (scaled 0–10) from the Cato Institute.

4.8 Foreign Direct Investment (FDI)

Foreign direct investment influences supply-side determinants of services exports, reflecting to some extent the quality of physical capital as well as worker skills and market penetration potential (De Gregorio 1992). Development economists agree that FDI inflows are likely to play an important role in explaining the growth of recipient countries (De Mello 1999). However, the World Bank (1993) notes that the role of FDI in export promotion depends crucially on its motive: FDI may contribute to export growth if it is aimed at tapping export

markets by exploiting a country's comparative advantage but not if it is aimed at capturing the domestic market (tariff-jumping type of investment). Thus, whether FDI contributes to export growth or not depends on the nature of the policy regime (Sharma 2000). Like the theoretical views, the existing empirical studies of the role of FDI in export performance also report mixed findings. In contrast, others indicate that FDI has a positive effect on the export performance of host countries (UNCTAD 2005; Eichengreen and Gupta 2012).

4.9 Services Trade Barriers (STB)

The services sector encompasses a largely heterogeneous selection of activities and operates differently. This heterogeneity gives rise to a range of barriers to services trade. As noted in the Introduction, these barriers tend to be qualitative or non-tariff barriers (NTBs), such as legal or regulatory restrictions on the import of services. The types of restrictions imposed vary between service sectors and modes of supply relevant in each (Walsh 2006). Hoekman and Braga (1997) summarise four major barriers to services trade and explain that quantity-based restrictions impose quotas or other types of quantity limitations. Findlay and Warren (2000) show the importance of non-discriminatory barriers, i.e., barriers that restrict the supply of services by domestic and foreign producers equally. More importantly, barriers to trade in services are difficult to measure compared to tariffs and non-tariff barriers to trade in goods. In the empirical literature, various studies have used different measures—for example, Grünfeld and Moxnes (2003) use the services trade restrictiveness index (STRI) developed by Findlay and Warren (2000), Kimura and Lee (2006) use the Economic Freedom of the World (EFW) index, and Nasir and Kalirajan (2013) use regional/multilateral trade agreements that cover goods and services. Our study uses the cumulative number of regional/multilateral trade agreements that help reduce the barriers to services exports. We expect a positive relation between reduction in trade barriers because of trade agreements and services export demand.

5. METHODOLOGY, DATA SOURCES AND RESULTS

We finally estimate services export function considering all possible determinants based on both theoretical and empirical literature. The total services export function is given below:

$$\begin{aligned}
 TSER_t = & a_0 + b_0 SIMP_t + b_1 RER_t + b_2 (INFRA/TEL)_t + b_3 (GSER/SCH)_t + b_4 (FIN/DBC)_t \\
 & + b_5 MNEXP_t + b_6 FDIY_t + b_7 INST_t + b_8 TA + u_t \quad \dots\dots\dots (1)
 \end{aligned}$$

As the services exports are broadly divided into modern and traditional exports, we further estimate those separately.

$$\begin{aligned}
 MSER_t = & b_0 + b_0 SIMP_t + b_1 RER_t + b_2 (INFRA/TEL)_t + b_3 (GSER/SCH)_t + b_4 (FIN/DBC)_t \\
 & + b_5 MNEXP_t + b_6 FDIY_t + b_7 INST_t + b_8 TA + u_t \quad \dots\dots\dots (2)
 \end{aligned}$$

$$TRSER_t = a_0 + b_0 SIMP_t + b_1 RER_t + b_2 (INFRA/TEL)_t + b_3 (GSER/SCH)_t + b_4 (FIN/DBC)_t + b_5 MNEXP_t + b_6 FDIY_t + b_7 INST_t + b_8 TA + u_t \quad \dots\dots\dots (3)$$

The expected sign of $\beta_0, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8 > 0$ and $\beta_1 < 0$.

The definition of the variables along with sample period and data sources is given below:

Variables	Definition	Sample period	Sources
TSER	Aggregate services exports as ratio of GDP	1980–2011	RBI
MSER	Modern services (software, business, financial, insurance and communication) exports as ratio of GDP	1980–2011	RBI
TRSER	Traditional services (transportation and travelling) exports as ratio of GDP	1980–2011	RBI
LSIMP	Log of world demand for services imports	1980–2011	WDI
WY	Real world GDP net of India	1980–2011	WDI
RER	Real exchange rate	1980–2011	WDI
INFRA	Infrastructure index	1980–2011	WDI
GSER	Gross secondary enrolment ratio proxy for human development	1980–2011	WDI
FIN	Financial development index comprises bank credit to domestic sector, bank branches and broad money ratio	1980–2011	WDI and RBI
MNEXP	Manufacturing exports as ratio of GDP	1980–2011	WDI
FDIY	FDI inflows as ratio of GDP	1980–2011	WIR
EF	Index of economic freedom in the world	1980–2011	Cato Institute
TA	Cumulative number of free trade agreements	1980–2011	Ministry of Commerce
DBC	Domestic credit provided by banks as ratio of GDP	1980–2011	WDI
SCH	Average years of school	1980–2011	UNDP
LQL	Labour force adjusted for average years of school	1980–2011	UNDP, WDI
TEL	Telecom density	1980–2011	WDI

Source: Authors' compilation

5.1 Data Sources

Annual data on aggregate and disaggregate services exports and bank branches have been collected from the RBI. Data on world demand for services imports (SIMP), manufacturing exports (MNEXP), world income (WY), gross enrolment ratio (GSER), exchange rate (RER), consumer price index of India and USA, broad money ratio (M2Y) and domestic credit by banking sector (DBC) are collected from the World Development Indicators (WDI) of the World Bank. The index of economic freedom in the world is collected from the Cato Institute. Infrastructure variables considered in this study are air freight transport (million tons per km), electric power consumption (kWh per capita), rail density (per 1,000 population), energy use (kg of oil equivalent per capita) and total telephone lines (main line plus cellular phones per 1,000 population), and are taken from various years of the World Development Indicators. The financial development index used in this study is developed through principal component analysis—like the infrastructure index—and includes bank branches per million population, bank credit as percentage of GDP and M2 by GDP ratio.

5.2 Analysis of Results

We test for unit roots in each series before estimating a model, as it involves time series data. The stationarity property of each series is tested by using the Augmented Dickey-Fuller (ADF) unit root test. First, we test unit root by assuming there is no trend but only intercept. Then, we test stationarity by assuming time trend in the variable. Since regressions have been run for aggregate exports as well as for sector-specific exports, we have undertaken tests separately. The result of ADF unit root test is given in Table 10.

Table 10 ADF Unit Root Test Results

Variable	At level with constant	Optimal lag	At level with constant and trend	Optimal lag	At first difference with constant	Optimal lag	Order of integration
TSER	0.06	3	-1.72	1	-6.76*	0	I(1)
MSER	0.6	2	-2.11	2	-5.06*	1	I(1)
TRSER	-0.13	2	-2.28	2	-4.41*	1	I(1)
LSIMP	0.40	2	-1.23	1	-4.69*	1	I(1)
GSER	1.41	2	-0.55	2	-3.25*	1	I(1)
SCH	1.60	2	0.02	1	-2.90*	3	I(1)
MNFEX	-0.83*	2	-1.54	2	-4.27	1	I(1)
FDIY	-1.33	1	-2.6	1	-3.78*	0	I(0)
DBC	-0.21	1	-0.23	3	-4.45*	2	I(1)
FINDEX	-0.40	2	-1.33	2	-3.42	0	I(1)
INFRA	0.76	3	-0.86	3	-5.20*	1	I(1)
RER	-2.02	3	-2.18	2	-3.71*	0	I(1)
INST	-0.79	2	-2.18	2	-3.26*	1	I(0)
LQL	0.33	2	-2.01	2	-3.37	1	I(1)
TEL	-0.80*	1	-1.49	2	-3.15		I(1)
TA	3.61	2	1.57	2	-2.94	1	I(1)

Since we have a combination of I(1) and I(0) variables and given that we have only 32 observations, we use autoregressive distributed lag (ARDL) and dynamic ordinary least square (DOLS) technique for cointegration analysis (see Appendix A.3 and A.4 for details). All the variables are non-stationary at level but stationary at first difference except the log value of real world income and FDI as ratio of GDP (Table 10). Therefore, the results of the ADF unit root test suggest that we have a mixture of I(1) and I(0) variables. Therefore, the next step in empirical analysis includes the establishment of a long-run equilibrium relationship between various services exports and their determinants.

We use the ARDL method developed by Pesaran et al. (2001) to find out the long-run relationship among the relevant variables.⁵ The ARDL bound test is based on the Wald-test (F-statistic). The asymptotic distribution of the Wald-test is non-standard under the null hypothesis of no cointegration among the variables. Two critical values are given by Pesaran et al. (2001) for the cointegration test. The lower critical bound assumes all the variables are I(0), meaning that there is no cointegration relationship between the examined variables. The upper bound assumes that all the variables are I(1), meaning that there is cointegration among the variables. When the computed F-statistic is greater than the upper bound critical value, then the H_0 is rejected (the variables are cointegrated). The result of the ARDL cointegration test is presented in Table 11. There is a long-run relationship or cointegration among the variables when services exports (total, modern, and traditional) constitute the dependent variable because their F-statistic exceeds the upper bound critical value (3.50) at the 5 per cent levels (Table 11). Given that we have only 32 observations, we have considered maximum two lags and the lags are selected on the basis of Akaike Information Criteria (AIC). Thus, the null of non-existence of stable long-run relationship is rejected in favour of long-run stable relation. These results also warrant proceeding to the next stage of estimation.

Table 11 ARDL cointegration test (1980–2011)

Dependent variable	F-stat	5% Critical Value#	Result
TSER	7.87*	3.50	Rejection of null of no cointegration
MSER	6.72*	3.50	Rejection of null of no cointegration
TRSER	6.96*	3.50	Rejection of null of no cointegration

Notes: The order of ARDL is selected on the basis of Akaike Information Criteria (AIC). # denotes upper bound critical values with seven independent variables. * denotes rejection of null hypothesis of no cointegration in favour of cointegration.

⁵ The ARDL model is suitable for a small sample size and obviates the endogeneity problem (Narayan 2004).

5.3 Determinants of Services Exports

Having found the long-run relationship between services exports and other variables (Table 11), we estimate cointegrated regression or determinants of services exports by using the DOLS and ARDL model to counter the problem of endogeneity and small sample bias. The results are presented in Tables 12, 13 and 14 respectively. Diagnostic test indicates that the serial correlation, the auto-regressive conditional heteroscedasticity (ARCH) effect and heteroscedasticity are not a problem. Further, the Ramsey test also suggests there is no misspecification problem for the model. Adjusted R² is high, indicating the model fits the data very well.

Table 12 Estimated result of total services (TSER)

Variabes	ARDL				DOLS			
Constant	118.32** (3.49)	67.50 (1.87)	13.20 (0.76)	32.45 (2.65)	-13.75 (-0.89)	-9.01* (0.78)	-9.50** (-1.25)	-151.22* (-2.05)
LSIMP	2.11** (3.54)	1.64* (2.74)	2.13 (-0.93)	2.62** (3.63)	2.59* (2.90)	2.10** (3.18)	2.23* (2.80)	1.86* (2.89)
RER	-0.22** (-2.56)	-0.31** (-3.34)	-0.20** (-3.21)	-0.12** (-3.58)	-0.18* (-2.27)	-0.14** (-3.86)	-0.13 (-2.37)	-0.08* (-2.06)
INFRA	2.34** (5.67)	–	–	–	1.84* (2.67)		1.44* (2.65)	–
TEL		0.20* (2.42)	0.31* (2.42)	0.18** (4.28)		0.26** (3.45)	–	0.18** (3.46)
DBC	0.14** (2.79)	0.17* (2.45)	–		0.16* (2.03)	0.24** (3.74)	–	
FINDEX			0.87** (3.55)	0.63** (4.17)			0.78* (2.15)	0.66* (2.58)
GSER	0.21* (2.56)	0.19* (2.09)	0.22* (2.36)		0.14** (2.37)	0.14** (2.07)	0.09* (1.99)	–
SCH				1.76** (5.14)				1.04** (3.12)
MNFEX	0.67** (6.09)	0.78** (4.09)	0.87** (4.87)	0.59** (3.24)	0.89** (7.20)	0.88* (2.67)	0.97** (6.57)	0.66* (3.16)
INST	–	–	0.71* (2.48)	1.35* (2.08)			0.21 (1.27)	0.70* (2.43)
	Adj. R ² =0.98, S.E=0.12, DW stat =2.51 LM=2.05 ARCH =2.05 Reset- 2.23	Adj. R ² =0.97 S.E=0.33 DW stat= 2.18 LM=1.12 ARCH = 1.13 Reset- 1.78	Adj. R ² =0.096 S.E=0.15, DW stat= 2.34 LM=1.66 ARCH =0.68 Reset- 1.24	Adj. R ² =0.94, S.E=0.33 DW stat= 2.15 LM=0.54 ARCH =0.28 Reset- 0.89	Adj. R ² =0.96, S.E=0.14 DW stat= 2.43 LM=1.09 ARCH =0.38 Reset- 1.5	Adj. R ² =0.98, S.E=0.18 DW stat= 1.78 LM=1.51 ARCH =1.46 Reset- 2.3	Adj. R ² =0.97, S.E=0.43 DW =1.76 ARCH =0.89 Reset- 2.1	Adj. R ² =0.97, S.E=2.4 DW= 2.4 LM=0.6 ARCH =1.5 Reset- 1.4

Notes: *** and ** denotes significance at 1%, 5% and 10% level respectively. Figures in parentheses are t-ratio.

Table 13 Estimated result of total services (MSER)

Variabes	ARDL				DOLS			
Constant	12.65 (0.72)	19.21 (1.65)	45.23 (1.43)	-4.67* (-2.31)	22.24* (2.21)	12.01* (1.78)	33.12* (2.03)	-3.22 (-1.05)
LSIMP	2.69** (3.90)	2.04* (2.21)	2.76 (-3.23)	2.06** (2.56)	2.81* (2.10)	1.67** (2.49)	2.43* (2.77)	1.84* (2.25)
RER	-0.19* (-2.94)	-0.13** (-3.57)	-0.18* (-2.17)	-0.09* (-2.86)	-0.12** (-4.87)	-0.10** (-4.26)	-0.17** (-3.01)	-0.09** (-4.09)
INFRA	2.65** (5.45)	-	1.31* (2.21)	-	1.46* (2.20)		1.41* (2.24)	
TEL		0.21** (2.78)		0.17* (2.21)		0.17** (2.17)	-	0.24** (2.34)
DBC	0.23** (2.66)	0.19* (2.11)	-		0.14* (2.03)	0.12* (2.17)	-	
FINDEX			1.11** (3.07)	0.91** (4.21)			0.62* (3.56)	0.48* (3.58)
GSER	0.19* (2.54)	0.13* (2.21)	0.12* (2.36)		0.16** (2.07)	0.13** (2.18)	0.14* (2.22)	-
SCH				2.31** (4.58)				2.12* (2.42)
MNFEX	0.74** (3.20)	0.94** (7.47)	0.65** (5.83)	0.52** (2.62)	0.88** (6.06)	0.73* (4.88)	0.96** (5.79)	0.56 (2.43)
FDIY		-	0.23* (2.03)			0.14* (2.56)	-	-
INST	-	0.83** (3.12)	-	1.28* (2.93)	-	-	- (1.27)	0.41* (2.43)
	Adj. R ² =0.98, S.E=0.12, DW stat =2.55 LM=2.05 ARCH =2.05 Reset- 1.79	Adj. R ² =0.96 S.E=0.17 DW stat= 2.27 LM=2.15 ARCH = 1.24 Reset- 1.26	Adj. R ² =.096 S.E=0.21, DW stat= 2.23 LM=1.62 ARCH =0.5 Reset- 2.07	Adj. R ² =0.93, S.E=0.20 DW stat= 134 LM=0.24 ARCH =0.28 Reset- 1.08	Adj. R ² =0.96, S.E=0.76 DW stat= 2.07 LM=1.39 ARCH =1.8 Reset- 1.45	Adj. R ² =0.98, S.E=0.47 DW stat= 2.32 LM=0.65 ARCH =1.06 Reset- 1.87	Adj. R ² =0.98, S.E=0.68 DW =2.45, LM=0.98 ARCH =1.3 Reset- 1.66	Adj. R ² =0.95, S.E=0.14 DW= 2.12 LM=0.7 ARCH =1.2 Reset- 1.12

Notes: *** and ** denotesignificance at 1%, 5% and 10% level respectively. Figures in parentheses are t-ratio.

Table 14 Estimated result of total services (TRSER)

Variabes	ARDL			DOLS
Constant	-12.33** (-4.36)	-16.67** (-3.98)	-8.85** (-4.27)	-13.59* (-2.42)
LSIMP	2.03** (4.77)	2.32** (4.22)	1.39** (4.10)	2.04** (3.52)
RER	-0.07* (-2.61)	-0.04** (-2.15)	-0.05* (-2.04)	-0.04* (-2.22)
INFRA	1.12* (2.87)	1.24* (2.07)	1.56** (6.37)	1.85** (3.02)
GSER	0.06** (3.25)	–	0.06** (5.23)	–
SCH	–	0.52* (2.64)	–	0.41* (2.81)
MNFEX	0.26** (4.26)	0.12* (2.88)	0.34* (3.27)	0.19* (2.66)
	Adj. R ² =0.94, S.E=0.05, DW stat=2.13 LM=0.52 ARCH=0.06 Reset-1.24	Adj. R ² =0.96, S.E=0.26, DW stat=2.24 LM=0.57 ARCH=0.28 Reset-1.91	Adj. R ² =0.96, S.E=0.19 DW stat=2.12 LM=1.39 ARCH=18 Reset-1.45	Adj. R ² =0.94, S.E=0.25 DW stat=2.09 LM=0.65 ARCH=2.06 Reset-1.87

Notes: *** and ** denotesignificance at 1%, 5% and 10% level respectively. Figures in parentheses are t-ratio.

5.4 Determinants of Total Services Exports

The long-run estimates of total services exports estimated by both DOLS and ARDL model are presented in Table 12. The results show that, as expected, demand for services exports has a positive significant effect on real services exports of India. The coefficient of real world demand is greater than 1, indicating that a 1 per cent increase in world GDP leads to an increase of more than 1 per cent in India's services exports to the world. As the world demand for services imports is directly and positively related to world income, it reflects that India's services exports depend on the growth of the world economy. This is in line with previous empirical studies on goods exports (Deardorff et al. 2000; Pain and van Welsum 2004; Eichengreen and Gupta 2012). Therefore, exports from India are more likely to be affected by external shocks, such as any changes in economic activity in major export destination markets. The coefficient of real exchange rate (RER) is found to have a negative

impact on real exports as appreciation of domestic currency adversely affects exports. The appreciation of the RER reduces export (Joshi and Little 1994; Srinivasan 1998; Sharma 2003); hence, a negative link between the appreciation of RER and export demand is expected. However, compared to demand effect, the price effect is much smaller. In addition, the impact of manufacturing exports on services exports is positive and significant—indicating the spillover impact of manufacturing impact on services exports in India—as countries that export more goods also export more services. This is because exports of traditional services are linked closely with the export of goods and arise from it, and because of network effects (Eichengreen and Gupta 2012). The coefficient of manufacturing exports is less than one, indicating that an increase of one unit in manufacturing exports would lead to an increase of less than one unit in total services exports.

Supply side or endowment factors (infrastructure stock, telecom density, human capital, financial development, and FDI) have expected signs. The coefficients of infrastructure stocks have a positive impact on services exports as better infrastructure stocks such as telecom, transport, and power reduce the cost of trade and increase competitiveness in international markets. Infrastructure facilitates improvement in the education and training system that produces skilled labour, thereby inducing services exports. Services such as communications, transportation, and construction are physical and capital-intensive and, therefore, the availability of better infrastructure increases the exports of these services (Urata and Kiyota 2003). Alternatively, telecom density or penetration rate has a positive impact on services exports. Since the mid-1990s, when reform began and the telecom sector in India was opened to private investment, there has been a teledensity revolution. Low cost tele-services is a major reason for services exports, particularly modern services exports.

As measured by domestic credit by banking sector, financial development has a positive impact on services exports in India because, as in the case of goods exports, it reduces the variable costs of exporting services (i.e., freight and transportation costs), thereby increasing the competitiveness of services exports (Beck 2003). When we replace domestic credit by financial development index—which includes variables such as bank branches per million population and bank credit as percentage of GDP and M2 by GDP ratio—similar results are found. Therefore, access to financial institutions and finance at reasonable cost can be important for India's services exports. Availability of human capital, proxied by gross secondary enrollment ratio and average years of schooling, is vital for services exports; the results support this. The coefficient of human capital-GSER and SCH is positive and significant across specifications. Therefore, we find that success in India's services exports is attributed to the large pool of high-quality, low-cost human capital.

Similarly, the coefficient of index of economic freedom, which is the proxy for institution quality, is positive and significant. Overall, we find that the major determinants of total

services exports are real world income, real exchange rate, manufacturing exports and relative endowment factors (infrastructure stock, human capital, and financial development).

5.5 Determinants of Modern Services

Having analysed the determinants of aggregate services exports, we next estimate the determinants of modern services exports using both DOLS and ARDL models.⁶ Like total exports, modern services exports are influenced by real world demand, real exchange rate, manufacturing exports, and relative endowments (infrastructure stocks, human capital development, financial development, and FDI) (Table 13). The coefficient of world demand for services exports is greater than one, which indicates that a rise in world income will boost modern services exports from India. On the other hand, rupee appreciation will reduce exports as real exchange rate reduces the competitiveness of India's services exports.

The stock of physical infrastructure boosts modern services as infrastructure (telecom, transport, power, etc.) helps in developing human capital. Poor infrastructure facilities characterise India and impede services trade, competitiveness, and sustainable development (Jones 2006; Sahoo and Dash 2010). Similarly, the availability of skilled, low-cost labour in India improves her exports of modern services. As expected, telecom density or penetration rate has a positive impact on modern services exports, as telecom is the lifeline of ICT, financial services, and communication. Foreign direct investment has a positive impact on modern services as it promotes exports by augmenting export capacity, increasing physical capital, worker skills and market penetration potential (De Gregorio 1992). In addition, the index of economic freedom (which is the proxy for better institutional quality) has a positive influence on modern services since better institutions improve the confidence of importers of services. The literature suggests that the quality of institutions positively influences trade in services (Lennon 2006; Kimura and Lee 2006).

5.6 Determinants of Traditional Services Exports

Finally, we estimate the long-run coefficients of traditional services exports. The results indicate that although the world demand effect is positive and significant, the magnitude of the coefficient is smaller than total and modern services. Similarly, the coefficient of real exchange rate is negative as in the case of total and modern services. However, the coefficient of RER is smaller than of total and modern services.

Like total and modern services, better infrastructure stock boosts traditional services such as transport and travel services. Similarly, human capital development in terms of

⁶ The diagnostic test indicates that the serial correlation, ARCH effect, and heteroscedasticity are not a problem. Further, the Ramsey test also suggests there is no misspecification problem for the model. Adjusted R^2 is also very high indicating the model fits the data very well.

higher skills also improves traditional services as in other cases. The coefficient of manufacturing services also boosts traditional services, but its impact is less than its impact on aggregate and modern services. Other important variables like financial development, FDI, index of economic freedom, and telecom penetration do not have significant impact on traditional services. These variables are dropped from the final estimation of traditional services exports.

6 CONCLUSION

In sum, based on the above analysis, we find that India's aggregate services are determined by world demand, exchange rate, manufacturing exports, endowment factors (human capital and physical infrastructure stock), and financial development. Similarly, the performance of modern services exports is determined by traditional factors and, additionally, institutions and FDI inflows. In comparison to modern services, traditional exports are dependent on limited factors (world demand income, exchange rate, and manufacturing exports) and endowment factors (human capital and infrastructure stocks). The impact of FDI, institutions and financial development is not significant.

In the past few years, the pace of growth of the world economy has been moderate; this might limit the growth of India's manufacturing and services exports. Therefore, India needs to focus on supply-side factors (development of human capital, infrastructure, financial sector, and broadband teledensity). The effort to improve the competitiveness of the manufacturing sector and manufacturing exports will also help services exports through the networking effect. Infrastructure development (energy availability, transportation, and communication) reduces trade and transaction costs, and India must focus on these sectors to make manufacturing and services exports competitive. In addition, further trade and financial liberalisation and removal of FDI caps in areas like health, education, and financial sectors is required to achieve sustained export growth in services. India's software exports are limited to a few developed countries, which are expected to grow at a moderate rate in the coming decades. Therefore, India needs to diversify software exports by targeting developing countries.

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APPENDIX

A.1 Analysis of Data for World Services Exports

For the analysis of India's services trade, we use data sets provided by the RBI. The concepts, classification and compilation procedure used for the trade in services is as per the standards set out in IMF's prescriptions (BPM/EBOPS). While the aggregate data provided by IMF's balance of payment data from 1976 to 2012 gives three categories of services – transport, travel and others (OCS). The other commercial services in this IMF BOP data are too broad and include components such as financial, legal, computer, etc. This aggregate data is not amenable to the mode of services in GATS. In comparison, RBI data is more disaggregated and since 2001-02, this also gives disaggregation of miscellaneous category of services into software, business services, financial services and communication services. This is more in tune with fifth edition of balance of payments manual (BPM5). The standard components of (BPM5) correspond to the four modes of services of WTO. While RBI data gives 5 categories where misc is further divided into four categories of data, UN service trade data is in consonance with BPM5 and this gives service data at 11 broad category levels which are further disaggregated at various levels. At this stage, we will use only these 11 broad categories to get a more general picture.

RBI Service Data	UN Service Data
1. Travel ((1950–2011)	1. Transportation (2000–10)
2. Transport (1950–2011)	2. Travel (2000–10)
3. Insurance (1950–2011)	3. Communication services (2000–10)
4. G.n.i.e (1950–2011)	4. Construction Services (2000–10)
1. Miscellaneous (1950–2011) (Construction and license fees, personal, cultural and recreational services etc.) of which i. Software service (2001–11) ii. Business service (2004–11) iii. Communication services(2004–11) iv. Financial services (2004–11)	5. Insurance Service (2000-10)
	6. Financial services (2000–10) 7. Computer and Information Services (2000–10) 8. Royalties and licencefees (2000–10) 9. Other business services (2000–10)

	10. Personal, cultural and recreational service (2000–10) 11. Government services n.i.e. (2000–10) Also given are: (2000–10) (2000–10) Compensation of employees (2000–10) Workers' remittances (2000–10) Migrants' transfers (2000–10) Direct investment (2000–10)
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A.2 Herfindahl Index of Services Export Concentration

While the HHI is generally used to measure market concentration of firms in any industry, here it is used as a measure of concentration in services export market of various services sector.

HHI=Sum of square of shares of all exporting countries in Total export of that sector

$1/N \leq HHI \leq 1$ where N=number of exporting countries

Normalised HHI or $HHI^* = (HHI - 1/N) / (1 - 1/N)$

$0 \leq HHI^* \leq 1$

Here, the normalised Herfindahl index is used as it is easier for comparison over time and across sectors. A low Herfindahl index is considered to indicate a less concentrated and more competitive market whereas a higher HHI* or nearer to 1 means more concentrated or monopolised export market.

A.3 ARDL Cointegration

We use the ARDL method developed by Pesaran et al. (2001) to find out the long-run relationship among the relevant variables. This procedure is good to use for stationary variables and a mixture of I(0) and I(1) variables. The existence of long-run relationship is confirmed with the help of an F-test that tests that the coefficients of all explanatory variables are jointly different from zero. The usual critical values are applicable for the F-test when all variables are I(0). However, different and higher critical values (provided in Pesaran and Shin 1998) are applicable when all or some of the variables are I(1).

The augmented ADRL model can be written as follows:

$$\alpha(L) y_t = \mu_0 + \sum_{i=1}^k \beta_i(L) x_{it} + u_t \quad \text{-----(4)}$$

where $\alpha(L) = \alpha_0 + \alpha_1 L + \alpha_2 L^2 + \dots + \alpha_n L^n$

and $\beta(L) = \beta_0 + \beta_1 L + \beta_2 L^2 + \dots + \beta_m L^m$

where μ_0 is a constant; y_t is the dependent variable; L is the lag operator such that $L^i x_t = x_{t-i}$. In the long-run equilibrium $y_t = y_{t-1} = y_{t-2} = \dots = y_0$ and $x_{it} = x_{it-1} = x_{it-2} = \dots = x_{it-0}$. Solving for y we get the following long-run relation:

$$y = a + \sum_{i=1}^k b_i x_i + \gamma_t \quad \dots \dots \dots (5)$$

Where $a = \frac{\mu_0}{\alpha_0 + \alpha_1 + \dots + \alpha_n}$

$$b_i = \frac{\beta_{i0} + \beta_{i1} + \beta_{i2} + \dots + \beta_{im}}{\alpha_0 + \alpha_1 + \alpha_2 + \dots + \alpha_n}$$

$$\gamma_t = \frac{u_t}{\alpha_0 + \alpha_1 + \alpha_2 + \dots + \alpha_n}$$

The error correction (EC) representation of the ARDL method can be written as follows:

$$\Delta y_t = \Delta \hat{\alpha}_0 - \sum_{j=2}^p \hat{\alpha}_j \Delta y_{t-j} + \sum_{i=1}^k \hat{\beta}_{i0} \Delta x_{it} - \sum_{i=1}^k \sum_{j=2}^q \hat{\beta}_{i,t-j} \Delta x_{i,t-j} - \alpha(1,p) ECM_{t-1} + \mu_t \quad (6)$$

where $ECM_t = y_t - \hat{\alpha} - \sum_{i=1}^k \hat{\beta}_{i0} \Delta x_{it}$

where Δ is the first difference operator; a_{ij} and b_{ij} are the coefficients estimated from Equation (6.6) and $\alpha(1,p)$ measures the speed of adjustment. A two-step procedure is used in estimating the long-run relationship. In the first step, we investigate the existence of a long-run relationship predicted by theory among the variables in question. The short and long-run parameters are estimated in the second stage if the long-run relationship is established in the first step.

A.4 The Dynamic OLS (or DOLS) procedure

This procedure, developed by Saikkonen (1991) and Stock and Watson (1993), has the advantage that the endogeneity of any of the regressors has no effect, asymptotically, on the robustness of the estimates. Further, statistical inference on the parameters of the co-integrating vector is facilitated by the fact that the t-statistics of the estimated co-efficient

have asymptotic normal distribution, even with endogenous regressors (Stock and Watson 1993). This procedure also allows for direct estimation of a mixture of I(1) and I(0) variables. The DOLS procedure incorporates the lags and leads of the first differences of the I(1) variables. Thus, estimation of the long-run relation between Y and X is carried out with a regression of the type:

$$Y = I^d \phi X + \sum_{-n}^n a_i DX_{t-i} \quad (7)$$

where I^d denotes the vector of long-run coefficients of X using the DOLS procedure. The inclusion of DX_{t+j} terms takes care of the possibility of endogeneity of X, i.e., feedback from Y to future values of X (see Stock and Watson 1993).

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