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An Empirical Study of the Effects of Services Infrastructure on Trade Efficiency and Growth in Myanmar*

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Abstract

This research attempts to investigate the existing levels of implementation of the General Agreement on Trade in Services (GATS) in Myanmar by examining the performance of three services sectors: transport, banking and telecommunications. The research questions include (i) what factors affect substantially the export and economic growth in response to service sectors liberalization? (ii) and investigating to what extent these factors contribute to the export and economic growth of Myanmar during the period 1990-2005 based on data availability. To achieve this, two types of model are used: the export supply equation and the growth model. The results from the export supply equation and growth model advocate that the efficiency in cargo-handling, transportation networks, capital formation/GDP ratio have significant impacts on Myanmar's exports among other service-openness factors. The amount of loans offered by private banks, and numbers of fixed and mobile telephone subscribers have minimal effects on both manufactured and aggregate exports, suggesting the need for substantial service trade liberalization to attract FDI inflows in service trade sectors through far-reaching policy initiatives which would intentionally create a more stable economic and political environment. In addition, the determinants of capita income growth in Myanmar are examined extensively applying the Barro and Sachs-Warner type growth model which incorporates financial and telecommunication performance variables in the model in support of dynamic efficiency gains obtained under the service-trade liberalization.

Keywords: Services Trade Liberalization, Services Infrastructure, Trade Efficiency, Growth

1. Introduction

The General Agreement in Trade in Services (GATS) under the World Trade Organization (WTO) divides services into four independent modes of supply, viz.: mode 1-cross border supply, mode 2-consumption abroad, mode 3-commercial presence and mode 4-movement of natural persons. This research aims to investigate the degree of openness in backbone service sectors and the relationship between service-trade infrastructure and economic growth in Myanmar by focusing on sectoral performance in relation to modes 1, 2 and 3. It will allow us the extent to which further liberalization is needed in selected service sectors to encourage foreign direct investment (FDI) which would enhance the trade and economic growth of Myanmar.

The report is structured as follows. The introduction is in section 1; the objectives of study, research questions and literature review are discussed in sections 2 and 3 respectively; section 4 analyses the developments in trade in goods and services in light of Myanmar's commitments in trade in services; and section 5 presents the performance of services trade liberalization. Section 6 explores effects of services-trade liberalization on trade and economic growth and section 7 concludes and suggests areas for further research.

2. Objectives

The objectives of the study are as follows: (i) to examine the existing level of implementation of GATT Article V,VIII and X in Myanmar, by constructing service-trade openness ratios/or performance indicators of three primary services sectors: transport, financial (banking) and telecommunications sectors1; (ii) to explore the benefits and contributions that may be expected from cooperation and liberalization in Myanmar; and (iii) to investigate the relationship between service trade liberalization and the modes 1, 2 and 3. It will enable to identify the restrictions affecting foreign firms entry in domestic market and the necessary measures for enhancing liberalization to achieve the benefits and contributions of such liberalization.

The research questions include (i) what factors affect substantially the export and economic growth in response to service sectors liberalization? (ii) and to what extent do these factors contribute to the export and economic growth of Myanmar during the period 1990-2005 based on data availability.

3. Literature Review

The study on the association between services and economic growth stem primarily from the financial sector. King and Levine (1993) postulate that financial services can affect growth through enhanced capital accumulation and/or technical innovation. Hoekman (1995)'s pioneer work on frequency ratios attempts to measure the relative degree of restrictiveness of market access to services trade across countries and sectors under the WTO. The frequency ratios are calculated based on the number of commitments scheduled in the GATS by individual countries. These countries designate sectors or sub-sectors unrestricted or partially restricted in relation to the maximum possible number of unrestricted commitments. The 'tariff equivalents' for individual sectors were estimated to reflect the degree to which market access to these sectors was restricted.

Francois and Schuknecht (1999) find a strong positive relationship between growth and financial sector competition. Deardoff (2001) also argues that there are particularly large gains including the efficiency (dynamic) gains from reducing trade costs.

Mattoo and Subramanian (2006) suggest that services liberalization is different from trade in goods because the former necessarily involves factor mobility and leads to scale effects that are distinctive though not unique. It finds a relatively strong and robust relationship for the financial sector and a less strong, but nevertheless,

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[1] The analysis on degree of service trade liberalization in the context of market access and national treatment of Myanmar can be found in Khin Maung Nyunt, "Financial and Telecommunication Services Liberalization in the GMS Economies," in Mikic, M. (eds) 2010, *Financial and Telecommunication Services- Regulation and Liberalization: Needs and Opportunities in GMS Economies*, UN ESCAP Publication, forth coming, November.

statistically significant relationship for the telecommunications sector. The UNCTAD (1998) discusses the importance of the complementary in the linkages between various modes of supply emphasizing on risks associated with the lack of competition in some international service markets.

Fink, Mattoo and Neagu (2002) conclude that while unilateral policy action in the maritime sector in Singapore can remove trade restrictions, there is also a need to deal with the possible private anti-competitive practices of international maritime cartels. Francois and Wooton (1999) report similar results with respect to shipping services.

Findlay (2001) stresses the importance of considering the interaction between services sectors between modes of supply and in some cases between goods and services through a cross-sectoral approach to the design of policy. In addition, empirical research on services trade and growth can be found in the recent studies of Hoekman and Saggi (2005), Wilson, Mann, and Otsuki (2003); Fink, Mattoo and Neagu (2002); and Asia Pacific Foundation of Canada (1999). In the previous studies, port efficiency measures have been constructed in accordance with the General Agreement on Tariffs and Trade (GATT), article V: Freedom of Transit. Customs environment measures consist of components that have their basis in GATT article VIII, while regulatory environment issues are contained in GATT article X. With respect to the role of transport costs and infrastructure in foreign trade, 'access to markets' and 'increases in per capita income' have been explored in recent research. Limão and Venables (2000) find that potential causes of high transport/shipping costs a re subject to the existence of restrictive trade policies, lack of infrastructure, anti-competitive practices of service suppliers, plus inefficient and time-consuming handling of cargo in ports and airports. With respect to communication costs, the studies of Freund and Weinhold (2002), Fink, Mattoo, and Neagu (2002) and Clarke (2002) find that efficient telephone and internet services lower communication costs. Freund and Weinhold (2002), Griindfeld and Moxnes (2003), Kimura and Lee (2006) and Lejour and Verheijden (2004) attempt to explain modes 1 and 2.

The work of Dihel, N.F. Eschenbach and B. Shepherd (2006) emphasizes mode 3 in relation to OECD and 18 non-OECD countries using FDI stocks in service sectors as a proxy for trade in service in the gravity model. Services trade and investment in eastern Europe and the former Soviet Union has been investigated by the World Bank (2006) by exploring "best practices", while applying trade-policy reform indices in the area of banking, telecommunication, and transport. It finds that the services are major inputs into the production of goods and other services since some services encourage trade efficiency through improvement in labor productivity.

4. Developments of Trade in Goods and Services in Myanmar

4.1 Share of Service Sectors in Gross Domestic Product (GDP)

The share of service sectors in GDP increased from 32 percent in 1990 to 35 percent in 2005 in line with market oriented reform in Maynmar. However, agriculture is still the most important sector, accounting for about 48 percent of GDP at current prices and employing about 60 percent of the labor force. Service sector exports account for a small share of production and employment compared with agriculture and industry. Export growth was robust indicating an average annual growth rate of 15.6 percent during the period under study. This seems to reflect success in tapping the regional export market. In contrast, the import growth rate averaged 10.5 percent. Volume of trade has risen rapidly since 1994, mainly as a result of the private sector's response to liberalization and high foreign direct investment inflow.

The trade in services in Myanmar, as estimated from balance of payment statistics, was greater than $1.44 billion, representing about 29.4 percent of total merchandised exports in 2005. The figures reveal that in 2004, transport represented around 15.3% of total exports, other commercial services exports almost 5%, while travel was approximately 6% of total exports.

Table1 Sectoral Output as Percent of GDP and Growth Rate of Output

Year	Sectoral Output as Percent of GDP				Growth Rate of Output (Percent)		
	Agriculture	Industry	Services	Total	Agriculture	Industry	Services
1990	57	11	32	100	2.8	1.8	5.5
1991	57	11	32	100	-0.7	-2.4	1.5
1992	59	10	31	100	9.7	10.5	12.7
1993	61	9	30	100	6	4.6	11
1994	63	9	28	100	7.5	5.9	10.3
1995	63	9	28	100	7	4.8	12.7
1996	60	10	30	100	6.4	5	10.7
1997	60	10	29	100	5.7	3.7	8.9
1998	59	10	31	100	5.8	4.5	6.1
1999	59	10	31	100	11	11.5	13.8
2000	60	9	31	100	13.8	11.1	21.3
2001	57	10	33	100	11.3	8.7	21.8
2002	57	11	32	100	12	6	35
2003	55	13	32	100	13.8	11.7	20.8
2004	51	14	35	100	13.6	11	21.5
2005	48	16	35	100	-	-	-

Source: Asian Development Bank (2007). *Key Indicators of Developing Asian and Pacific Countries-2007*, Manila, the Philippines.

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4.2 Myanmar Commitments in GATS under WTO and ASEAN

Myanmar is committed to implementing the GATT Article V: Freedom of Transit; Article VIII: Fees and formalities connected with Importation and exportation; and Article X: Publication and Administration of Goods and People. Myanmar also follows the Harmonized System of International Nomenclature in recording traded goods and commercial services. After joining ASEAN in 1997, Myanmar took measures to comply with the ASEAN Common Effective Preferential Tariff Scheme (CEPT) under ASEAN Free Trade Area (AFTA). As far as 'freedom of transit' is

concerned, Myanmar has implemented measures to encourage transit trade under the framework of AFTA and WTO. In addition, Myanmar became a member of the World Customs Organization (WCO) in 1991 and introduced various regulatory reforms and measures as follows: introducing 'green and red' channels for customs clearance; transforming export and import division under the Customs Department into a one-stop service station; application of customs declaration forms using UN layout key; simplification of the customs clearance system; establishment of the customs transit system; adoption of the inward clearance procedure in accordance with the Kyoto Convention; establishment of a risk management system in custom inspection; and preparing for the ASEAN single window and establishment of Customs website for dissemination of trade regulations and information.

With respect to port and customs liberalization, the measures undertaken by Myanmar are summarized as follows:

(a) The Amendment of Sea Customs Act was drafted and approved by the office of the Attorney-General in order to comply with the provisions of WTO.

(b) The valuation agreement is in the process of being approved by the cabinet through the Ministry of Finance and Revenue to promulgate a new legal enactment.

(c) Export tax rates used for both border and conventional trade have been reduced to zero percent with effect from 1st April 1998 and 1st January 1999 respectively.

(d) Transit duty was abolished with effect from 1st January 2000 as a fulfillment of their commitment to the ASEAN agreement on the Facilitation of Goods in Transit.

(e) The Green Lane System which has been laid out by ASEAN Customs Administrations for the rapid clearance of goods of ASEAN origin was implemented in Myanmar on 1st January 1999.

(f) The Customs Value Declaration Form was prescribed with effect from 1st April 1999 to provide the implementation of the WTO Valuation Agreement.

(g) The CEPT Product List under Tariff Reduction Plan was implemented

Myanmar shares borders with five countries for about 6,151 kilometers and establishes a total of 13 main border trade points[2] with its four neighbors[3], Border trade

[2] The border trade points comprises Muse, Lwejei, Laizar, Chinshwehaw and Kambaiti established with China since 1998; Tachilek, Kawthoung, Myawaddy and Myeik with Thailand since 1996; Tamu and Reedkhawdhar with India since 1995; and Maungtaw and Sittway with Bangladesh also since 1995. To boost border trade with neighboring countries, the 150-hectare Muse border trade zone, the first largest of its kind in the country was established in June 2006, linking Muse with Ruili in Yunnan.

[3] These countries include Thailand, China, India and Bangladesh.

plays a leading role in the Myanmar economy comprising 30 percent of its total trade volume[4]. The foreign trade of Myanmar totaled 5.5 billion dollars in 2005-2006.

The normal trade transaction method which is the export first/import later system was introduced in which all payments have to be made in US Dollars. With respect to border trade, all payments have to be made in US currency (or) local currencies at each border. Myanmar maintains a dual exchange rate arrangement. Officially the kyat has been pegged to SDR at a fixed rate of K 8.5 per SDR since 1977, or at about K 6 per U.S. dollar. Since most trade is conducted at a market-determined exchange rate, it may lead to the economic costs of private sector and rent seeking opportunities of public sector.

5. The Performance of Services Trade Liberalization

This section analyses the performances of three primary services trade: (i) transport services, (ii) finance and banking, and (iii) telecommunications, by constructing representative indicators/ratios as reported in Table 2.

5.1 Transport Services

Myanmar's commitment in transport service liberalization includes the implementation of development of GATT Article V: Freedom of Transit; Article VIII: Fees and formalities connected with Importation and exportation; and Article X: Publication and Administration of Goods and People. Myanmar follows the Harmonized System of International Nomenclature. After joining ASEAN in 1997, Myanmar took measures to comply with the Association of Southeast Asian Nations (ASEAN) Common Effective Preferential Tariff Scheme (CEPT) under ASEAN Free Trade Area (AFTA). The performance of transport service sector in Myanmar can be assessed on the basis of length of highways, international passenger and freight carried, tonnage loaded and unloaded at international ports. The growth rate of length of road was low at 1.7% during 1990-2005. The growth performance of transport sector reflects the government's encouragement of private sector participation; in recent years, several Build-Operate-Transfer contracts for developing toll-roads, aviation routes and ports have been awarded to private investors.

[4] It comprises Muse, Lwejei, Laizar, Chinshwehaw and Kambaiti established with China since 1998; Tachilek, Kawthoung, Myawaddy and Myeik with Thailand since 1996; Tamu and Reedkhawdhar with India since 1995; and Maungtaw and Sittway with Bangladesh also since 1995. To boost border trade with neighboring countries, the 150-hectare Muse border trade zone, the first largest of its kind in the country was established in June 2006, linking Muse with Ruili in Yunnan.

As far as 'consumption abroad' under WTO is concerned, numbers of international passenger travel with tourist or business visas and are observed. Tourism appears to be relatively dynamic sectors in Myanmar and are foreign currency earners. With respect to air transport international passenger travel with business visas and tourists arrivals with tourist visa flows increased from 16.5 thousand in 1990 to 75.6 thousand in 2005 indicating average annual growth. From a regional perspective, during 1990-2005, exports to Asia grew at 10.6 percent. Tourist arrivals from Asia represented approximately 51.3% of total visitor flows in 2005.

With respect to Port and Customs Efficiency, the Port of Yangon has been upgraded and extended for handling of the burgeoning container traffic. One wharf is government-owned Botataung Wharf, and two are privately owned wharves: Myanmar International Terminals Thilawa and Asia World Terminal were launched in 1987, 1996 and 2001 respectively. In this regards, the cargo tonnage loaded and unloaded under maritime transport are used as a proxy in this empirical research.

5.2 Banking and Financial Services

Banking sector performances are used to examine the number of entry of foreign banks into the domestic market in terms of number of foreign banks, bank penetration rates, assets of private banks and the amounts of loans offered by private banks. The banking sector in Myanmar is at an early stage of development, but the role of private banks has increased significantly in the last decade. The banking system comprises Central Bank of Myanmar, state-owned banks, and private banks. The other state-owned commercial banks are the Myanma Investment and Commercial Bank, and the Myanma Foreign Trade Bank. The state banks operate a network of over 550 branches.

Since 1999 the Central Bank of Myanmar has issued licenses to foreign banks to open representative offices in Myanmar, and by October 2001, 28 foreign banks have opened representative office[5]. Representative offices of foreign of foreign banks fell from 43 to 36 during 1998/99, following the revocation of their foreign exchange trading licenses. Since commencing operations in June 1992, private banks have expanded in number from 4 in 1992 to 20 in 2001 and 34 in 2005. The non-bank financial sector is relatively small. The non-bank financial institutions include the Myanma Insurance Company; the Myanma Securities Exchange Center a joint venture between the Myanma Economic Bank and Diwa of Japan and foreign exchange bureau.

[5] There are six from Singapore, four each from Japan, France, and Malaysia, two each from Thailand, and Bangladesh and one each from the Netherlands, Cambodia, United Kingdom, Brunei Darussalam, Korea and Germany

Table 2 Trede, Banking and Finance Sector Performance

Year	TRADE		BANKING AND FINANCE					
	Export/ GDP (%)	Real GDP growth rate (%)	FDI service/ GDP (%)	FDI in services (mil US dollar)	Total FDI (mil US dollar)	Assets of Private bank (mil Kyat)	Loans of private banks (mil Kyat)	Capital formation/ GDP (%)
1990	6	2.8	0.172	86	1872	-	7,208	13
1991	6	-0.7	-	0.05	6	-	12,406	15
1992	7	9.7	0.007	3.58	104	522	19,173	14
1993	7	6	0.536	0.084	378	2,399	23,076	12
1994	9	7.5	0.84	524	8111	6,720	28,262	12
1995	8	7	0.692	462	668	20,231	45,956	14
1996	8	6	1.36	985	2814	48,966	75,346	12
1997	8	6	0.67	503	1013	85,062	115,505	13
1998	8	6	0.002	1	54	139,849	155,761	12
1999	10	11	0.108	16	58	230,588	188,649	13
2000	13	14	0.064	62	218	384,071	266,966	12
2001	15	11	2.41	2,599	7,395	597,174	416,676	12
2002	17	10	-	0	87	846,215	609,101	10
2003	10	14	0.022	30	91	439,204	342,547	11
2004	12	5	1.86	2,629	7,592	-	787,281	12
2005	14	4.5	-	0	6030	-	-	-

Source: Calculations of the Author.

5.3 Telecommunication Services

Myanmar Telecom Corporation, under the Ministry of Post and Telecommunication represents major telecommunication service providers in Myanmar, while the mobile service providers in the private sector comprise CDMA Telephone Co Ltd., GSM Mobile Phone Co Ltd., Wireless Local Loop (WLL) and D-AMPS Telephone Co Ltd. In May 2002, Thai satellite operator Shin Sat signed a service contract and a procurement contract in Myanmar with Bagan Cybertech IDC & Teleport. Bagan Cybertech is a partially government-owned telecommunications company which offers the Very Small Aperture Terminal (VSAT) and high-speed Internet services. The operator planned to deploy and use an iPSTAR ground system to provide rural telephony services for over 3,000 unserviced villages.

Table 3 Transportation and Communications Sector Performance

Year	TRANSPORTATION				COMMUNICATIONS			PORT PERFORMANCE		
	Total tourist arrivals	**Total tourists including border pass**	**Tourists (business visa) '000 person**	**High-ways length of road ('000km)**	**Telephone in use '000 person**	**Internet users ('000 person)**	**Fixed and mobile phone in use '000**	**Int'l Cargo '000 ton**	**Maritime int'l, loaded '000 ton**	**Maritime int'l, unloaded '000 tons**
1990	8,806	25,261	16	24	86,333	-	86,333	2,132	650	2,132
1991	7,947	26,012	18	24	95,646	-	95,646	2,462	698	2,462
1992	22,363	44,079	22	24	107,048	-	107,048	3,466	879	3,466
1993	62,096	90,579	28	24	128,695	-	128,695	4,606	1,278	4,606
1994	95,616	132,255	37	27	140,428	-	140,428	5,765	1,587	5,765
1995	120,205	170,143	50	28	169,530	-	174,764	6,206	2,662	6,206
1996	251,501	310,298	59	29	199,017	-	213,559	7,129	2,302	7,129
1997	265,122	329,379	64	29	225,315	-	242,311	7,700	2,093	7,700
1998	287,394	345,829	58	28	240,673	578	258,899	7,207	4,289	7,207
1999	246,574	309,985	63	28	260,579	890	283,357	7,736	3,812	7,736
2000	260,616	325,042	64	29	282,853	3,313	309,813	10,093	5,926	10,093
2001	295,354	359,404	64	29	307,056	4,879	352,398	9,630	5,103	9,630
2002	301,024	365,281	64	29	351,763	19,946	419,392	10,335	910	3,307
2003	269,205	330,320	61	30	372,317	37,610	469,799	9,294	1,002	2,951
2004	-	-	59	0	424,900	-	517,400	-	788	2,811
2005	-	-	76	43	-	-	-	-	1,173	3,252

Source: Ibid.

The joint venture was targeting installations in 500 villages by the middle of 2003. Under the contract, Shin Sat and Bagan agreed to jointly set up an iPSTAR gateway in Myanmar, while Bagan will be responsible for its operation and maintenance.

The growth of the transport and communication sectors averaged more than 18 percent during 1990-2004. Liberalization measures can be examined by focusing on the number of fixed and mobile phone users, and e-commerce attributed to expansion by the private sector.

5.4 FDI Flows as the Proxy for Commercial Presence

Commercial presence in Myanmar can be examined in the context of activities of majority-owned foreign affiliates using FDI flow in services as a proxy. The share of services in FDI stock rose from 25% in 1990 to about 45% in 2005. Asian countries remain the main source of inward FDI. Myanmar FDI has been driven by 'push' and 'pull' factors dominated by structural and geo-political factors.

5.5 Movement of Natural Persons for Services Provisions

The achievement of mode-4 transactions in this region will depend partly on the extent to which drug and human trafficking can be eliminated through regional cooperation. Similarly, the data on mode-4 trade can be gathered through regional cooperation between service trade partners. Myanmar has no commitments in relation to the movement of natural persons except some forms of labor contracts under the ASEAN service trade framework.

6. Effects of Services-trade Liberalization on Trade and Economic Growth

In this section, two linkages: (a) rate growth of GDP and manufactured and total exports, and (b) FDI in services and GDP growth rate are investigated for the period: 1990-2005.

6.1 Analytical Framework

The empirical specification of the export supply model in this research is based on the traditional, partial equilibrium model of trade flows of Goldstein and Khan (1985) that provides a clear exposition of a 'imperfect substitute' model. The export supply model in this research has been extended in three dimensions in relation to liberalization in finance, telecommunication and transport sectors. The algebraic framework of this equation can also be found in the work of Rose (1991).

6.1.1 The Linkage between Service Trade Performance and Export Growth

The augmented export supply model can be specified as follows:

$$\ln E_t = \beta_0 + \beta_1 \ln(P_t^d/P_t^w) + \beta_2 \ln ER_t + \beta_3 rGDP + \beta_4 \ln TEL_t + \beta_5 \ln FIN_t + \beta_6 \ln PE_t + \beta_7 \ln TRN_t + \beta_8 \ln AIR_t + \varepsilon_t \quad (1)$$

where

$\ln(P_t^d/P_t^w)$ = log of relative price of export
$\ln E_t$ = log of merchandised exports as % of GDP
$\ln ME_t$ = log of manufactured exports as % of GDP
$\ln FDI_t$ = log of foreign direct investment (FDI) as % of GDP
$\ln FDIS_t$ = log of FDI in service sectors as % of GDP
$\ln ER_t$ = effective exchange rate (CPI based measures)

$\ln(K/GDP)_t$ = Capital formation to GDP ratio
$rGDP_t$ = rate of growth of GDP
$\ln FIN_t$ = amount of loans provided by private banks
$\ln TEL_t$ = fixed and mobile phones scribers per 1000 person
$\ln TRN_t$ = transport network (length of express way)
$\ln PE_t$ = cargo loaded and unloaded at maritime transport as proxy for port efficiency
$\ln TOUR_t$ = number of tourist arrival with tourist visa
ε_i = random error term

Augmented export supply model asserts that export supply of a country depends on relative price of export, real exchange rate, capital formation and other service-trade infrastructures variables such as amount of loan provided by private bank, road network telecommunication penetration rates, cargo throughput, and numbers of tourist arrivals. The model is expressed in Equation 1 and it is estimated using total exports as well as manufactured exports as a dependent variable in the model. The results are reported in Table 5 and 6 respectively.

6.1.2 The Linkage between Service Trade Performance and Economic Growth

It can be postulated that service trade liberalization measures will encourage service-trade infrastructure performance, and hence, exports, as well as economic growth of Myanmar. In particular, linkages between service trade performance and export and GDP growths are examined by applying the Barro and Sachs-Warner type growth model employed by Mattoo and Subramanian (2006). It can be reformulated as follows:

$$rGDP_t = \beta_0 + \beta_1 \ln E_t + \beta_2 \ln ER_t + \beta_3 \ln FDI_t + \beta_4 \ln(K/GDP_t) + \beta_5 \ln TEL_t + \beta_6 \ln FIN_t + \beta_7 \ln PE_t + \beta_8 \ln TRN_t + \beta_9 \ln TOUR_t + \varepsilon_t \quad (2)$$

In addition, as a variant of growth model, to explain the commercial presence (mode 3), this research will apply the work of Dihel, N.F. Eschenbach and B. Shepherd (2006) which initiated the use of FDI stock measures as proxy for foreign firm affiliate sales.

$$\ln FDIS_t = \beta_0 + \beta_1 \ln E_t + \beta_2 \ln ER_t + \beta_3 \ln(K/GDP_t) + \beta_4 \ln FIN_t \ \beta_5 \ln TEL_t + + \beta_6 \ln PE_t + \beta_7 \ln TRN_t + \beta_7 \ln TOUR_t + \varepsilon \quad (3)$$

Where, the notations are same as before.

6.2 Empirical Results

The export supply model of Myanmar has been estimated by applying the standard export supply model which incorporates trade service infrastructure for the period 1990-2005 based on data availability. In the first stage, to examine the stationary properties of time series and to determine the level of cointegration among variables under study, the standard unit root tests are conducted stationary at 5% level of significance. The estimation results are given in Table 5.

The results from Augmented Dicky-Fuller unit root test are provided in Table 3, while Johansan's cointegration test are reported in Table 4. According to the Engle and Granger methodology, given that all variables were found to be integrated of order 1 and residuals are stationary, we can conclude that there is a cointegration or long-run relationship between exports and GDP, real exchange rates and trade service indicators under study. Thus the stationary in level I(0) indicates $\ln E_t$, lnDFIS, FIN_t, K_t, TRN_t, PE_t, TEL_t, and $TOUR_t$, in comparison, I(1) series reflect $\ln(P_t^d/P_t^w)$, $\ln ER_t$, $rGDP_t$, and $\ln FIN_t$. The results from this specification provide evidence for cointegration according to both the trace and maximum eigenvalue statistics. The results suggest that ratio of export/GDP is related in a stable fashion to real exchange rates and loaded tonnage.

In the second stage, the export supply model is estimated, in that the exports are regressed on the real GDP, export prices, real exchange rates and trade service infrastructure variables. The estimated residuals from the long-run equation are stationary at a 5% level of significance. A decrease in real exchange rate induces higher levels of exports. This results in exports which increase in real income (GDP), loaded and unloaded cargo tonnage, road networks and total FDI and decreases in export prices and real exchange rates. The regression analysis is consistent with the literature which finds a positive relationship between per capita GDP growth and investment statistically significantly at the 5% level. Service-trade infrastructure variables are highly significant determinants of per capita GDP growth, but most striking is the performance of the road network and cargo throughput. The prominent role of the banking sector is noteworthy.

Table 3 Augmented Dickey-Fuller Unit Root Test

Variable		Constant, No Trend	Constant, No Trend	Constant, Trend	Conclusion
lnE_t	Level	-1.6386	1.0796	-3.3147	-
	First diff	-3.624	-	-	I(1)
$lnME_t$	Level	-2.5679	-2.1598	-4.7875	I(0)
	First diff	-	-	-	-
$ln\ FDIS_t$	Level	-3.0495	-2.3730	-	I(0)
	First diff	-	-	-	-
$rGDP_t$	Level	-2.5831	-0.912	-2.4571	-
	First diff	-5.3661	-	-	I(1)
$ln(P_t^d/P_t^w)$	Level	-3.0810*	-	-	-
	First diff	-	-8.1829*	-	I(1)
$ln\ K_t$	Level	-1.7729***	-	-	I(0)
	First diff	-	-4.3290	-	-
$lnER_t$	Level	-.9274	-0.5171	-5.7509	I(0)
	First diff	-	-	-	-
$lnFDIS_t$	Level	-3.7619*		-	I(0)
	First diff	-		-	-
$lnFIN_t$	Level	-2.4379		-	I(0)
	First diff	-		-	-
$lnTRN_t$	Level	-3.6599**		-	I(0)
	First diff	-		-	-
$lnPE_t$	Level	-2.5921		-	I(0)
	First diff	-		-	-
$lnTEL_t$	Level	-8.4137*		-	I(0)
	First diff	-		-	-
$lnTOUR_t$	Level	8.4137***		-	I(0)
	First diff	-		-	-

Note: The notations: *, **, *** denotes significance at the 10%, 5% and 1% level respectively.

Table 4 Johansen Cointegration Results

Long-run Coefficient	**Manufactured export ($lnME_t$)**	**Total exports (lnE_t)**	**Growth rate of real GDP ($rGDP_t$)**	**Ratio of FDI in service sector to GDP ($ln\ FDIS_t$)**
Trace	25.2883	53.3945	48.1092	21.4046
λ-max	44.6041	31.3609	28.2653	17.3686
CR's	(0,1)	(1,1)	(2,2)	(2,1)
lag	2	2	2	2
N	15	15	15	15

Notes: Trace (λ-max) is the trace (maximum eigenvalue) test statistics for the null of zero cointegrating vector against the alternative of one. CR is the number of cointegrating relations implied by the asymptotic critical values for the trace, λ-max and 5% significance level.

Table 5 Long-Run Specification of Export Supply Function Sample: 1990-2005

Variable	**Dependent variable: lnE_t**				**Dependent variable: $lnME_t$**	
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Constant	-7.6115 (-4.9014)	-14.6671 (-5.6848)	-17.7445 (-3.8505)	-19.5501 (-4.6630)	-28.7694 (-8.1427)	
$\ln(P^d/P^w)_t$				0.1085 (2.2226)		
$\ln(P^d/P^w)_{t-2}$	0.3976 (1.4661)		1.02402 (1.7756)			
$\ln(P^d/P^w)_{t-3}$					4.2662 (2.9509)	
$\ln(P^d/P^w)_{t-4}$		2.2021 (4.3602)				
$\ln ER_t$	-.3549 (-5.6241)	-0.3185 (-2.1871)		-0.7944 (-4.1735)		
$\ln(K/GDP)_{t-2}$		0.10813 (2.8188)	0.5647 (1.5316)			
$\ln(K/GDP)_{t-3}$				1.6963 (4.7536)		
$\ln FDIS_t$						
$\ln FDI_t$					0.0714 (2.3876)	
$\ln FIN_t$		0.3042 (3.3218)		0.3547 (3.0419)	0.4971 (4.2557)	
$\ln TRN_{t-5}$			4.2438 (7.5311)			

Table 5 Long-Run Specification of Export Supply Function Sample: 1990-2005 (Continued)

Variable	Dependent variable: lnE_t				Dependent variable: $lnME_t$	
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
$lnPE_t$						
$lnTEL_{t-4}$				1.2645 (3.4665)		
$lnTEL_{t-5}$		0.00001 (2.7927)				
$lnAIR_{t-1}$	0.1072 (1.7874)					
$lnTOUR_t$				-0.0895 (-1.3921)		
R-squared	0.8899	0. 9681	0.9299	0.9640	0.7130	
Adjusted R-squared	0.8409	0.9361	0.8999	0.9209	0.6054	
Log likelihood	12.4546	17.9083	13.5906	19.0154	2.9622	
Durbin-Watson stat	2.2614	2.8703	1.9300	2.7495	2.7194	
Akaike info criterion	-1.0649	-2.1651	-1.7437	-2.0026	0.1729	
Schwarz criterion	-0.8367	-1.9481	-1.5991	-1.7197	0.3346	
F-statistic	18.1814	30.3017	30.9796	22.3345	6.6255	

Table 6 Long-Run Specification of Growth Model Sample: 1990-2005

Variable	Dependent variable: $rGDP_t$			Dependent variable: $lnFDIS_t$
	Model 1	**Model 2**	**Model 3**	**Model 1**
constant	88.1762 (-2.7052)	-118.2591 (-2.5629)	-68.0791 (2.1938)	-172.2725 (-2.8557)
$ln(EXGDP)_{t-1}$	14.5564 (4.2652)		19.4564 (2.0421)	19.1517 (5.0268)
$ln(EXGDP)_{t-3}$				
$ln(K/GDP)_{t-1}$	24.6939 (2.3657)	22.3516 (2.2191)		
$lnER_t$				-21.1071 (-4.3609)
$lnFDIS_{t-3}$	0.43327 (1.7975)	.6038 (2.6247)	0.5463 (2.3891)	
$lnFDI_t$				
ln FIN_t			2.0845 (2.7188)	6.0026 (2.2418)
$lnTRN_t$				28.7463 (1.5988)

Table 6 Long-Run Specification of Growth Model Sample: 1990-2005 (Continued)

variable	Dependent variable: $rGDP_t$			Dependent variable: $lnFDIS_t$
	Model 1	**Model 2**	**Model 3**	**Model 1**
$lnPE_t$				
$lnTEL_t$		5.5151 (2.7876)		
$lnAIR_t$				
$lnTOUR_t$				
R-squared	0.6706	0.5712		0.8164
Adjusted R-squared	0.5718	0.4282		0.7246
Log likelihood	-30.5347	-27.8029		-22.4192
Durbin-Watson stat	2.0925	1.9491		2.6946
Akaike info criterion	4.9335	4.8927		4.4356
Schwarz criterion	5.1161	5.0666		4.4356
F-statistic	6.7866	3.9958		0.0048

As shown in Table 5, if export price increases by 1%, export/GDP ratio will increase by 2.2 %. In contrast, a 1% increase in real exchange rate increases export/GDP ratio by 0.79% as shown in model 4. In addition, a 1% present increases in FDI increases manufacturing export/GDP by 0.07%. The coefficient of capital formation implies export/GDP ratio by 9% during the period of study. The cargo handled has a positive effect on the growth of total exports. The elasticity of export growth with respect to cargo handled is 0.22, which is significantly different from zero at the 5% significant level.

With respect to the growth model, as seen in Table 6, the results highlight that the amount of loans offered by private banks; numbers of fixed and mobile phone users, ratio of FDI in services sector and length of road, correlate positively with GDP growth in Maynmar. However, it has a minimal effect on export growth, suggesting the need for substantial service trade liberalization in order to attract FDI inflows in service trade sectors through far-reaching policy initiatives which would intentionally create a more stable economic and political environment.

There are several significant findings to be gleaned from this analysis. First, a stable and long relationship exists for exports; the real exchange rate and trade infrastructures. The evidence for co-integration is particularly strong for a real exchange rate. The price elasticity of manufactured export is economically small and statistically insignificant. One final finding is that the effects of capital formation on growth indicates quite large. This finding also suggests that improvements in the trade balance may require large movements in the value of the dollar, especially

when starting from an initial position of deficit. Real exchange rate constitutes an important determinant of the export supply.

It is worth noting that Myanmar's exports have also been supported by a substantial effort under trade liberalization to improve the predictability of suppliers and expand the country's port and telecommunications network.

7. Conclusion and Further Research

It is widely accepted that large gains in efficiency are possible through institutional reform which enables governments to manage transport more efficiently and to enhance capacity; thus, becoming more consumers oriented liberalization policies. Management systems should be accountable and modern equipment in the private sector must be updated substantially through liberalization. These types of inefficient management systems and work practices impose costs on users that reduce efficiency and impede utilization of infrastructure. Utilization of modern management systems through far-reaching policy initiatives, based on a more predictable and stable economic and political environment would encourage a substantial increase in FDI in service trade infrastructure and enhance the capacity of current infrastructure in Myanmar.

Potential for service trade depends primarily on the extent to which international trade in services is intra or inter-industry. It can help in understanding the underlying forces that generate trade in the selected service sectors, in service negotiations. Myanmar's commitments to the WTO and ASEAN, in particular, 'freedom of transit' as well as its strategic regional location linking two large countries such as China and India, would allow it to become an important service provider encouraging intermodal/multimodal transport systems through strengthening regional cooperation by adhering to national and regional interests.

Three broad conclusions can be drawn from this study. First, service liberalization in Myanmar necessarily involves mobility of capital and labor through trade and foreign investment and leads to scale and productivity effects. Second, service trade liberalization has an important positive relationship with trade and economic growth. Third, some evidence reveals that such gains can be obtained through regional cooperation and integration in major service sectors. There remains considerable scope for refining and expanding this study by introducing logistics, insurance, education and health. In addition, not only ex-post, as discussed in the study, but also ex-anti and other qualitative variables, such as regulatory and policy initiatives, provide indicators for best practice in the model. The gravity model of service trade among Asian countries might also be explored.

The results shown in this study indicate that the amount of loans offered by private banks, the number of fixed and mobile phone users, the number of air-passengers carried, international cargo tonnage and total tourist arrivals (including both tourist and business visas) and business visa holder arrivals contribute significantly to Myanmar's export growth, among other factors. Conversely, the share of FDI in services is at a relatively low in Myanmar and has a minimal effect on export growth.

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