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Pohit, Sanjib

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Trends in High Technology Trade¹

Sanjib Pohit

**National Institute of Science
Technology and Development Studies**

Pusa Gate

K.S. Krishnan Marg

New Delhi 110 012 INDIA

Email: spohit@gmail.com; spohit@nistads.res.in

¹ Dr. Sanjib Pohit is a Senior Fellow (Chief Economist) at NCAER The author would to thank Mr. Barun Deb Pal and Rajesh Kumar for able research assistance. These are the author's personal views.

1. Introduction

The process of major economic reforms undertaken in the Indian economy has now completed seventeen years of implementation. The economy has entered into a new phase of development directed towards becoming globally competitive through opening up to trade, foreign investment, and technology inflows. The unilateral reforms of the trade and domestic policies of India, along with reforms of the tax regime since 1991, represent a significant departure from the policy framework of the previous four decades and are important to the future course of the Indian economy².

The economy reforms seem to have paid off handsomely. The economy is now on a high growth trajectory, registering growth of around 8 per cent in the present decade. In fact, the Indian economy is now among the fastest growing economies of the world. The Indian economy is now more integrated with the world. India's trade to GDP ratio has increased from 15 percent to 45 percent of GDP between 1990 and 2007³.

One of the objective of the launching of the economic reforms was it would facilitate access to new technology. As a result, India would be able to move up the technology ladder in all spheres of activities. It should be manifested in the growth of high-technology manufacturing industries and knowledge-intensive service industries. It should be accompanied with the growth of India's trade in the above two segments in the global marketplace. This paper attempts to analyse India's performance of same over time and vis-à-vis other major economies.

2. High Technology Merchandise Trade

This section presents a detailed analysis of the trade in high technology manufacturing products. Our focus is on trends over time and the relative position vis-à-vis other economies.

In order to analyse the competitive and trade performance of high technology products, one need to define what constitute high technology segments. The standard approach that is commonly used to identify technology-intensive industries and products is the product approach. The product list is based on the calculations of R&D intensity by groups of products (R&D expenditure/total sales). Exports and imports of these products comprise high technology trade. According to European Union's definition of high technology trade, the following commodities comprise the same:⁴

² See Chadha, Pohit, Deardorff and Stern (1998).

³ See Government of India (2009).

⁴ See Meri, (2008).

Table A. High-Technology groups of Products

<i>List of high-technology groups of products</i>	<i>SITC Rev. 3</i>
Aerospace	7921+ 7922 + 7923 + 7924 + 7925 + 79293 + (714 – 71489 - 71499) + 87411
Computers-office machines	75113 + 75131 + 75132 + 751 34 + (752 - 7529) + 75997
Electronics-telecommunications	76381 + 76383 + (764 – 76493 - 76499) + 7722 + 77261 + 77318 + 77625 + 7763 + 7764 + 7768 + 89879
Pharmacy	5413 + 5415 + 5416 + 5421 + 5422
Scientific instruments	774 + 8711 + 8713 + 8714 + 8719 + 87211 + (874 – 87411 - 8742) + 88111 + 88121+ 88411 + 88419 + 89961 + 89963 + 89967
Electrical machinery	77862 + 77863 + 77864 + 778 65 + 7787 + 77884
Chemicals	52222 + 52223 + 52229 + 522 69 + 525 + 57433 + 591
Non-electrical machinery	71489 + 71499 + 71871 + 71877 + 72847 + 7311 + 73135 + 73144 + 73151+ 73153+ 73161 + 73165 + 73312 + 73314 + 73316 + 73733 + 73735
Armament	891

All high technology trade data are extracted from the World Bank's WITS database. In what follows, we analyse the performance of India's trade in respect of the above commodity groups in recent years. To judge India's presence in the global market, a comparison is made with respect to selected countries. The selected countries are basically the so-called developed (OECD) countries, and some newly industrialised countries as well as the other members of the BRICs group of countries.⁵

2.1 Aggregate Trade

Table 2-1 shows the trends of high technology exports in aggregate for selected countries between 1995 and 2006. As Table 2-1 shows, India's high technology trade has increased from US \$ 1021 millions in 1995 to US \$ 4463 millions in 2006. During the same period, the export of high technology trade of Brazil has increased by 8 times, while that of China has risen by 25 times! The share of high technology trade in India's GNP at 0.49 percent in 2006 is the lowest among the group of selected countries. If India has to emerge as the economic powerhouse in the 21st century, India needs to improve its position significantly in the arena of high technology trade. Between the years 1995 and 2006, India's share in global high technology trade has increased marginally from 0.14 percentage points to 0.23 percentage points. India lacks far behind China in capturing global market place. This is not surprising giving the fact the India's share of high technology export in total manufactured exports has hardly changed between the years 1995 and 2004.

⁵ BRIC: Brazil, Russia, India and China

The statistics on high technology imports are shown in Table 2-2. With the opening up of the economy and easing of the embargo on high technology imports, India seems to have improved its position between the years 1995 and 2006. India's import of high technology trade has jumped from US \$ 2621 millions in 1995 to US \$ 23 billions in 2006. This corresponds to a share of 1.16 percent in world's high technology imports in 2006 as compared to a paltry share of 0.36 percent in 1995. However, its share in GNP is still small compared to other emerging / developed economies or BRIC member countries.

2.2 Product Trade

We have seen above that India occupies an insignificant position in the global space of high technology export. A principal reason for the same is that in some of the product segment of high technology trade, India is virtually absent (Table 2-3). For instance, take the case of aerospace instruments. India exported only US \$ 5 millions in 2006, whereas a country like Israel exported US \$ 39 millions, Korea US \$ 547 millions, Brazil US \$3585 millions. Only in this product segment, China's performance is relatively poor- it exported only US \$ 867 millions, capturing less than 1-percentage points of the global export basket. The four countries –USA, UK, France and Germany- control about 80 percent of the world exports in aerospace equipments.

The growth of domestic airline in India has expectedly pushed up the demand of aerospace equipments. Between 1995 and 2006, India's imports of the same increased from US \$223 millions to US \$ 4.5 billions (Table 2-3). As a result, the share in global imports rose to 3.4 percent in 2006. Except China, its share in global imports is the highest among the developing countries.

On the other hand, India exhibits a better presence in the global market of trade in computer office equipments (Table 2-4). India exported US \$ 275 millions and imported US 3760 millions of computer office equipments in 2006. Except China, India compares favourably with respect to other BRIC countries. Among the selected developing countries, India ranks high in respect of global import in this product category signifying the deepening of the IT spreads in the Indian economy.

Table 2-5 shows the stylised facts of trade in electronic telecommunication equipments. Between the period 1995 to 2006, India's exports in value terms tripled up to US \$ 1207 millions whereas imports surged by eleven times to reach US \$ 10 billions. India's share in global imports stands at 1.15 percent, which in line with countries like Brazil, Russia, and Sweden. However, its export share in global market place is insignificant- only 0.11 percent, while the same of Korea is 8.43 percent, Israel is 0.62 percent, Brazil is 0.85 percent. The striking point is that China has been able to increase its market share in this product category from 2.6 percent in 1995 to 41 percent in 2006. In fact, it is the major exporter in the global market followed (way behind) by USA (23 percent) and Japan (21 percent).

Among the high technology product category, pharmacy is the one where India has a marked presence among the developing countries (Table 2-6). As this table shows, India's share of exports at about 5 percent in 2006 is the highest among the developing countries (except China) and is

higher than some of the OECD countries like Japan, Canada. In fact, the divide between India and China is not too wide only in this product category. By contrast, India's share of global import in this category stands at less than 1 percent in 2006. To some extent, the low figure could be ascribed to the restriction of imports to India by developed countries due to IPR issues.

The low level of trade (imports and exports) in scientific instruments by India is a cause for concern. This probably portrays the state of scientific research in India. While the share of China in global imports of scientific instruments stood at 24 percent in 2006 after rising from 3.5 percent in 1995, the share of the same for India has risen merely from 0.83 percent in 1995 to 1.05 percent in 2006 (Table 2-7). India exported only US \$ 563 millions of instrument in 2006, whereas a country like Israel exported nearly US \$ 2 billions in 2006.

India's performance is dismal in the product category *Electrical Machinery*. As Table 2-8 indicates, India exported and imported good amounting to US \$ 45 million and US \$ 385 millions respectively in 2006. Among the BRIC countries, India's position is the lowest in this category.

The similar trend is also observed in the product category *Non-electrical Machinery* (Table 2-9). In 2006, India exported US \$ 310 million and imported US \$ 294 millions. There has not been any significant change in the shares of imports/export in the global trade over the 10 years period 1995-2006.

With regard to high technology trade in chemicals product category, India's position is relatively better and has significantly improved between the years 1995 and 2006 (Table 2-10). India has a share of 2.41 percent in global high technology exports in this category, which is higher than many of the selected countries. India exported about US \$ 1032 millions in 2006 and its imports amounted to only US \$ 376 million. There has been a significant increase in export between the years under observations. In recent years, the stricter environmental regulations in the developed countries have led to a shift in the production base of the chemical industries to a developing country like India. To some extent, this has contributed to this trend.

India is late entrant in the global marketplace of armaments. Only recently, India has made a decision to be a player in this market. India has been able to increase its exports of armaments from US \$ 325 millions in 1995 to US \$ 4363 million in 2006 (see Table 2-11). Its share of 0.05 percent in the global export market is currently low given the size of her economy. There is no reason why India can not improve her position in this category.

3. Knowledge Intensive Service Trade

The last section has revealed that India plays a minor role in the global market of high technology manufacturing trade. In the last two decades, the service sector has been growing faster than the manufacturing sector and is driving economic activity around the world. So, it is more important that India should stand on a strong footing in the knowledge intensive service category. The general impression is that India has performed relatively well in this category among the emerging countries. This section makes an attempt to analyse the same with a view to identify the components where India has improved her performance and where India needs to tighten her belt.

3.1 Aggregate Picture

Table 3-1 and Table 3-2 portray the salient features of India's commercial trade (exports and imports) in recent years. As Table 3-1 shows, India's commercial exports has more than doubled between the years 1995 and 2006. The share of India in world exports of commercial services stands at 0.64 percent in 2006, which is even higher than that of China, Korea, Israel, South Africa. The category commercial services include transportation as well as travel, which is not strictly a knowledge intensive service industry. As this table shows, the share of computer, communication and other services in commercial service exports of India, which basically represent knowledge intensive service industry, stands at 74 percent in 2006. Thus, it indicates that India has been fairly successful in the global market of knowledge intensive service industries. India's position is the highest among the BRIC countries in this category.

With regard to commercial service imports, India's share in the global market is to the tune of 0.59 percent 2006, up by 0.19 percentage points from 1995 (Table 3-2) The share of import in GNP is about 1.26 percent in 2006, which is significantly higher than that of China.

3.2 Product Approach

The knowledge intensive service sector (commercial service except transportation and travel services) has several components. The principal among them are communication services, insurance services, financial services, computer and information services, royalties and licenses fees, construction services, personal cultural and recreational services, and other business services. Below, we have made an attempt to analyse India's performance in the various components wherever available data are available.

Table 3-3 provides stylised facts on statistics of royalties and licenses fees for selected countries. India received royalties' receipts amounting to US \$ 626 millions in 2006. Its payments on the same amounted to US \$1056 in 2006. As Table 3-3, three countries- USA, UK, and Germany – corner nearly 65 percent of the global receipts on account of royalties' receipts. As Table 3-3 indicates, their monopoly powers seem to have declined over the period 1995-2006. In 1995, the share of the three countries in global receipts was about 73 percent. The available evidence indicates that there is a strong

association between royalties payments/receipts and high technology exports.⁶ Thus, unless India scores well in this category, it is unlikely that India can improve her position in respect of high technology trade.

The relationship between royalties and trade is explored further in Table 3-4. As this table indicates, the share of royalties' receipts or payments in total trade is significantly lower compared to the share of same vis-à-vis total high technology trade for the selected countries. This further confirms that India needs to improve her position vis-à-vis royalties' receipts/payments to establish herself as a major player in the area of high technology trade.

Table 3-5 provides status on communication services. Note that India's rank is four in respect of exports and seven in respect of imports in the year 2005, the latest year for which data is available.

With respect to insurance services, India's rank with respect to exports and imports are respectively 7 and 6 out of 15 major economies in the year 2006 (Table 3-6).

Like in the case of insurance services, India is late entrant in the global market of financial services. Only recently, India has opened up somewhat its financial services. India exported US \$ 1468 millions worth of financial services in 2006 (Table 3-7). Its imports of the same amounted to US \$ 1027 millions in 2006.

Among the commercial services, India is a predominant player in the area of computer and information services. This is the segment where out IT industry is concentrated. It is not surprising that India exported US \$ 16 billion in 2006 capturing 16 percent of the trade share of the 15 large economies (Table 3-8). Its position is way above China and is next only to EU. Its imports in this category are only US \$ 1.4 billions.

4. Concluding Remarks

By and large, India's performance on the high technology manufacturing trade front is not too impressive. Unlike China or Brazil, India is a small player in most of the product categories barring pharmacy sector. In the last ten years period of observation, India has not able increase her presence significantly in most of the segment. By contrast, China, starting from the similar base like India in some of the segments, has exhibited marked improvement. Since pharmacy is one sector where India is doing well, it would make sense to nurture this sector. It is also surprising that India, with a large scientific base, occupies such a small share in respect of trade in scientific instruments. As our analysis indicates that there is a direct link between royalties and high technology trade, it is important to encourage this segment.

Our analysis indicates that India has performed relatively well in the knowledge intensive service industries. However, this has happened primarily due to the significant growth of the area of computer and information services. However in the coming years, the other segments like financial

⁶ The correlation coefficient between royalties' payment or receipts and high technology exports range between 0.54 to 0.78 for the years 1995 and 2006.

services, insurance services, health services, entertainment services are more likely to grow at a rapid pace. If India is to emerge as an important player in the knowledge intensive service industries, we need to improve our presence in these segments. At present, we are small players in these categories.

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Table 2-1 High Technology Exports

(Thousand dollars and percentage)

Country	Values				Share in GNP		Share in World's HT Exports		Share of HT Export in Manufactured Export	
	1995	2000	2005	2006	1995	2006	1995	2006	1995	2006
Austria	5073163	8305046	13485424	14715349	2.15%	4.47%	0.68%	0.75%	8.63%	13.07%
Belgium		15120654	23724365	23530587		5.80%		1.20%	0.00%	0.08%
Brazil	1064786	6070929	8059255	8672636	0.15%	0.97%	0.14%	0.44%	4.85%	0.12%
Canada	18120670	33878710	30475770	33183716	3.23%	2.77%	2.42%	1.69%	15.07%	0.15%
China	11885166	45254619	236830247	307379509	1.66%	11.73%	1.59%	15.64%	10.04%	0.30%
Denmark	5051999	7382237	13093766	13207372	2.81%	4.66%	0.68%	0.67%	15.20%	0.20%
France	43532092	61249366	74710764	85555176	2.77%	3.71%	5.82%	4.35%	18.72%	0.21%
Germany	61640615	88074855	154353040	176504667	2.46%	5.82%	8.24%	8.98%	12.90%	0.17%
India	1021961	1771447	3638016	4463637	0.29%	0.49%	0.14%	0.23%	4.31%	
Israel	3298579	8598393	8431932	11796918	3.80%	8.30%	0.44%	0.60%	15.83%	0.14%
Japan	120595526	139084972	147924770	155180995	2.30%	3.14%	16.12%	7.90%	26.13%	0.22%
Korea	32827608	59957306	106552922	120921668	6.37%	14.12%	4.39%	6.15%	25.87%	0.32%
Netherlands	27835371	46039075	70285424	73997556	6.27%	10.52%	3.72%	3.77%	23.82%	0.28%
Russia	1125504	2891669	4071405	4505480	0.29%	0.55%	0.15%	0.23%	0.00%	0.09%
South Africa	722424	1052499	1887499	1949254	0.49%	0.76%	0.10%	0.10%	5.67%	0.06%
Sweden	14265223	21790583	24156307	25936063	5.83%	6.56%	1.91%	1.32%	16.08%	
Switzerland	11757680	15458030	28528739	31562257	3.62%	7.26%	1.57%	1.61%	13.91%	0.16%
UK	57297893	76858298	89429159	123771987	5.07%	5.04%	7.66%	6.30%	27.34%	0.34%
USA	162040639	248753920	257306150	293677732	2.23%	2.19%	21.67%	14.95%	32.80%	0.30%

Source: WITS online database, (World Bank)

Table 2-2 High Technology Imports

(Thousand dollars and percentage)

Country	Values				Share in GNP		Share in World's HT Imports	
	1995	2000	2005	2006	1995	2006	1995	2006
Austria	7315816	10670317	14385971	15163980	3.11%	4.61%	0.99%	0.77%
Belgium		17114622	25182052	25209303		6.22%		1.28%
Brazil	8038167	12600300	15649984	19564058	1.16%	2.19%	1.09%	0.99%
Canada	27738630	44311980	43725416	44666463	4.94%	3.73%	3.76%	2.26%
China	20957511	58641011	247258328	305151721	2.93%	11.64%	2.84%	15.44%
Denmark	5860983	7705957	13912771	15300705	3.26%	5.40%	0.79%	0.77%
France	37580443	55193462	68901047	75754004	2.39%	3.28%	5.09%	3.83%
Germany	62348541	91720082	138552919	159890518	2.49%	5.27%	8.45%	8.09%
India	2621543	4259012	19867915	22896681	0.75%	2.52%	0.36%	1.16%
Israel	4003268	7586536	10538463	11125532	4.62%	7.82%	0.54%	0.56%
japan	53760397	79422487	93087211	107413775	1.02%	2.18%	7.29%	5.43%
Korea	25849512	44038246	58928772	62852223	5.02%	7.34%	3.50%	3.18%
Netherland	26494659	46963011	63543527	69906178	5.96%	9.94%	3.59%	3.54%
Russia	621339	3846435	13386441	18752798	0.16%	2.28%	0.08%	0.95%
South Africa	4347825	5049341	9085275	10400374	2.93%	4.07%	0.59%	0.53%
Sweden	11939673	16125600	17930787	19232405	4.88%	4.86%	1.62%	0.97%
Switzerland	11433303	15690031	21116736	22331038	3.52%	5.14%	1.55%	1.13%
UK	50697622	80377305	84416968	100732344	4.49%	4.10%	6.87%	5.10%
USA	159955053	268346057	267176675	304397565	2.20%	2.27%	21.68%	15.40%

Source: WITS online database, (World Bank)

Table 2-3 Trade in Aerospace Equipment: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value		Share in Global Exports		Imports in Value		Share in Global Imports	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	118087	702915	0.19%	0.41%	645591	789291	1.18%	0.58%
Belgium		406585		0.24%		563058		0.42%
Brazil	315924	3585899	0.50%	2.09%	341778	1503911	0.62%	1.11%
Canada	3401773	9937340	5.37%	5.80%	1987954	5463369	3.63%	4.05%
China	103251	867270	0.16%	0.51%	1209296	11633255	2.21%	8.62%
Denmark	45271	433147	0.07%	0.25%	341127	478868	0.62%	0.35%
France	13984291	30030314	22.07%	17.54%	3792904	8752670	6.93%	6.49%
Germany	6750900	28607937	10.65%	16.71%	6160710	23912443	11.25%	17.72%
India	268	5170	0.00%	0.00%	223449	4564999	0.41%	3.38%
Israel	203608	39925	0.32%	0.02%	481455	431283	0.88%	0.32%
japan	384066	1649882	0.61%	0.96%	3187954	7321673	5.82%	5.43%
Korea	716202	547191	1.13%	0.32%	2925809	3038879	5.34%	2.25%
Netherland	2497735	1961717	3.94%	1.15%	2030352	1938521	3.71%	1.44%
Russia	585814	1997510	0.92%	1.17%	128540	1800351	0.23%	1.33%
South Africa	104861	546180	0.17%	0.32%	520256	1394421	0.95%	1.03%
Sweden	1646256	1336151	2.60%	0.78%	1034979	765937	1.89%	0.57%
Switzerland	983231	2925297	1.55%	1.71%	1236533	2174061	2.26%	1.61%
UK	7396581	16234944	11.67%	9.48%	4229449	8412487	7.72%	6.23%
USA	24578320	70884592	38.78%	41.40%	8450725	22573026	15.43%	16.73%
World	63371566	171226232			54758872	134947663		

Source: WITS online database, (World Bank)

Table 2-4 Trade in Computer Office Machines: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value		Share in Global Exports		Imports in Value		Share in Global Imports	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	684362	1297284	0.32%	0.28%	1848003	2952748	0.85%	0.63%
Belgium		4468038		0.95%		5234844		1.11%
Brazil	177396	344431	0.08%	0.07%	1344256	2333641	0.61%	0.49%
Canada	5338519	3049406	2.46%	0.65%	7892812	10668300	3.61%	2.26%
China	-116228	102492625	-0.05%	21.78%	2023475	36696766	0.93%	7.77%
Denmark	753822	1168237	0.35%	0.25%	1956387	3317488	0.89%	0.70%
France	7512337	6835280	3.46%	1.45%	10841612	15850010	4.96%	3.36%
Germany	11311722	27469541	5.21%	5.84%	19478666	37536070	8.91%	7.95%
India	183641	275831	0.08%	0.06%	308515	3760289	0.14%	0.80%
Israel	115132	362957	0.05%	0.08%	489452	1352063	0.22%	0.29%
japan	31581613	21881486	14.56%	4.65%	14924193	22964624	6.83%	4.86%
Korea	4683879	17277196	2.16%	3.67%	3032086	4481394	1.39%	0.95%
Netherland	11486925	33048791	5.30%	7.02%	12052750	33282149	5.51%	7.05%
Russia		90998		0.02%		2523488		0.53%
South Africa	70621	221003	0.03%	0.05%	1128102	2331862	0.52%	0.49%
Sweden	706655	1533016	0.33%	0.33%	3141112	4570746	1.44%	0.97%
Switzerland	765633	471268	0.35%	0.10%	3509455	3528644	1.61%	0.75%
UK	16331587	17165196	7.53%	3.65%	16455483	24213662	7.53%	5.13%
USA	36718777	40369569	16.93%	8.58%	56895839	95038518	26.02%	20.13%
World	216907512	470641085			218643302	472219506		

Source: WITS online database, (World Bank)

Table 2-5 Trade in Electronic Telecommunications Equipment: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value		Share in Global Exports		Imports in Value		Share in Global Imports	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	2114484	6745708	0.69%	1.62%	2389739	6205776	0.78%	0.68%
Belgium		5952903		1.43%		7996430		0.88%
Brazil	116844	3526464	0.04%	0.85%	3894223	10312507	1.28%	1.14%
Canada	6620538	12669279	2.17%	3.04%	12190022	17184443	4.00%	1.90%
China	7833558	171078368	2.57%	41.02%	13394686	189177689	4.40%	20.86%
Denmark	1606763	4181436	0.53%	1.00%	1833971	5599149	0.60%	0.62%
France	12250885	24978740	4.02%	5.99%	11585563	28425162	3.80%	3.13%
Germany	21055935	60609190	6.91%	14.53%	21960755	60103978	7.21%	6.63%
India	327597	1207401	0.11%	0.29%	937804	10414100	0.31%	1.15%
Israel	1877282	2815309	0.62%	0.67%	1739481	2891397	0.57%	0.32%
Japan	66694895	90583148	21.87%	21.72%	21734786	48218296	7.13%	5.32%
Korea	25704561	78276254	8.43%	18.77%	13181038	37001445	4.33%	4.08%
Netherlands	7527159	22932585	2.47%	5.50%	6852810	20199336	2.25%	2.23%
Russia		1166215		0.28%		8754990		0.97%
South Africa	126849	442061	0.04%	0.11%	1492199	4294061	0.49%	0.47%
Sweden	9306396	16824559	3.05%	4.03%	5095489	9263996	1.67%	1.02%
Switzerland	1960229	3108155	0.64%	0.75%	3073498	5139135	1.01%	0.57%
UK	18872895	65291552	6.19%	15.65%	18495232	45794308	6.07%	5.05%
USA	62753701	98092783	20.58%	23.52%	70733016	122765768	23.22%	13.54%
World	304901063	417089565			304681929	906809549		

Source: WITS online database, (World Bank)

Table 2-6 Trade in Pharmacy: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value		Share in Global Exports		Imports in Value		Share in Global Imports	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	964398	3030902	3.54%	10.45%	697165	2223669	0.23%	2.35%
Belgium		6976603	0.00%	24.04%		5193782		5.50%
Brazil	86053	145468	0.32%	0.50%	568237	1457889	0.19%	1.54%
Canada	249995	1009696	0.92%	3.48%	637739	2151783	0.21%	2.28%
China	724317	2410132	2.66%	8.31%	210967	1160971	0.07%	1.23%
Denmark	1501824	4411529	5.51%	15.20%	345309	590296	0.11%	0.62%
France	2032257	6272540	7.46%	21.62%	2135921	5868705	0.70%	6.21%
Germany	2527459	10628944	9.27%	36.63%	2487217	10503868	0.82%	11.12%
India	290246	1298566	1.06%	4.48%	329498	815291	0.11%	0.86%
Israel	70140	127474	0.26%	0.44%	74453	164886	0.02%	0.17%
Japan	982244	1207959	3.60%	4.16%	2446362	3296671	0.80%	3.49%
Korea	187144	324647	0.69%	1.12%	356945	778465	0.12%	0.82%
Netherlands	1139988	4136998	4.18%	14.26%	1185576	4415015	0.39%	4.67%
Russia	68738	85719	0.25%	0.30%	218889	1769643	0.07%	1.87%
South Africa	15171	19542	0.06%	0.07%	224554	322635	0.07%	0.34%
Sweden	399748	2078393	1.47%	7.16%	318773	788389	0.10%	0.83%
Switzerland	2378040	13311231	8.72%	45.87%	1077656	6959979	0.35%	7.37%
UK	2329465	7402244	8.55%	25.51%	1541451	6131264	0.51%	6.49%
USA	3994150	12957246	14.65%	44.65%	3150220	12855915	1.03%	13.61%
World	27256229	29017107			304681929	94471026		

Source: WITS online database, (World Bank)

Table 2-7 Trade in Scientific Instruments: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value		Share in Global Exports		Imports in Value		Share in Global Imports	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	766080	1899630	1.12%	0.88%	1085643	1946297	1.64%	0.90%
Belgium		1988513		0.92%		2922986		1.35%
Brazil	96980	335343	0.14%	0.16%	992851	2746276	1.50%	1.27%
Canada	1286323	4051816	1.87%	1.88%	3383680	6557434	5.11%	3.02%
China	1320713	20508092	1.92%	9.52%	2327955	53593011	3.51%	24.71%
Denmark	989500	2182269	1.44%	1.01%	554351	1306754	0.84%	0.60%
France	4269057	10499341	6.22%	4.87%	4589730	9779866	6.93%	4.51%
Germany	12861005	33159994	18.74%	15.39%	6685922	15872843	10.09%	7.32%
India	47619	563407	0.07%	0.26%	546746	2282542	0.83%	1.05%
Israel	492679	1707195	0.72%	0.79%	472290	1165202	0.71%	0.54%
Japan	12480609	25475418	18.18%	11.82%	5733091	16489749	8.65%	7.60%
Korea	948096	17112604	1.38%	7.94%	4414255	9973989	6.66%	4.60%
Netherlands	3037103	7784830	4.42%	3.61%	2608719	6678419	3.94%	3.08%
Russia		667380		0.31%		2622074	0.00%	1.21%
South Africa	72266	197697	0.11%	0.09%	568805	1207848	0.86%	0.56%
Sweden	1562673	2472957	2.28%	1.15%	1404434	2382120	2.12%	1.10%
Switzerland	3157445	7581627	4.60%	3.52%	1485842	2811843	2.24%	1.30%
UK	6010485	10932673	8.76%	5.07%	5083435	9249487	7.67%	4.27%
USA	19188169	42879818	27.95%	19.90%	12071941	30958873	18.22%	14.28%
World	68642358	215463469			66252766	216850415		

Source: WITS online database, (World Bank)

Table 2-8 Trade in Electrical Machinery: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value		Share in Global Exports		Imports in Value		Share in Global Imports	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	183101	422831	0.85%	0.66%	224618	467734	0.98%	0.76%
Belgium		751196		1.17%		889715		1.46%
Brazil	16950	85619	0.08%	0.13%	319649	370367	1.40%	0.61%
Canada	304114	882836	1.41%	1.37%	550087	690525	2.41%	1.13%
China	689919	5145733	3.19%	7.99%	690092	7676934	3.02%	12.56%
Denmark	99564	171249	0.46%	0.27%	102513	213921	0.45%	0.35%
France	626776	648633	2.90%	1.01%	1000901	1469232	4.39%	2.40%
Germany	2001326	5754904	9.26%	8.93%	2377247	4943442	10.42%	8.09%
India	5950	45669	0.03%	0.07%	51458	385742	0.23%	0.63%
Israel	413606	5979009	1.91%	9.28%	565549	4863962	2.48%	7.96%
japan	5396108	8267644	24.98%	12.84%	1851692	3325876	8.12%	5.44%
Korea	413606	5979009	1.91%	9.28%	565549	4863962	2.48%	7.96%
Netherland	623465	918789	2.89%	1.43%	548275	950287	2.40%	1.55%
Russia		152622		0.24%		224034		0.37%
South Africa	31421	57958	0.15%	0.09%	211005	148626	0.92%	0.24%
Sweden	109021	279468	0.50%	0.43%	268637	363902	1.18%	0.60%
Switzerland	291828	477006	1.35%	0.74%	237895	346478	1.04%	0.57%
UK	1844941	2271081	8.54%	3.53%	1842991	2225913	8.08%	3.64%
USA	2759945	7311178	12.77%	11.35%	3963065	7378444	17.37%	12.07%
World	21606024	64410826			22817676	61142098		

Source: WITS online database, (World Bank)

Table 2-9 Trade in Non-electrical Machinery: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value		Share in Global Exports		Imports in Value		Share in Global Imports	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	177514	402682	1.06%	0.95%	97931	220589	0.64%	0.60%
Belgium		1253077		2.96%		430832		1.17%
Brazil	10753	10696	0.06%	0.03%	246736	242807	1.60%	0.66%
Canada	220510	453979	1.32%	1.07%	434158	524869	2.82%	1.43%
China	21408	473767	0.13%	1.12%	533584	3433478	3.46%	9.36%
Denmark	21408	473767	0.13%	1.12%	533584	3433478	3.46%	9.36%
France	1351711	1664504	8.08%	3.93%	952858	1553940	6.18%	4.24%
Germany	2361217	5508866	14.11%	13.02%	1548386	3295230	10.04%	8.98%
India	6089	31057	0.04%	0.07%	147409	294587	0.96%	0.80%
Israel	13351	257404	0.08%	0.61%	75439	105292	0.49%	0.29%
Japan	2188918	4523179	13.08%	10.69%	994944	1566634	6.45%	4.27%
Korea	74	95908	0.00%	0.23%	2453	1320540	0.02%	3.60%
Netherlands	349822	755496	2.09%	1.79%	409209	624674	2.65%	1.70%
Russia	610	3160	0.00%	0.01%	36275	46627	0.24%	0.13%
South Africa	4887	4991	0.03%	0.01%	73406	472280	0.48%	1.29%
Sweden	445566	1272060	2.66%	3.01%	262995	459927	1.71%	1.25%
Switzerland	1412849	2661675	8.44%	6.29%	417593	746818	2.71%	2.04%
UK	1333042	2898751	7.96%	6.85%	1231831	2393452	7.99%	6.52%
USA	4526901	11097480	27.05%	26.23%	1806362	3808446	11.72%	10.38%
World	16737317	42303608			15419201	36688437.7		

Source: WITS online database, (World Bank)

Table 2-10 Trade in Chemistry: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value		Share in Global Exports		Imports in Value		Share in Global Imports	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	32608	174872	0.16%	0.41%	298100	324118	1.37%	0.69%
Belgium		1667673		3.89%		1934960		4.13%
Brazil	167466	506171	0.81%	1.18%	326500	582260	1.50%	1.24%
Canada	326500	582260	1.57%	1.36%	312442	921135	1.44%	1.97%
China	1281946	4364805	6.18%	10.18%	566280	1777543	2.61%	3.80%
Denmark	24693	151187	0.12%	0.35%	176340	229880	0.81%	0.49%
France	1356769	4229369	6.54%	9.87%	2570426	3909798	11.84%	8.35%
Germany	2498919	4387025	12.05%	10.23%	1482105	3598257	6.83%	7.68%
India	160225	1032173	0.77%	2.41%	76165	375916	0.35%	0.80%
Israel	110429	505904	0.53%	1.18%	105149	151447	0.48%	0.32%
Japan								
Korea	125546	1183552	0.61%	2.76%	411682	1083862	1.90%	2.31%
Netherlands	996574	2431826	4.80%	5.67%	679126	1639079	3.13%	3.50%
Russia	470342	309712	2.27%	0.72%	237636	999893	1.09%	2.14%
South Africa	291524	459821	1.41%	1.07%	129499	228641	0.60%	0.49%
Sweden	63624	82419	0.31%	0.19%	375432	603773	1.73%	1.29%
Switzerland	740750	780384	3.57%	1.82%	241090	365193	1.11%	0.78%
UK	1996915	1422291	9.63%	3.32%	1281597	2147771	5.90%	4.59%
USA	3212498	6294093	15.49%	14.68%	2161109	6727798	9.95%	14.37%
World	20743063	42863482			21715194	46823614		

Source: WITS online database, (World Bank)

Table 2-11 Trade in Armaments: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value		Share in Global Exports		Imports in Value		Share in Global Imports	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	32530	38525	0.42%	0.47%	29025	33757	0.62%	0.49%
Belgium		65999		0.80%		42696		0.62%
Brazil	76421	132544	0.99%	1.61%	3937	14400	0.08%	0.21%
Canada	372397	547106	4.81%	6.64%	349735	504605	7.53%	7.28%
China	26282	38718	0.34%	0.47%	1176	2073	0.03%	0.03%
Denmark	9154	34551	0.12%	0.42%	17400	130871	0.37%	1.89%
France	148007	396455	1.91%	4.81%	110529	144620	2.38%	2.09%
Germany	272133	378266	3.51%	4.59%	167534	124387	3.61%	1.79%
India	325	4363	0.00%	0.05%	498	3214	0.01%	0.05%
Israel	2352	1741	0.03%	0.02%			0.00%	0.00%
Japan	90296	83596	1.17%	1.01%	346807	167803	7.46%	2.42%
Korea	48499	125307	0.63%	1.52%	959695	309688	20.65%	4.47%
Netherlands	176601	26524	2.28%	0.32%	127841	178697	2.75%	2.58%
Russia		32164		0.39%		11699		0.17%
South Africa	4822		0.06%				0.00%	0.00%
Sweden	25283	57040	0.33%	0.69%	37821	33615	0.81%	0.48%
Switzerland	67676	245614	0.87%	2.98%	153741	258886	3.31%	3.73%
UK	1181982	153256	15.26%	1.86%	536152	164000	11.54%	2.36%
USA	4308178	3790974	55.61%	45.99%	722776	2290776	15.55%	33.03%
World	7746485.9	8242739.2			4646977.9	6935586.39		

Source: WITS online database, (World Bank)

Table 3-1 Export of Commercial Services: Stylized Facts

(Thousand dollars and percentage)

Country	Exports in Value				Share in Global exports		Share of computer, communication & other services In commercial services export		Share of export in GNP	
	1995	2000	2005	2006	1995	2006	1995	2006	1995	2006
Austria	16075862	19412582	30378278	32439095	1.74%	1.58%	41.89%		6.83%	9.85%
Belgium	31691546	31060081	53104305	45201794	3.43%	2.20%	38.43%	46.86%	10.96%	11.15%
Brazil	33619402	48556217	54091706	57285410	3.64%	2.79%	23.65%	50.87%	4.85%	6.42%
Canada	6005000	8960929	14855652	17945691	0.65%	0.87%	36.81%	46.77%	1.07%	1.50%
China	3248900	3994516	6925654	7406132	0.35%	0.36%	24.39%	39.12%	0.45%	0.28%
Denmark	6637583	6751098	11713775	13296397	0.72%	0.65%	31.03%		3.69%	4.69%
France	8262000	9687000	14448700	15833700	0.90%	0.77%	36.90%	36.27%	0.53%	0.69%
Germany	83108129	79901145	117904018	117585668	9.01%	5.72%	43.50%	48.34%	3.32%	3.88%
India	5085883	5835813	12652407	13191218	0.55%	0.64%	31.36%	73.69%	1.45%	1.45%
Israel	5342000	5060709	12571367	11091109	0.58%	0.54%	35.09%	66.12%	6.16%	7.80%
Japan	7741200	14999200	17405500	19228700	0.84%	0.94%	58.84%	53.24%	0.15%	0.39%
Korea	1689308	1601693	2239069	2431594	0.18%	0.12%	34.45%	32.32%	0.33%	0.28%
Netherlands	2020436	2853561	7569562	9317934	0.22%	0.45%	43.73%	58.22%	0.45%	1.32%
Russia	8160690	8895533	15028391	17623800	0.88%	0.86%	22.78%	39.15%	2.08%	2.14%
South Africa	4414445	4888097	10898392	11712123	0.48%	0.57%	17.66%	12.73%	2.98%	4.59%
Sweden	40018791	52112190	93853021	105482884	4.34%	5.13%	42.73%	55.13%	16.35%	26.68%
Switzerland	149598	270559	274385	273717	0.02%	0.01%	19.53%	57.50%	0.05%	0.06%
UK	77549120	118567383	205824814	225867913	8.40%	10.99%	35.36%	45.35%	6.87%	9.20%
USA	198501000	278086289	361600000	397832692	21.51%	19.35%	35.48%	44.30%	2.73%	2.97%
World	922762282	1169183750	1866875500	2055523332						

Source: WDI online database, (World Bank)

Table 3-2 Import of Commercial Services: Stylized Facts

(Thousand dollars and percentage)

Country	Imports in Value				Share in Global imports		Share of import in GNP	
	1995	2000	2005	2006	1995	2006	1995	2006
Austria	16979448	43618131	29909157	31631251	1.80%	1.64%	7.21%	9.61%
Belgium	27551776	2430730	49001520	32398293	2.93%	1.68%	9.52%	7.99%
Brazil	32510816	1781365	50408326	52285184	3.46%	2.71%	4.69%	5.86%
Canada	13161000	6906000	22408857	27149220	1.40%	1.41%	2.34%	2.27%
China	3524000	6339117	7521848	8289194	0.37%	0.43%	0.49%	0.32%
Denmark	4859907	22353750	10109761	11726144	0.52%	0.61%	2.70%	4.14%
France	4511000	17111895	9507400	10288200	0.48%	0.53%	0.29%	0.45%
Germany	64522653	18628634	104600383	106949462	6.86%	5.54%	2.58%	3.53%
India	3765479	129227000	11292501	11485473	0.40%	0.59%	1.07%	1.26%
Israel	13230000	16075862	21836469	21406108	1.41%	1.11%	15.26%	15.05%
Japan	8133800	31691546	13492900	14703500	0.86%	0.76%	0.15%	0.30%
Korea	1384615	6005000	2464880	2595628	0.15%	0.13%	0.27%	0.30%
Netherlands	1349846	1640987	3103033	3568427	0.14%	0.18%	0.30%	0.51%
Russia	6339117	9528000	10298570	11313582	0.67%	0.59%	1.62%	1.38%
South Africa	5756013	6763272	11862972	13948881	0.61%	0.72%	3.88%	5.46%
Sweden	22353750	5342000	66738885	77901734	2.38%	4.03%	9.14%	19.70%
Switzerland	206046	7741200	400638	359942	0.02%	0.02%	0.06%	0.08%
UK	62523950	11438250	160096055	170961744	6.64%	8.85%	5.54%	6.96%
USA	129227000	9584800	282211900	308348714	13.73%	15.97%	1.78%	2.30%
World	940944900	1158177516	1773438615	1930703481				

Source: WDI online database, (World Bank)

Table 3-3 Royalties receipts and Payment

(Thousand dollars and percentage)

Country	Receipts in Value		Payments in Value		Share in Global receipts		Share in Global payments	
	1995	2006	1995	2006	1995	2006	1995	2006
Austria	234342	621196	947022	2221038	0.44%	0.49%	2.08%	2.02%
Belgium	133373	0	532774	0	0.25%	0.00%	1.17%	0.00%
Brazil	581769	1543583	1157879	1075460	1.10%	1.21%	2.55%	0.98%
Canada	32000	150307	529000	1663677	0.06%	0.12%	1.16%	1.51%
China	1900	55203	50000	381329	0.00%	0.04%	0.11%	0.35%
Denmark	13182	30912	53328	525978	0.02%	0.02%	0.12%	0.48%
France	47000	138000	97000	159200	0.09%	0.11%	0.21%	0.14%
Germany	1850021	6230102	2320298	3298020	3.50%	4.89%	5.10%	2.99%
India	31698	626904	69995	1056350	0.06%	0.49%	0.15%	0.96%
Israel	0	13503	0	869697	0.00%	0.01%	0.00%	0.79%
Japan	134500	596300	155600	678700	0.25%	0.47%	0.34%	0.62%
Korea	0	0	0	0	0.00%	0.00%	0.00%	0.00%
Netherlands	2927	4779	125055	47906	0.01%	0.00%	0.28%	0.04%
Russia	19243	81648	236796	348824	0.04%	0.06%	0.52%	0.32%
South Africa	44672	45784	293135	1282025	0.08%	0.04%	0.64%	1.16%
Sweden	196073	921983	1266226	2503615	0.37%	0.72%	2.79%	2.27%
Switzerland	888603	3	1004151	105824	1.68%	0.00%	2.21%	0.10%
UK	6080094	13588024	5198358	9962437	11.49%	10.66%	11.43%	9.04%
USA	30289000	62378000	6919000	26433000	57.25%	48.94%	15.22%	24.00%
World	52908282	127462717	45465570	110157569				

Source: WDI online database, (World Bank)

Table 3-4 Stylized Facts on Royalties, Trade, year 2006

Country	Royalties receipts as percent of		Royalties payments as percent of	
	Total HT Trade	Total Trade	Total HT Trade	Total Trade
Austria	2.08	0.22	7.43	0.79
Brazil	5.47	0.66	3.81	0.46
Canada	0.19	0.02	2.14	0.22
China	0.01	0.00	0.06	0.02
Denmark	0.11	0.02	1.85	0.29
France	0.09	0.01	0.10	0.02
Germany	1.85	0.31	0.98	0.16
India	2.29	0.21	3.86	0.36
Israel	0.06	0.01	3.79	0.90
Japan	0.23	0.05	0.26	0.06
Netherlands	0.00	0.00	0.03	0.01
Russia	0.35	0.02	1.50	0.07
South Africa	0.37	0.03	10.38	0.94
Sweden	2.04	0.34	5.54	0.91
Switzerland	0.00	0.00	0.20	0.04
UK	6.05	1.27	4.44	0.93
USA	10.43	2.11	4.42	0.90

Note: HT Trade is computed by adding imports and exports of items of high technology trade.

Total trade is computed by adding merchandise exports and imports.

Table 3-5 Major exporters and importers of communications services, 2005

(Million dollars and percentage)

Rank	Exporters	Value	Share in 15 economies	Rank	Importers	Value	Share in 15 economies
1	European Union (25)	29697	63.2	1	European Union (25)	29405	64.8
	Extra-EU (25) exports	8592	18.3		Extra-EU (25) imports	9611	21.2
2	United States	5033	10.7	2	United States	5292	11.7
3	Canada	2171	4.6	3	Canada	2010	4.4
4	India a	1999	4.3	5	Switzerland	954	2.1
6	Switzerland	1156	2.5	7	Korea, Republic of	773	1.7
9	Russian Federation	658	1.4	8	Russian Federation	746	1.6
10	Australia	625	1.3	9	India a	715	1.6
11	Malaysia b	615	1.3	10	Malaysia b	680	1.5
13	Mexico b	548	1.2	11	Australia	625	1.4
14	Philippines	520	1.1	12	Japan	616	1.4
15	China	485	1	13	China	603	1.3
				15	Indonesia	495	1.1

Source: WTO, *International Trade Statistics*, pp 133**Table 3-6 Major exporters and importers of insurance services, 2005**

(Million dollars and percentage)

Rank	Exporters	Value	Share in 15 economies	Rank	Importers	Value	Share in 15 economies
1	European Union (25)	24349	52.70	1	United States	28482	32.10
	Extra-EU (25) exports	7982	17.30	2	European Union (25)	26754	30.20
2	United States	6831	14.80		Extra-EU (25) imports	10208	11.50
3	Switzerland	4503	9.70	3	Mexico	8714	9.80
4	Canada	3211	6.90	4	China	7200	8.10
5	Mexico	1550	3.40	5	Canada	4591	5.20
7	India a	919	2.00	6	India a	2391	2.70
8	Japan	873	1.90	8	Japan	1894	2.10
9	China	549	1.20	9	Thailand	1656	1.90
10	Australia	530	1.10	11	Turkey	891	1.00
14	Russian Federation	323	0.70	12	Egypt	781	0.90
15	Turkey	323	0.70	13	Korea, Republic of	733	0.80
				14	Brazil	702	0.80
				15	Russian Federation	698	0.80

Source: WTO, *International Trade Statistics*, pp 137

Table 3-7 Major exporters and importers of financial services, 2005

(Million dollars and percentage)

Rank	Exporters	Value	Share in 15 economies	Rank	Importers	Value	Share in 15 economies
1	European Union (25)	96001	58.3	1	European Union (25)	46721	62.9
	Extra-EU (25) exports	44070	26.8		Extra-EU (25) imports	17709	23.8
2	United States	34081	20.7	2	United States	12349	16.6
3	Switzerland	10402	6.3	3	Japan	2687	3.6
5	Japan	5044	3.1	4	Canada	2356	3.2
7	Korea, Republic of	1651	1	8	India a	1227	1.7
8	Canada	1590	1	9	Switzerland	1023	1.4
10	India a	1468	0.9	10	Russian Federation	892	1.2
11	Australia	764	0.5	12	Brazil	737	1
13	South Africa	534	0.3	13	Mexico	550	0.7
14	Brazil	507	0.3	14	Indonesia	539	0.7
15	Russian Federation	390	0.2	15	Australia	408	0.5

Source: WTO, *International Trade Statistics*, pp 139**Table 3-8 Major exporters and importers of computer and information services, 2005**

(Million dollars and percentage)

Rank	Exporters	Value	Share in 15 economies	Rank	Importers	Value	Share in 15 economies
1	European Union (25)	60233	60.30	1	European Union (25)	31580	58.40
	Extra-EU (25) exports	21285	21.30		Extra-EU (25) imports	10745	19.90
2	India a	16091	16.10	2	United States	8969	16.60
3	United States	8239	8.20	3	Japan	2432	4.50
4	Israel b	4529	4.50	4	Canada	1792	3.30
5	Canada	3925	3.90	5	Brazil	1713	3.20
6	China	1840	1.80	6	China	1623	3.00
7	Japan	1126	1.10	7	India a	1498	2.80
9	Australia	886	0.90	9	Australia	802	1.50
11	Malaysia b	435	0.40	10	Indonesia	561	1.00
12	Russian Federation	422	0.40	11	Russian Federation	482	0.90
				13	Malaysia b	379	0.70

Source: WTO, *International Trade Statistics*, pp 141

