

WORKING Papers

Production sharing in Latin
America and East Asia



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Abstract

In this paper we empirically examine the extent and properties of production sharing in Latin and North America as well as that in East Asia. In 2006, exports of parts and components from Latin and North America constituted 29.7% of the region's exports of manufactured goods to the world. Both exports and imports of parts and components were declining shares of trade in manufactured goods or trade in all goods. A large amount of trade in parts and components in the region was with members of NAFTA, particularly the United States. Imports from East Asia and from China were increasingly important. There was a relatively thick production network of parts of motor vehicles in Latin and North America, followed by networks of parts of telecommunication equipment and electronic components. But the network was primarily within the United States, Mexico and Canada, with Brazil also playing a role. For East Asia, the motor vehicle parts network was not as significant, but the electronic components network was much wider and deeper.

1. Introduction

In this paper, we aim to examine the magnitude, trend and characteristics of various aspects of production sharing in most major economies in Latin and North America and in East Asia. The phenomenon of production sharing is also often called production fragmentation, vertical specialization or in the business literature, global or regional supply chain. Production sharing or production fragmentation is the splitting up of the production processes into various vertical stages, with each stage of production being parceled out to different locations. The resulting components and parts are then traded among members of the production process chain and eventually assembled into final goods and shipped to the final consumers, often consumers in the United States, in the European Union (EU) and sometimes in other developed economies like Japan.¹

There are at least *four* economic and business reasons why production sharing is of significant interest to researchers, business managers and policymakers in various economies, including those in the Asia-Pacific Economic Cooperation (APEC) and in Latin America. This form of trade is important to developing and emerging countries because it allows the countries to participate in the highly efficient and increasingly complex global supply chain and such participation is often viewed as an important ingredient for long term economic growth.² Countries

¹ There is an ongoing debate concerning to what extent the final demands are driven by consumers in the United States and in the EU vs. final demands in the Asian and Latin American markets. The quick drop of economic growth in Asia in the final quarter of 2008 seems to indicate that Asia is not decoupled from the economies of the United States and Europe.

² For example, China is often viewed as a country that started its economic takeoff via its participation in the regional supply chain, first with toys and garments, then with electronics goods and electric equipment.

may start at the low end of the supply chain, but over time they can learn and climb up the value ladder, allowing such form of trade to deliver higher and higher value added to the countries. Production sharing is also crucial to bind regional economies together as a form of “de facto” regional economic and trade integration. There is also evidence that production sharing is associated with an increase of foreign direct investment, as multinationals set up factories in various countries to produce these parts at different locations. Such foreign direct investment can lead to technology transfer and human capital accumulation in the host countries. Thus multinational companies, global or regional banks, together with trading firms, logistics companies, as well as insurance and shipping corporations are all integral parts of this global or regional production sharing process. Furthermore, since some rapidly growing economies such as China and Hong Kong are perceived to be important links of this global or regional supply chain, this mode of production and trade should be taken into account to evaluate the impact of policies such as the Yuan exchange rate revaluation (Garcia-Herrero and Koivu 2007). Thus for a variety of reasons, it is important for scholars, economists, policymakers and company executives, particularly those in developing economies to have better information and statistics about the nature and characteristics of production sharing.

For the important and specific case of the economic relationship between China and Latin America, policymakers from both Latin America and China are increasingly interested in deepening their trade and investment ties. In 2004, when Chinese President Hu Jintao participated in an APEC forum in Chile, he set a target for the trade volume between China and Latin America to reach US\$100 billion by 2010. This trade volume target was actually already exceeded two years ago. In

fact, in 2007, China was among the top five export markets for 10 countries in Latin America and the Caribbean, including Argentina, Brazil, Chile and Mexico (UNECLAC 2008). On November 22 and 23, 2008, the 16th APEC leaders' meeting was again held in Latin America (this time in Lima, Peru) and it was confirmed that a free trade agreement would be signed in the near future between Peru and China. In addition to Peru, President Hu also visited Costa Rica and Cuba in the region.³

While there is a consensus that trade and investment ties are getting stronger between China and Latin America, it is also true that much of Latin American exports to China consist of natural resources, while a large share of China's exports to Latin America is in manufactured products.⁴ Some analysts have argued that this pattern of trade is not sufficiently "balanced". Furthermore, a significant amount of Chinese investment in Latin America is also in sectors related to minerals, fuels or food.⁵ In contrast, intra-East Asian trade is characterized by trade not only in manufactured products, but increasingly by trade in parts and components, with China being a very important partner in the network. Thus to further deepen economic links between China and East Asia with Latin America, it is important to understand the characteristics of trade in parts and components in both regions and to promote policies that can foster bi-regional and trans-continental networks of production sharing.

³ Among the Latin America economies, Mexico, Peru and Chile are members of APEC.

⁴ This pattern is also true in general for bi-regional trade between the Asia-Pacific countries and Latin American countries, with the Asia-Pacific economies exporting manufactured products to Latin America and importing mainly primary products from Latin America. Trade between the two regions is thus mostly inter-industry, while within the Asia-Pacific economies, trade is much more intra-industrial and as we will show in later sections, trade in the Asia-Pacific is also increasingly of the intra-product mode.

⁵ In May 2008, China signed a US\$2.2 billion deal with Peru to extract 7 million ton of copper ore from Peru. China is also negotiating to build a US\$ 3 billion steel mill with Brazil. For more details, see Bajak (2008).

The rest of the paper is organized as follows: in the next section, we provide a review of the current and relevant literature and a description of our empirical methodology. In section 3, we examine the trend and pattern of trade in parts and components in Latin and North America. We also examine some relevant background trade and investment data for the region. In section 4, we focus on some analytical analysis of trade in parts and components, relying mainly on the revealed comparative advantage (RCA) indices. In section 5, we examine a comparison of the Latin America case of trade in parts and components with the East Asian case. In the final section, we conclude.

2. Literature Review and Methodology

The literature on the *empirical measurement* of production sharing started with Ng and Yeats (2001), Yeats, (2001), Hummels, Ishii and Yi (2001), Arndt and Kierzkowski (2001), Cheng and Kierzkowski (2001), with subsequent contributions by Ng (2003), Feenstra and Hansen (2005), Althukorala (2006), Baldwin (2006), Fung, Iizaka and Siu (2008), Dean, Fung and Wang (2007), Chen, Cheng, Fung and Lau (2008) etc. There is also a parallel growing literature on analyzing production sharing from a theoretical perspective. This literature often lumps production fragmentation together with offshoring or outsourcing. This line of research typically (though not exclusively) uses an *incomplete contract* approach or a *transaction costs* or *property rights* approach. Some earlier papers also use the more traditional comparative advantage framework. The theoretical literature includes papers by Deardorff (2001), Jones and Kierzkowski (2001), Antras (2003,

2005), Grossman and Helpman (2005), Markusen (2005), Antras and Helpman (2004), Spencer (2005), etc.

In this paper, we will adopt the methodology of using global international trade statistics to get a better sense of the features and trend of production sharing. Using international trade data rather than domestic production data has the advantage of greater reliability since international trade data are generally more accurate than domestic data on production or value added.⁶ This is particularly true for domestic data from emerging and developing countries. International trade data is also more regionally and even globally compatible since they have been classified into industries and products on a consistent basis.⁷ In essence, we are using the measurement of international trade in parts and components by products, by countries and regions as well as by years to provide us with information about the trend and characteristics of production fragmentation.

We also opt to use a relatively simple algorithm to select items in the global trade statistics that are deemed to be a part of this production sharing process. This methodology picks up trade data classifications that contain the words “ parts... “ and/ or “ components....”. We then supplement this procedure by carefully examining all trade classifications that reflect trade in intermediate goods. For example, “internal combustion engines....” (SITC 7132) is trade of a component even if it does not contain the explicit words “parts...” or “components...”.⁸ We

⁶ Attempts to measure domestic value added or vertical specialization include work by Hummels, Ishii and Yi (2001), Chen, Cheng, Fung and Lau (2008) as well as work by Dean, Fung and Wang (2007). This set of literature requires the use of national input-output tables.

⁷ We will be using the UN COMTRADE statistics.

⁸ We can also employ the United Nations Broad Economic Categories (UN BEC) to classify trade in components and parts, see e.g. Fung, Iizaka and Siu (2008). However, some researchers argue that the UN BEC classification

make several *contributions* to the growing empirical literature on production fragmentation. First, we will be able to use the most up-to-date globally compatible trade data to analyze the supply chain issue. We are also able to add to the literature by focusing on and comparing *two* important regions where production sharing has become important. Specifically, we will empirically examine over several years the trend and characteristics of trade in parts and components in various *Latin and North American* countries as well as economies in *East Asia*. These two regions have in recent decades been the most economically dynamic regions in the world. Partly because of this, a focus on Latin and North America and on East Asia should be of interest to many researchers and policymakers. In addition, because we are using globally compatible data, we are able to make specific and comparative references to those countries that are of particular current interest---big emerging markets or countries that are often seen to be important in the organization or participation of the global supply chain including countries such as the United States, China, Mexico and Brazil.

sometimes can mis-classify certain items, including items that should be parts and components but are classified as finished capital goods.

3. Trends and Characteristics of Trade in Parts and Components in Latin and North America

3.1 Background information about Trade and Foreign Direct Investment in Latin and North America

Before we delve into the details of production sharing in Latin and North America, we first look at some background economic information. Here we highlight such information in two tables. In Table 1, we present the background trade and foreign direct investment (FDI) statistics for North America and Latin America. In Mexico, FDI to gross domestic product (GDP) is 2.3% in 2006, as compared to 1.3% in the United States, 2.6% in China and 1.8% in Brazil ⁹. Trade as a ratio to GDP is 65.1% for Mexico in 2006, 27.9% for the United States, 72.4% for China and 26.4% for Brazil. At the aggregate level, these statistics tend to indicate that China and Mexico are more open to trade and investment than Brazil or the United States and are more similar to each other.

⁹ In later sections, we will discuss in greater details the comparison of trade in components and parts by countries and by products. At a finer level of disaggregation, the most up-to-date globally comparable trade data are from 2006. To make the statistics more consistent, we focus on the year 2006 even when we are looking at aggregate data.

-Table 1 -

Table 1: Comparisons of Foreign Direct Investment (FDI) and Trade Openness in North & Latin American Countries and Other Selected Comparators

Country	FDI Net Inflow (\$ mill)			FDI/GDP (%)			Exports(gs)/GDP (%)			Total Trade (X+M)/GDP (%)		
	1985	1995	2006	1985	1995	2006	1985	1995	2006	1985	1995	2006
Argentina	919	5,609	4,840	1.0	2.2	2.3	11.7	9.6	24.7	18.0	19.7	43.9
Bolivia	19	393	240	0.4	5.8	2.2	19.0	22.6	42.5	41.9	49.7	75.1
Brazil	1,441	4,859	18,782	0.6	0.6	1.8	12.2	7.3	14.7	19.3	16.0	26.4
Chile	144	2,957	7,952	0.9	4.1	5.5	28.1	29.3	45.4	53.9	56.4	76.3
Colombia	1,023	968	6,463	2.9	1.0	4.2	13.8	14.5	22.4	26.3	35.5	47.3
Ecuador	62	452	271	0.5	2.2	0.7	28.5	25.7	34.3	51.7	54.0	67.5
Mexico	1,984	9,526	19,222	1.1	3.3	2.3	15.4	30.4	31.9	25.7	58.1	65.1
Paraguay	1	103	189	0.0	1.3	2.0	22.1	59.4	49.2	48.4	130.7	115.2
Peru	1	2,557	3,467	0.0	4.8	3.8	23.0	12.6	28.7	39.4	30.8	48.5
Uruguay	-8	157	1,346	-0.2	0.9	7.0	26.8	19.0	29.9	47.9	38.1	60.2
Venezuela	68	985	-543	0.1	1.3	-0.3	24.1	27.1	36.6	42.2	48.9	57.6
Canada	1,372	9,255	69,041	0.4	1.6	5.4	28.3	37.3	36.3	54.2	71.5	70.0
United States	20,490	58,772	175,394	0.5	0.8	1.3	7.2	11.1	11.1	17.2	23.4	27.9
Some East Asian Countries:												
China	1,956	37,521	69,468	0.6	5.2	2.6	10.0	23.1	40.1	24.1	43.9	72.4
Korea, Rep.	218	1,247	4,950	0.2	0.2	0.6	32.0	28.8	43.2	63.4	58.7	85.3
Malaysia	695	5,815	6,060	2.2	6.5	4.0	54.1	94.1	117.0	103.2	192.1	217.0

Sources: UNCTAD World Investment Report database (FDI data) and World Bank WDI database (GDP and Trade data).

In Table 2, we examine the matrix of flow of exports of *all goods* from North American and Latin American economies to its own region as well as to outside markets such as the twenty-seven members of the European Union (EU (27)) and thirteen countries in East Asia for the year 2006. The thirteen North American and Latin American economies (Nam(13)) include Canada, United States, Argentina, Bolivia, Brazil, Chile, Columbia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela. LAIA (11) refers to Nam (13) without the United States and Canada. The thirteen East Asian economies (EA(13)) include Cambodia, China, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Mongolia, Philippines, Singapore, Taiwan, Thailand and Vietnam. From Table 2, it can be seen that the United States is a major exporter from this region. In 2006, 90.7% of imports by Mexico from Nam (13) came from the United States. For Canada, Brazil and EA (13), it was 95.1%, 51.4% and 75.8%, respectively. In this region, the United States itself imported 51.1% from Canada, 34.2% from Mexico, but only 4% from Brazil. It is clear that in North and Latin America, the center of trade is the United States, with a tight network with Canada and Mexico. Brazil forms another center of trade, but it is a much smaller one compared in the Americas. This picture will essentially carry over when we examine trade in parts and components.

-Table 2 -

Table 2: The Matrix of Intra-Regional Exports and Trade Balance of All Goods among North & Latin America and Other Major Countries in 2006

Partner/Importer	Exporting Country													
	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Mexico	Paraguay	Peru	Uruguay	Venezuela	Canada	USA	Nam(13)
	Exports of All Goods (\$ '000)													
Argentina	0	391,247	11,739,592	768,463	51,187	44,160	952,155	168,499	74,012	301,486	11,074	169,556	4,772,824	19,444,253
Bolivia	374,993	0	701,602	285,824	58,501	9,290	35,474	29,486	189,505	6,087	2,234	23,114	215,323	1,931,033
Brazil	8,032,346	1,592,048	0	2,757,820	190,701	26,508	1,147,290	327,983	814,541	582,529	1,501,053	1,170,980	19,227,472	37,371,273
Chile	4,374,272	68,144	3,913,549	0	258,760	554,359	904,934	130,835	1,429,921	165,260	950,153	417,011	6,789,923	19,957,121
Colombia	549,996	155,832	2,139,883	491,508	0	715,264	2,132,118	2,643	505,780	14,693	585,614	452,504	6,708,245	14,454,081
Ecuador	301,899	10,871	877,498	421,998	1,237,076	0	386,345	3,902	327,287	7,925	191,025	139,385	2,706,857	6,612,067
Mexico	1,435,398	21,740	4,458,202	2,280,566	581,599	58,384	0	6,642	390,443	133,869	595,029	3,857,164	134,127,535	147,946,573
Paraguay	613,705	28,406	1,233,639	61,590	2,415	945	27,086	0	647	58,146	469	5,881	910,756	2,943,685
Peru	719,696	248,693	1,509,564	931,572	692,046	1,039,364	533,468	27,841	0	21,113	103,597	254,397	2,927,202	9,008,556
Uruguay	1,134,439	1,327	1,012,598	89,297	5,563	2,996	66,481	420,243	8,457	0	2,140	21,336	478,359	3,243,236
Venezuela	787,370	200,972	3,565,424	492,549	2,701,734	318,896	1,783,182	9,601	412,007	78,151	0	695,356	9,011,588	20,056,829
Canada	448,987	49,522	2,280,741	1,288,695	275,148	39,365	5,176,224	5,136	1,611,607	44,550	605,441	0	230,244,127	242,069,542
United States	4,034,274	413,801	24,774,417	8,947,470	9,948,230	6,824,753	212,131,773	66,624	5,707,487	536,574	29,956,778	316,661,390	0	620,003,571
Can+USA	4,483,262	463,324	27,055,158	10,236,165	10,223,378	6,864,117	217,307,996	71,761	7,319,093	581,124	30,562,218	316,661,390	230,244,127	862,073,113
LAIA(11)	18,323,716	2,719,282	31,151,551	8,581,187	5,779,582	2,770,168	7,968,534	1,127,674	4,152,600	1,369,259	3,942,388	7,206,684	187,876,084	282,968,708
Nam(13)	22,806,977	3,182,606	58,206,709	18,817,352	16,002,961	9,634,285	225,276,530	1,199,435	11,471,693	1,950,383	34,504,607	323,868,074	418,120,211	1,145,041,822
EU(27)	8,411,616	247,742	31,123,402	15,344,338	3,722,551	1,494,950	11,042,063	114,112	4,727,066	674,362	4,941,696	25,736,724	214,978,352	322,558,974
EA(13)	6,339,408	484,535	19,262,040	16,906,657	1,124,759	342,082	5,067,949	74,707	4,697,151	338,382	394,502	23,416,330	245,403,159	323,851,659
World	46,423,170	4,223,298	137,806,190	55,880,977	24,390,975	12,727,796	249,960,546	1,906,367	23,764,897	3,952,321	61,385,240	388,091,449	1,037,029,245	2,047,542,473
	Share of Intra-trade in All Goods from Importer (%)													
Argentina	0	2.0	60.4	4.0	0.3	0.2	4.9	0.9	0.4	1.6	0.1	0.9	24.5	100.0
Bolivia	19.4	0	36.3	14.8	3.0	0.5	1.8	1.5	9.8	0.3	0.1	1.2	11.2	100.0
Brazil	21.5	4.3	0	7.4	0.5	0.1	3.1	0.9	2.2	1.6	4.0	3.1	51.4	100.0
Chile	21.9	0.3	19.6	0	1.3	2.8	4.5	0.7	7.2	0.8	4.8	2.1	34.0	100.0
Colombia	3.8	1.1	14.8	3.4	0	4.9	14.8	0.0	3.5	0.1	4.1	3.1	46.4	100.0
Ecuador	4.6	0.2	13.3	6.4	18.7	0	5.8	0.1	4.9	0.1	2.9	2.1	40.9	100.0
Mexico	1.0	0.0	3.0	1.5	0.4	0.0	0	0.0	0.3	0.1	0.4	2.6	90.7	100.0
Paraguay	20.8	1.0	41.9	2.1	0.1	0.0	0.9	0	0.0	2.0	0.0	0.2	30.9	100.0
Peru	8.0	2.8	16.8	10.3	7.7	11.5	5.9	0.3	0	0.2	1.1	2.8	32.5	100.0
Uruguay	35.0	0.0	31.2	2.8	0.2	0.1	2.0	13.0	0.3	0	0.1	0.7	14.7	100.0
Venezuela	3.9	1.0	17.8	2.5	13.5	1.6	8.9	0.0	2.1	0.4	0	3.5	44.9	100.0
Canada	0.2	0.0	0.9	0.5	0.1	0.0	2.1	0.0	0.7	0.0	0.3	0	95.1	100.0
United States	0.7	0.1	4.0	1.4	1.6	1.1	34.2	0.0	0.9	0.1	4.8	51.1	0	100.0
Can+USA	0.5	0.1	3.1	1.2	1.2	0.8	25.2	0.0	0.8	0.1	3.5	36.7	26.7	100.0
LAIA(11)	6.5	1.0	11.0	3.0	2.0	1.0	2.8	0.4	1.5	0.5	1.4	2.5	66.4	100.0
Nam(13)	2.0	0.3	5.1	1.6	1.4	0.8	19.7	0.1	1.0	0.2	3.0	28.3	36.5	100.0
EU(27)	2.6	0.1	9.6	4.8	1.2	0.5	3.4	0.0	1.5	0.2	1.5	8.0	66.6	100.0
EA(13)	2.0	0.1	5.9	5.2	0.3	0.1	1.6	0.0	1.5	0.1	0.1	7.2	75.8	100.0
World	2.3	0.2	6.7	2.7	1.2	0.6	12.2	0.1	1.2	0.2	3.0	19.0	50.6	100.0
	Trade Balance of All Goods (\$ '000)													
Argentina	0	-56,051	3,685,944	-3,709,209	-534,641	-371,579	-846,370	-593,492	-728,362	-777,062	-494,056	-335,019	495,891	-4,264,006
Bolivia	51,980	0	-746,777	227,752	-58,690	3,725	-3,477	1,658	70,420	4,733	-249,336	-20,154	-162,296	-880,462
Brazil	-3,717,728	1,015,748	-77,979	-1,472,664	-1,694,184	-857,453	-4,410,543	-787,222	-782,683	-495,336	-965,548	-1,836,382	-8,803,775	-24,875,747
Chile	3,774,891	-167,043	1,031,694	0	-253,523	63,812	-1,564,830	53,619	565,936	94,061	544,847	-1,228,719	-3,501,150	-586,404
Colombia	494,043	91,952	1,891,980	128,613	-623,828	-831,279	1,387,893	-660	-444,908	11,662	-1,835,084	-106,807	-3,118,326	-2,954,750
Ecuador	230,391	1,121	847,105	-184,847	540,147	0	315,974	3,256	-764,820	3,952	-13,772	24,111	-4,864,663	-3,862,044
Mexico	324,012	-27,498	3,148,277	1,286,233	-1,708,972	-299,273	0	-172,277	-128,342	73,259	-1,043,287	-10,266,157	-66,372,147	-75,186,173
Paraguay	108,532	4,680	937,734	-119,504	-12,658	-7,854	17,722	0	-129,426	32,293	-56,638	-6,407	842,547	1,611,020
Peru	667,959	59,276	721,424	-494,954	174,619	692,111	63,293	26,691	-697	14,192	-189,630	-1,593,492	-3,227,906	-3,087,113
Uruguay	833,298	-4,975	394,373	-86,492	-25,823	-58,903	-195,802	358,151	-22,545	0	-53,320	-27,062	-69,001	1,041,900
Venezuela	762,615	144,337	2,973,803	290,515	1,204,118	-111,415	803,394	-139,512	-132,904	-521,308	0	-368,387	-29,374,574	-24,469,317
Canada	263,124	25,874	1,086,724	807,543	-225,502	-113,768	-2,200,004	-1,459	1,319,195	26,280	175,385	-2,956,775	-77,478,937	-79,272,318
United States	-263,629	71,509	9,917,928	3,378,430	2,987,625	4,085,940	81,321,955	-286,779	3,191,796	208,736	22,563,490	124,662,345	0	251,839,347
Can+USA	-505	97,384	11,004,652	4,185,974	2,762,123	3,972,173	79,121,952	-288,239	4,510,991	235,016	22,738,875	121,705,571	-77,478,937	172,567,029
LAIA(11)	3,529,993	1,061,548	14,807,578	-4,134,558	-2,993,434	-1,778,107	-4,432,744	-1,249,787	-2,498,332	-1,559,554	-4,345,823	-15,764,475	-118,155,400	-137,513,096
Nam(13)	3,529,448	1,158,931	25,812,230	51,416	-231,311	2,194,066	78,689,208	-1,538,026	2,012,660	-1,324,538	18,393,052	105,941,096	-195,634,337	35,053,933
EU(27)	2,561,445	-14,000	10,912,806	10,139,657	233,115	282,420	-18,044,244	-212,125	2,933,884	187,368	1,730,698	-17,741,588	-126,428,008	-133,458,574
EA(13)	493,965	12,561	-1,981,920	9,631,916	-3,622,097	-1,776,017	-61,534,417	-2,355,397	1,646,761	-222,148	-3,203,664	-37,529,707	-423,802,089	-524,242,252
World	12,263,020	1,398,459	46,463,407	21,154,569	-1,771,465	614,238	-6,125,375	-3,972,392	8,453,338	-822,545	30,826,240	38,185,824	-881,967,849	-735,300,533

Source: Computations based on UN COMTRADE Statistics.

3.2 Trend and Characteristics of Trade in Parts and Components in Latin and North America

Next we now show directly the exports and imports of *parts and components* from North American and Latin American economies by products over the years. The three years that we have highlighted in Table 3 are 1985, 1995 and 2006. The year 2006 is the most up-to-date information we have about trade in parts and

components because for the year 2007, so far only about 60 percent of the trade data have been reported to the globally consistent trade dataset.¹⁰ As we mentioned earlier, we classify parts and components using all classifications with “Parts of...” as well as other notable components, under textile and garment (SITC 65 + 61), machinery and transport equipment (SITC 7), metal manufacturing (SITC 69) and other miscellaneous goods (SITC 8). An important aspect of Table 3 is that we show explicitly all the products that we have picked up from the globally consistent trade data as trade of parts and components are listed in the first column of Table 3.

In 2006, the value of *exports* of parts and components from the region to the world was US\$397,906 million. This is a large increase from 1995 (US\$221,057 million) and from 1985 (US\$78,111 million). As shares of exports of *manufactured goods*, they were 37.15%, 32.87% and 29.70% for 1985, 1995 and 2006. As shares of exports of all goods, they were 21.76%, 22.55% and 19.44%, respectively. Despite the significant growth in the absolute values of exports of parts and components, they constituted a smaller share of exports of manufactured goods or of all goods in 2006 as compared to 1985 or 1995. A similar pattern emerges for *imports* of parts and components. The values have gone up, but the shares have declined, at least when we compare 2006 to those in 1995. The values were US\$525,107, US\$259,616 and US\$84,913 in 2006, 1995 and 1985, respectively. As shares of imports of manufactured products (all goods), they were 25.96% (18.87%), 28.77% (22.77%) and 25.38% (17.85%). Generally, for this region, trade of manufactured goods as well as trade of all goods have grown faster than trade in parts and components. In this sense, we can argue that production sharing in the region has only grown absolutely but not relatively over time. We can summarize the above discussion as follows:

Exports of parts and components from Latin and North America constituted 29.7% of the region's exports of manufactured goods to the world. Both exports and imports of parts and components were declining shares of trade in manufactured goods or trade in all goods

¹⁰ This is the case as of early September 2008.

Table 3: The Development of North and Latin American Countries' Trade in Parts and Components, 1985, 1995 and 2006

SITC	Products of Parts and Components	Export Value (\$ million)			Share in Exports (%)			Import Value (\$ million)			Share in Imports (%)		
		1985	1995	2006	1985	1995	2006	1985	1995	2006	1985	1995	2006
65	Textile yarn, fabrics & made-up materials	3,846	12,408	19,873	4.92	5.61	4.99	7,047	18,801	39,091	8.30	7.24	7.44
6112	Leather fibre composition	0	29	26	0.00	0.01	0.01	14	18	12	0.02	0.01	0.00
691	Parts of structure in iron and steel	636	1,159	3,661	0.81	0.52	0.92	532	844	4,806	0.63	0.33	0.92
69733	Parts of cooking and heating apparatus	0	71	178	0.00	0.03	0.04	25	142	464	0.03	0.05	0.09
69911	Locks and parts	123	618	1,896	0.16	0.28	0.48	228	1,105	2,861	0.27	0.43	0.54
6992	Chain and parts	48	146	263	0.06	0.07	0.07	221	547	946	0.26	0.21	0.18
69971	Anchors and parts	7	5	20	0.01	0.00	0.00	7	13	97	0.01	0.00	0.02
7119	Parts of boilers and auxiliary plants	192	365	355	0.25	0.17	0.09	54	117	307	0.06	0.04	0.06
7129	Parts of steam power units	288	601	451	0.37	0.27	0.11	278	217	431	0.33	0.08	0.08
71319	Parts of aircraft internal comb engines	259	226	243	0.33	0.10	0.06	375	122	340	0.44	0.05	0.06
7132	Internal combustion engines for vehicles	1,648	7,255	14,115	2.11	3.28	3.55	3,547	11,023	18,395	4.18	4.25	3.50
7133	Internal combustion engines for marine	205	506	1,012	0.26	0.23	0.25	269	720	1,730	0.32	0.28	0.33
7139	Parts of internal combustion engines	3,789	5,320	10,195	4.85	2.41	2.56	2,681	6,042	13,501	3.16	2.33	2.57
7149	Parts of other engines and motors	3,074	6,361	16,379	3.94	2.88	4.12	1,362	4,390	12,056	1.60	1.69	2.30
7169	Parts of rotating electric motors	629	1,092	2,585	0.81	0.49	0.65	248	1,187	3,271	0.29	0.46	0.62
71889	Parts of water and hydraulic motors	51	92	126	0.07	0.04	0.03	74	93	91	0.09	0.04	0.02
72119	Parts of cultivating equipment	95	155	328	0.12	0.07	0.08	95	172	258	0.11	0.07	0.05
72129	Parts of harvesting machinery	163	274	639	0.21	0.12	0.16	299	295	665	0.35	0.11	0.13
72139	Parts of dairy machinery	38	56	70	0.05	0.03	0.02	20	46	76	0.02	0.02	0.01
72198	Parts of wine making machinery	0	6	17	0.00	0.00	0.00	0	4	13	0.00	0.00	0.00
72199	Parts of other agricultural machinery	19	217	219	0.02	0.10	0.05	61	124	265	0.07	0.05	0.05
7239	Parts of construction machinery	3,318	6,070	15,007	4.25	2.75	3.77	1,138	2,422	10,158	1.34	0.93	1.93
72449	Parts of spinning and extruding machinery	108	216	134	0.14	0.10	0.03	113	354	183	0.13	0.14	0.03
72469	Parts & loom and knitting machinery	48	93	112	0.06	0.04	0.03	199	401	262	0.23	0.15	0.05
72479	Parts of textile machinery	133	88	182	0.17	0.04	0.05	92	123	289	0.11	0.05	0.06
7259	Parts of paper making machinery	206	559	530	0.26	0.25	0.13	350	625	736	0.41	0.24	0.14
72689	Parts of book binding machinery	11	13	26	0.01	0.01	0.01	25	64	65	0.03	0.02	0.01
7269	Parts of printing & typesetting machinery	220	376	541	0.28	0.17	0.14	257	485	759	0.30	0.19	0.14
72719	Parts of grain milling machinery	0	37	43	0.00	0.02	0.01	15	36	60	0.02	0.01	0.01
72729	Parts of the food processing machinery	286	215	269	0.37	0.10	0.07	279	242	397	0.33	0.09	0.08
72819	Parts of machine tools for special industry	163	150	596	0.21	0.07	0.15	98	211	419	0.12	0.08	0.08
72839	Parts of mineral working machinery	169	484	927	0.22	0.22	0.23	159	360	1,040	0.19	0.14	0.20
72849	Parts of machines for other special industry	163	2,943	4,293	0.21	1.33	1.08	450	2,365	4,017	0.53	0.91	0.76
7369	Parts of machine tools for metal industry	383	1,092	1,669	0.49	0.49	0.42	635	1,076	1,679	0.75	0.41	0.32
73719	Parts of foundry equipment	0	129	222	0.00	0.06	0.06	28	238	339	0.03	0.09	0.06
73729	Parts of rolling mills	22	292	467	0.03	0.13	0.12	56	419	571	0.07	0.16	0.11
74149	Parts of refrigerating equipment	87	456	954	0.11	0.21	0.24	46	300	1,129	0.05	0.12	0.21
7429	Parts of the pumps for liquids	447	944	2,063	0.57	0.43	0.52	405	1,288	2,981	0.48	0.50	0.57
7439	Parts of centrifuges and filters	42	776	1,690	0.05	0.35	0.42	210	832	1,730	0.25	0.32	0.33
74419	Parts of fork lift trucks	168	391	713	0.22	0.18	0.18	267	577	1,196	0.31	0.22	0.23
7449	Parts of lifting and loading machinery	273	1,534	2,395	0.35	0.69	0.60	482	846	2,482	0.57	0.33	0.47
74519	Parts of power hand tools	125	160	564	0.16	0.07	0.14	106	258	693	0.12	0.10	0.13
74523	Parts of packing machinery	120	343	383	0.15	0.15	0.10	111	479	840	0.13	0.18	0.16
7499	Parts of other non-electric machinery	498	1,928	3,291	0.64	0.87	0.83	600	3,125	4,975	0.71	1.20	0.95
759	Parts of office and adding machinery	7,357	22,544	25,716	9.42	10.20	6.46	6,447	28,553	46,041	7.59	11.00	8.77
764	Parts of telecommunication equipment	5,123	24,030	53,751	6.56	10.87	13.51	9,639	28,171	101,694	11.35	10.85	19.37
77129	Parts of other electric power machinery	58	917	862	0.07	0.41	0.22	350	578	1,294	0.41	0.22	0.25
772	Parts of switchgear	2,390	11,746	24,643	3.06	5.31	6.19	3,136	16,503	34,236	3.69	6.36	6.52
77579	Parts of domestic electrical equipment	70	255	384	0.09	0.12	0.10	138	205	292	0.16	0.08	0.06
77589	Parts of electrothermic appliances	129	273	250	0.16	0.12	0.06	286	331	522	0.34	0.13	0.10
776	Parts of electronic components	5,297	39,339	57,541	6.78	17.80	14.46	7,615	53,366	48,766	8.97	20.56	9.29
77819	Parts of electronic accumulators	41	155	161	0.05	0.07	0.04	274	196	210	0.32	0.08	0.04
77829	Parts of electric lamps and bulbs	128	171	165	0.16	0.08	0.04	39	154	223	0.05	0.06	0.04
7783	Internal electric equipment for automobiles	527	2,161	4,992	0.67	0.98	1.25	1,239	3,905	8,652	1.46	1.50	1.65
77889	Parts of other electrical machinery	969	1,838	938	1.24	0.83	0.24	3	623	541	0.00	0.24	0.10
784	Parts & motor vehicles and accessories	17,859	36,252	64,343	22.86	16.40	16.17	22,114	42,074	83,924	26.04	16.21	15.98
625	Rubber tyres for wheels	1,100	3,726	6,996	1.41	1.69	1.76	2,588	5,529	15,146	3.05	2.13	2.88
78539	Parts of carriages and cycles	21	353	672	0.03	0.16	0.17	459	1,144	1,995	0.54	0.44	0.38
78689	Parts of trailers and non-motor vehicles	43	284	651	0.06	0.13	0.16	9	314	1,019	0.01	0.12	0.19
79199	Parts of railway vehicles and equipment	233	840	2,331	0.30	0.38	0.59	422	892	2,459	0.50	0.34	0.47
7929	Parts of aircraft	13,841	11,555	22,789	17.72	5.23	5.73	5,016	3,834	10,780	5.91	1.48	2.05
81242	Parts of lighting fittings and base metals	167	814	2,407	0.21	0.37	0.60	394	2,246	7,671	0.46	0.87	1.46
82119	Parts of chairs and seats	3	2,437	6,571	0.00	1.10	1.65	5	2,802	8,485	0.01	1.08	1.62
82122	Mattress supports and cushion for furniture	171	207	650	0.22	0.09	0.16	58	377	2,736	0.07	0.15	0.52
82199	Parts of other furniture materials	8	639	1,716	0.01	0.29	0.43	50	1,093	3,938	0.06	0.42	0.75
87429	Parts of measuring and drawing machines	0	357	1,337	0.00	0.16	0.34	5	387	900	0.01	0.15	0.17
8749	Parts of instruments and accessories	153	2,165	4,172	0.20	0.98	1.05	543	1,644	3,550	0.64	0.63	0.68
88119	Parts of still cameras and apparatus	60	206	100	0.08	0.09	0.03	89	181	153	0.10	0.07	0.03
88121	Parts of cameras under 16mm	0	8	5	0.00	0.00	0.00	11	5	1	0.01	0.00	0.00
88129	Parts of other cameras under/over 16mm	19	66	130	0.02	0.03	0.03	17	36	70	0.02	0.01	0.01
88411	Parts of unmounted optical elements	167	1,145	3,720	0.21	0.52	0.93	196	894	2,644	0.23	0.34	0.50
88514	Watch cases and parts	18	126	4	0.02	0.06	0.00	37	61	38	0.04	0.02	0.01
88529	Parts of clocks and watches	20	39	25	0.03	0.02	0.01	74	110	79	0.09	0.04	0.02
8989	Parts of musical instrument & accessories	41	155	245	0.05	0.07	0.06	95	237	320	0.11	0.09	0.06
89949	Parts of umbrellas and cans	1	6	6	0.00	0.00	0.00	7	26	51	0.01	0.01	0.01
	All above parts and components	78,111	221,057	397,996	100.00	100.00	100.00	84,913	259,618	525,107	100.00	100.00	100.00
	All manufacturing goods	210,274	672,506	1,339,904				334,589	902,530	2,023,122			
	As % of all manufactured goods				37.15	32.87	29.70				25.38	28.77	25.96
0 to 9	All goods	359,000	980,288	2,047,542				475,645	1,140,256	2,782,843			
	As % of all goods				21.76	22.55	19.44				17.85	22.77	18.87

Notes: Parts and components items are defined as those products with official description of "Parts of" and other noble components in SITC revision 2, including textiles and garments (65+61), machinery and transport equipment (7), metal manufacturing (69), and other miscellaneous manufactured goods (8).

All manufacturing goods are classified as those products under SITC 5+6+7+8-68.

Nam(13) includes Canada, United States, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

Due to the missing data, Mexico doesn't have 1985 trade data.

Source: Computations based on UN COMTRADE Statistics.

Table 4 looks at the importance of trade in parts and components across various product groups in North and Latin America. In 2006, it can be seen that parts and components were important shares of both exports and imports of telecommunication equipment, power generating machinery and electrical machinery. Over time, production fragmentation seems to have declined in the exports of textile and garment as well as in both the exports and imports of other transport equipment. In contrast, office machines have stayed relatively low throughout the years. The overall decline of the importance of exports of parts and components from this region to the world is partly driven by the declining shares of telecommunication equipment, power generating machinery and textiles and garment. If we compare the importance of parts and components trade in similar product groups in East Asia (not shown here), we will find that in 2006, there was a higher degree of production sharing in telecommunication equipment and electrical equipment, with their export (import) shares reaching 71.4 percent and 72.6 percent, respectively (81.5 percent and 82.6 percent, respectively). One message here is as follows:

In terms of product groups, in 2006, East Asia has higher degrees of production sharing in telecommunication equipment and electrical machinery, whereas Latin and North America has more production sharing in power generating machinery.

-Table 4-

Table 4: The Relative Importance of Parts and Components Exports and Imports in Selected Product Groups in North & Latin America

Product Group (SITC)	Value of Parts and Components (\$ million)					Share of Parts and Components in Product Group (%)				
	1985	1990	1995	2000	2006	1985	1990	1995	2000	2006
EXPORTS										
Textiles and garments (65+6112+84)	3,846	7,621	12,437	17,763	19,899	74.1	64.4	51.1	45.9	55.7
Metal manufacturing (69)	813	1,081	1,999	3,987	6,018	18.9	12.6	12.6	15.1	17.4
Power generating machinery (71)	10,135	16,234	21,818	34,796	45,462	80.6	73.3	68.2	69.5	65.3
Specialized industry machinery (72)	5,140	6,711	11,951	14,736	23,933	43.0	36.9	39.4	37.3	43.1
Metalworking machinery (73)	405	974	1,512	2,410	2,358	26.3	30.6	27.6	32.7	23.9
General industrial machinery (74)	1,760	5,345	6,531	8,877	12,052	19.1	26.0	19.6	18.4	17.0
Office machines (75)	7,357	13,063	22,544	32,107	25,716	44.2	41.7	44.1	42.6	39.0
Telecommunication equipment (76)	5,123	10,033	24,030	53,258	53,751	86.4	83.2	76.0	81.2	68.1
Electrical machinery (77)	9,608	25,882	56,856	98,946	89,937	69.0	70.4	67.7	67.7	60.9
Road vehicles (78)	19,023	24,893	40,615	56,601	72,663	43.1	39.8	37.6	37.0	34.5
Other transport equipment (79)	14,074	11,580	12,395	18,503	25,119	82.0	31.5	37.1	32.6	28.5
Other misc manufactures (8)	827	3,862	8,370	17,294	21,088	4.7	8.9	11.9	15.1	13.7
All above products	78,111	127,279	221,057	359,277	397,996	48.8	41.4	42.5	43.7	39.0
IMPORTS										
Textiles and garments (65+6112+84)	7,061	10,437	18,819	29,473	39,103	28.5	25.7	28.3	27.9	29.1
Metal manufacturing (69)	1,012	1,472	2,651	5,006	9,174	10.7	10.5	10.4	11.7	14.3
Power generating machinery (71)	8,889	15,296	23,911	39,323	50,123	64.3	68.5	70.4	68.3	65.7
Specialized industry machinery (72)	3,651	5,205	8,330	10,816	19,662	26.2	22.9	23.6	25.7	30.4
Metalworking machinery (73)	719	1,087	1,733	2,242	2,589	18.5	19.1	18.9	18.9	18.9
General industrial machinery (74)	2,227	5,125	7,705	10,095	16,025	17.3	19.5	17.3	15.7	15.5
Office machines (75)	6,447	11,042	28,553	41,881	46,041	39.9	31.9	36.3	35.8	32.5
Telecommunication equipment (76)	9,639	15,696	28,171	67,043	101,694	44.0	54.4	57.4	67.4	61.9
Electrical machinery (77)	13,079	29,408	75,860	113,083	94,737	56.0	61.3	67.3	63.9	51.9
Road vehicles (78)	25,170	32,255	49,061	72,456	102,084	30.6	32.0	32.6	31.0	31.6
Other transport equipment (79)	5,438	4,972	4,726	10,345	13,239	79.8	44.6	36.9	34.2	39.8
Other misc manufactures (8)	1,580	4,932	10,099	21,646	30,637	4.6	8.1	9.9	12.7	12.3
All above products	84,913	136,928	259,618	423,409	525,107	32.2	32.9	36.0	36.8	33.9

Notes: North & Latin America includes Canada, United States, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.
Due to the missing data, Mexico doesn't have 1985 trade data.

Source: Computations based on UN COMTRADE Statistics.

Table 5 splits the exports of various categories of product groups and components and parts over the years into exports *within the region* and exports *outside the region*. In 2006, 19.7% of intra-regional exports of all goods consisted of parts and components. This share has actually declined over time. In 2000, it was 25.4% and in 1995, it was 22.9%. That reflects the fact that intra-regional exports of all goods grew faster than intra-regional exports of parts and components. For North and Latin American exports to the rest of the world, the value of parts and components in 2006 was US\$172,769 million, which was 19.1% of exports of all goods exports outside the region. Intra-regional exports of all goods in this region have been driven by intra-regional exports in all manufactured goods, with a share of 67.5 percent in 2006. However the most important category behind intra-regional exports in all manufactured goods was that of machinery and transport (40.9 percent of all manufactured goods in 2006), not parts and components. This does not mean that exports of parts and components were not intra-regional.

Indeed, of all the parts and components exported to the world in 2006 from this region, 56.6 percent was intra-regional. From Table 5, we can see that:

Mineral fuels, machinery and transport, textiles and garments and parts and components were among the categories of goods that had a high degree of intra-regional exports in North and Latin America.

-Table 5-

Table 5: North and Latin America Intra-Regional and Rest-of-World Exports of Parts and Components and Other Major Product Groups

Year	All Goods	Food & Feeds	Agric Raw Materials	Ores & Metals	Mineral Fuels	All Manufactures	Of Which:				
							Chemicals	Machinery & Transport	Textiles & Garments	Other Manufactures	Parts & Components
Value of North & Latin America Intra-Regional Exports (\$ million)											
1985	165,510	13,481	6,883	6,898	24,372	107,039	9,727	72,250	2,174	22,888	36,047
1990	281,344	23,334	10,627	12,946	34,204	188,665	18,529	119,443	5,041	45,657	62,766
1995	494,869	36,797	17,712	19,360	42,574	361,341	36,086	224,773	14,218	86,269	113,453
2000	813,778	47,563	19,691	21,918	87,253	608,237	53,551	386,965	27,923	139,802	206,753
2006	1,145,042	74,820	22,681	52,269	184,285	773,118	91,118	468,869	25,622	187,512	225,226
Share of North & Latin America Intra-Regional Exports (%)											
1985	100.0	8.1	4.2	4.2	14.7	64.7	5.9	43.7	1.3	13.8	21.8
1990	100.0	8.3	3.8	4.6	12.2	67.1	6.6	42.5	1.8	16.2	22.3
1995	100.0	7.4	3.6	3.9	8.6	73.0	7.3	45.4	2.9	17.4	22.9
2000	100.0	5.8	2.4	2.7	10.7	74.7	6.6	47.6	3.4	17.2	25.4
2006	100.0	6.5	2.0	4.6	16.1	67.5	8.0	40.9	2.2	16.4	19.7
Value of North & Latin America Exports to Rest-of-World (\$ million)											
1985	193,243	42,398	10,864	13,467	16,515	103,191	17,990	60,763	3,014	21,426	42,049
1990	351,299	56,299	21,826	23,424	21,458	212,328	32,084	124,007	6,788	49,454	64,490
1995	485,418	79,089	29,461	27,011	15,667	311,165	46,448	184,604	10,123	70,014	107,604
2000	569,954	69,669	21,778	24,885	20,119	408,064	56,389	255,176	10,768	85,753	152,524
2006	902,496	113,447	29,826	86,412	63,919	566,783	98,468	327,997	10,095	130,245	172,769
Share of North & Latin America Exports to the Rest-of-World (%)											
1985	100.0	21.9	5.6	7.0	8.5	53.4	9.3	31.4	1.6	11.1	21.8
1990	100.0	16.0	6.2	6.7	6.1	60.4	9.1	35.3	1.9	14.1	18.4
1995	100.0	16.3	6.1	5.6	3.2	64.1	9.6	38.0	2.1	14.4	22.2
2000	100.0	12.2	3.8	4.4	3.5	71.6	9.9	44.8	1.9	15.0	26.8
2006	100.0	12.6	3.3	9.6	7.1	62.8	10.9	36.3	1.1	14.4	19.1
Share of North & Latin America Intra-Regional Trade in Total World Exports (%)											
1985	46.1	24.1	38.8	33.9	59.6	50.9	35.1	54.3	41.9	51.7	46.2
1990	44.5	29.3	32.7	35.6	61.4	47.0	36.6	49.1	42.6	48.0	49.3
1995	50.5	31.8	37.5	41.8	73.1	53.7	43.7	54.9	58.4	55.2	51.3
2000	58.8	40.6	47.5	46.8	81.3	59.8	48.7	60.3	72.2	62.0	57.5
2006	55.9	39.7	43.2	37.7	74.2	57.7	48.1	58.8	71.7	59.0	56.6

Note: The classification of product groups is defined in SITC revision 2 as all goods (0 to 9), food & feed (0+1+22+4), agricultural raw materials (2-22-27-28), ores & metals (27+28+68), fuels (3), all manufactures (5+6+7+8-68), chemicals (5), machinery & transport (7), textiles & garments (65+84), other manufactures (6+8-65-68-84), and parts & components (see table 41).

North & Latin America (Nam13) includes Canada, United States, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

Source: Computations based on UN COMTRADE Statistics.

In Table 6, we focus on where Latin and North American economies exported their parts and components as well as where they imported their parts and components over the years. As mentioned earlier, more than half of all parts and

components exported were within the region in 2006. There is a tendency to see a slight increase of this ratio over the years. However, this intra-regional exports of parts and components were dominated by exports to the members of NAFTA (North American Free Trade Agreements), consisting of 49.9 percent. To the United States alone, it was 24.1 percent. Exports of parts and components from this region to the East Asian economies came to 20.4 percent. To China, it was 3.9 percent. Imports of parts and components by origin show a different picture. There was a much larger share coming from East Asia, with a proportion of 45.2 percent. The East Asian share has risen gradually since 1985. The Chinese share was 17.2 percent, much higher than its export counterpart. The share by China has been growing rapidly in recent years, jumping from 5.2 percent since 2000. Intra-regional imports constituted 36.9 percent, with members of NAFTA combining for 34 percent. The United States had a share of 16.9 percent. The share by the United States has dropped since 2000.

A large amount of trade in parts and components in the region was with members of NAFTA, particularly the United States. Imports from East Asia and from China were increasingly important.

-Table 6 -

Table 6: The Origins and Destinations of North and Latin American Countries Trade in Parts and Components

Region/Country Group	Value of Trade (\$ million)					Share in Trade (%)				
	1985	1990	1995	2000	2006	1985	1990	1995	2000	2006
EXPORTS										
World	78,111	127,279	221,057	359,277	397,996	100.0	100.0	100.0	100.0	100.0
North & Latin America (Nam 13)	36,047	62,766	113,453	206,753	225,226	46.1	49.3	51.3	57.5	56.6
Of which: NAFTA (3)	32,164	57,396	99,760	188,593	198,590	41.2	45.1	45.1	52.5	49.9
- United States	12,588	21,338	41,403	86,875	95,754	16.1	16.8	18.7	24.2	24.1
Latin America & Caribbean	9,687	17,054	33,343	64,628	80,070	12.4	13.4	15.1	18.0	20.1
Of which: LAIA (11)	8,529	15,512	30,837	60,512	71,481	10.9	12.2	13.9	16.8	18.0
- Mercosur (4)	1,696	2,608	7,466	11,374	13,982	2.2	2.0	3.4	3.2	3.5
EU (27)	16,186	28,188	39,129	56,344	56,140	20.7	22.1	17.7	15.7	14.1
EFTA (3)	679	1,016	1,483	1,635	2,019	0.9	0.8	0.7	0.5	0.5
Other Europe & Central Asia	646	698	1,286	1,371	2,777	0.8	0.5	0.6	0.4	0.7
East Asia & Pacific	12,820	24,491	51,228	75,695	81,313	16.4	19.2	23.2	21.1	20.4
Of which: East Asia (13)	12,757	24,407	51,112	75,530	81,154	16.3	19.2	23.1	21.0	20.4
- China	1,343	938	2,702	4,551	15,404	1.7	0.7	1.2	1.3	3.9
- Japan	3,946	8,068	13,524	19,013	13,321	5.1	6.3	6.1	5.3	3.3
IMPORTS										
World	84,913	136,928	259,618	423,409	525,107	100.0	100.0	100.0	100.0	100.0
North & Latin America (Nam 13)	38,958	55,120	102,046	192,847	193,789	45.9	40.3	39.3	45.5	36.9
Of which: NAFTA (3)	37,150	52,522	96,609	185,270	178,675	43.8	38.4	37.2	43.8	34.0
- United States	22,607	28,389	56,337	105,472	88,502	26.6	20.7	21.7	24.9	16.9
Latin America & Caribbean	6,084	9,885	21,558	45,487	67,146	7.2	7.2	8.3	10.7	12.8
Of which: LAIA (11)	5,694	9,520	21,011	43,585	64,391	6.7	7.0	8.1	10.3	12.3
- Mercosur (4)	1,637	2,249	4,612	6,287	12,912	1.9	1.6	1.8	1.5	2.5
EU (27)	15,772	24,707	37,788	58,392	72,741	18.6	18.0	14.6	13.8	13.9
EFTA (3)	728	1,158	1,566	2,191	2,673	0.9	0.8	0.6	0.5	0.5
Other Europe & Central Asia	88	208	452	931	1,782	0.1	0.2	0.2	0.2	0.3
East Asia & Pacific	27,733	52,601	111,574	155,792	237,604	32.7	38.4	43.0	36.8	45.2
Of which: East Asia (13)	27,729	52,584	111,409	155,621	237,504	32.7	38.4	42.9	36.8	45.2
- China	519	1,784	7,506	21,812	90,340	0.6	1.3	2.9	5.2	17.2
- Japan	16,315	31,061	51,687	53,463	51,927	19.2	22.7	19.9	12.6	9.9

Notes: The classification of country groups is defined as follow:

Nam (13) = Canada, United States, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

NAFTA (3) = Canada, Mexico and United States.

LAIA (11) = Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

MERCOSUR (4) = Argentina, Brazil, Paraguay and Uruguay

European Union (27) = EU 25 members plus Bulgaria and Romania.

EFTA (3) = Iceland, Norway and Switzerland.

East Asia (13) = Cambodia, China, Hong Kong, Indonesia, Japan, Korea Rep., Malaysia, Mongolia, Philippines, Singapore, Taiwan, Thailand, Vietnam.

Source: Computations based on UN COMTRADE Statistics.

Table 7 highlights the exports and trade balances of parts and components by countries within the region and by major partners for the year 2006. Brazil exported most to the United States, Argentina and Venezuela. It exported more parts and components to Argentina than to EU 27 in 2006. It exported more to Chile than to East Asia. Unlike Brazil, which seemed to spread its exports of parts and components to various countries, both Mexico and Canada concentrated their

exports of parts and components to the United States. In terms of absolute magnitude, Mexican exports of parts and components to the world were almost four times as much as those of Brazil. However, Mexican exports to LAIA 11 (Latin American economies without the United States and Canada) were much smaller than those from Brazil.

Naturally given its size, the United States was the biggest exporter in the region, accounting for almost two-thirds of the regional exports of parts and components to the world. However, almost 90 percent of its exports to the region were to Canada and Mexico. Outside of NAFTA, the second biggest exporter behind Brazil was Argentina, which also tended to spread its exports throughout the region, particularly to non-NAFTA countries. In terms of imports from other regional economies, exports from the United States were significant shares for almost all countries. Brazil was also important, particularly for Argentina, Uruguay, Paraguay and Venezuela.

Production sharing in the region was concentrated among the NAFTA economies. There was only a smaller production network among the rest of the regional economies, led by Brazil.

-Table 7 -

Table 7: The Matrix of Intra-Regional Exports and Trade Balance of Parts and Components among North & Latin America and Other Major Countries in 2006

Partner/Importer	Exporting Country													
	Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Mexico	Paraguay	Peru	Uruguay	Venezuela	Canada	USA	Nam(13)
	Exports of Parts & Components (\$ '000)													
Argentina	0	2,109	2,977,360	131,913	6,786	635	448,933	13,074	4,774	66,027	1,241	52,508	1,102,969	4,808,330
Bolivia	15,006	0	93,329	42,498	4,015	2,342	5,664	1,121	19,571	234	22	3,156	57,405	244,362
Brazil	925,112	1,281	0	45,214	22,624	1,483	251,276	20,292	7,262	25,524	2,214	125,777	6,890,584	8,318,644
Chile	116,783	2,830	634,750	0	25,245	2,963	239,574	521	26,236	2,596	547	85,728	1,090,014	2,227,787
Colombia	61,211	7,397	577,272	31,874	0	63,209	465,846	480	39,366	3,033	27,767	83,971	1,467,239	2,828,666
Ecuador	34,719	239	139,669	10,895	129,856	0	119,558	54	23,583	263	5,693	9,056	506,092	979,677
Mexico	127,254	389	919,003	79,540	80,953	592	0	7	8,293	14,830	8,157	949,795	42,655,455	44,844,268
Paraguay	32,737	55	178,263	4,282	173	244	7,966	0	228	2,530	0	2,892	232,347	461,717
Peru	43,465	7,745	279,399	59,383	40,861	14,432	122,835	11	0	484	1,594	39,773	854,452	1,464,433
Uruguay	62,981	109	175,763	6,159	487	149	31,321	5,567	1,149	0	4	5,607	104,295	393,591
Venezuela	120,686	1,044	1,319,316	27,233	240,300	17,323	187,101	0	31,881	1,074	0	231,499	2,732,080	4,909,536
Canada	75,978	701	124,528	10,487	9,560	774	1,193,519	13	2,729	1,017	34	0	56,572,036	57,991,377
United States	298,595	8,882	3,983,364	122,625	201,279	21,123	50,081,913	1,351	46,664	18,919	57,137	40,912,261	0	95,754,111
Can+USA	374,573	9,583	4,107,892	133,112	210,839	21,897	51,275,432	1,364	49,393	19,936	57,171	40,912,261	56,572,036	153,745,488
LAIA(11)	1,539,955	23,197	7,294,124	438,992	551,300	103,374	1,880,073	41,127	162,342	116,593	47,239	1,589,763	57,692,930	71,481,011
Nam(13)	1,914,528	32,780	11,402,016	572,104	762,139	125,270	53,155,506	42,491	211,736	136,529	104,410	42,502,024	114,264,966	225,226,499
EU(27)	409,601	1,386	2,216,908	20,420	92,814	2,697	1,302,522	3,204	39,421	66,012	4,213	3,713,498	48,267,227	56,139,922
EA(13)	103,617	163	611,397	6,945	9,396	2,148	1,129,284	28	23,241	43,873	1,936	2,232,045	76,990,095	81,154,167
World	3,011,337	34,595	15,560,672	635,110	961,353	138,542	56,870,924	47,601	294,415	268,340	124,146	50,279,184	269,769,537	397,995,758
	Share of Intra-trade in Parts & Components from Importer (%)													
Argentina	0	0.0	61.9	2.7	0.1	0.0	9.3	0.3	0.1	1.4	0.0	1.1	22.9	100.0
Bolivia	6.1	0	38.2	17.4	1.6	1.0	2.3	0.5	8.0	0.1	0.0	1.3	23.5	100.0
Brazil	11.1	0.0	0	0.5	0.3	0.0	3.0	0.2	0.1	0.3	0.0	1.5	82.8	100.0
Chile	5.2	0.1	28.5	0	1.1	0.1	10.8	0.0	1.2	0.1	0.0	3.8	48.9	100.0
Colombia	2.2	0.3	20.4	1.1	0	2.2	16.5	0.0	1.4	0.1	1.0	3.0	51.9	100.0
Ecuador	3.5	0.0	14.3	1.1	13.3	0	12.2	0.0	2.4	0.0	0.6	0.9	51.7	100.0
Mexico	0.3	0.0	2.0	0.2	0.2	0.0	0	0.0	0.0	0.0	0.0	2.1	95.1	100.0
Paraguay	7.1	0.0	38.6	0.9	0.0	0.1	1.7	0	0.0	0.5	0.0	0.6	50.3	100.0
Peru	3.0	0.5	19.1	4.1	2.8	1.0	8.4	0.0	0	0.0	0.1	2.7	58.3	100.0
Uruguay	16.0	0.0	44.7	1.6	0.1	0.0	8.0	1.4	0.3	0	0.0	1.4	26.5	100.0
Venezuela	2.5	0.0	26.9	0.6	4.9	0.4	3.8	0.0	0.6	0.0	0	4.7	55.6	100.0
Canada	0.1	0.0	0.2	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0	97.6	100.0
United States	0.3	0.0	4.2	0.1	0.2	0.0	52.3	0.0	0.0	0.0	0.1	42.7	0	100.0
Can+USA	0.2	0.0	2.7	0.1	0.1	0.0	33.4	0.0	0.0	0.0	0.0	26.6	36.8	100.0
LAIA(11)	2.2	0.0	10.2	0.6	0.8	0.1	2.6	0.1	0.2	0.2	0.1	2.2	80.7	100.0
Nam(13)	0.9	0.0	5.1	0.3	0.3	0.1	23.6	0.0	0.1	0.1	0.0	18.9	50.7	100.0
EU(27)	0.7	0.0	3.9	0.0	0.2	0.0	2.3	0.0	0.1	0.1	0.0	6.6	86.0	100.0
EA(13)	0.1	0.0	0.8	0.0	0.0	0.0	1.4	0.0	0.0	0.1	0.0	2.8	94.9	100.0
World	0.8	0.0	3.9	0.2	0.2	0.0	14.3	0.0	0.1	0.1	0.0	12.6	67.8	100.0
	Trade Balance of Parts and Components (\$ '000)													
Argentina	0	-16,136	2,077,830	22,204	-58,553	-41,847	351,460	-18,167	-39,432	9,749	-50,313	-35,161	772,453	2,974,087
Bolivia	14,365	0	93,170	41,909	-3,810	2,149	5,119	1,075	13,813	119	-771	3,152	53,332	223,622
Brazil	-2,012,639	-49,115	0	-460,580	-400,018	-122,690	-907,696	-143,851	-230,181	-143,684	-818,092	-198,161	2,907,934	-2,582,850
Chile	55,760	-24,944	588,920	0	-4,491	-14,625	145,352	-4,319	-32,934	-2,584	-24,842	79,099	989,012	1,749,404
Colombia	53,897	3,817	541,765	6,542	0	-80,655	375,729	346	-5,718	2,647	-241,772	71,714	1,317,690	1,892,587
Ecuador	34,406	-1,680	138,125	7,465	69,147	0	118,910	-91	14,751	105	-6,003	8,429	488,787	872,351
Mexico	-460,126	-5,363	496,755	-258,295	-541,773	-70,542	0	-15,884	-148,696	-16,548	-182,444	-3,258,836	29,374	-4,432,378
Paraguay	20,111	-1,038	160,822	3,793	170	226	7,853	0	217	-354	0	2,858	231,437	426,096
Peru	38,943	-9,116	272,302	36,447	-286	-14,449	113,924	-225	0	-778	-25,388	35,664	812,057	1,259,081
Uruguay	202	-147	149,994	3,232	-6,836	-165	14,201	3,240	676	0	-794	4,068	85,573	253,244
Venezuela	116,926	554	1,310,974	25,284	172,536	-5,951	84,365	-315	26,838	1,063	0	209,580	2,512,442	4,454,295
Canada	29,015	-2,116	-781	-75,051	-29,079	-5,026	-531,287	-2,502	-39,814	-5,257	-44,931	0	19,038,644	17,095,742
United States	-260,432	-47,706	882,088	-680,626	-921,211	-442,304	15,503,479	-103,069	-345,490	-44,240	-1,674,650	-4,614,099	0	7,251,739
Can+USA	-231,417	-49,822	881,307	-755,678	-950,289	-447,330	14,972,192	-105,571	-385,304	-49,497	-1,719,582	-5,850,171	19,038,644	24,347,481
LAIA(11)	-2,138,154	-103,169	5,826,580	-571,999	-927,332	-348,549	309,216	-178,192	-400,678	-150,265	-1,350,418	-3,077,594	10,200,092	7,089,539
Nam(13)	-2,369,571	-152,991	6,707,886	-1,327,677	-1,877,621	-795,879	15,281,408	-283,763	-785,982	-199,762	-3,070,000	-8,927,765	29,238,736	31,437,020
EU(27)	-780,392	-28,269	-2,702,101	-884,089	-610,449	-204,813	-5,460,161	-51,962	-307,286	-32,467	-493,252	-2,908,155	-2,137,884	-16,601,280
EA(13)	-1,603,359	-72,199	-9,610,576	-981,841	-1,205,834	-285,358	-31,091,892	-584,440	-690,175	-54,628	-761,632	-13,209,173	-96,198,321	-156,349,427
World	-4,873,437	-264,064	-5,019,185	-3,455,444	-3,886,468	-1,340,631	-21,532,905	-932,527	-1,882,619	-283,755	-4,499,893	-24,634,726	-54,505,699	-127,111,352

Source: Computations based on UN COMTRADE Statistics.

In the next two tables (Table 8 and 9), we focus on the top 25 regional exports and imports of parts and components by countries for the year 2006. For all the economies, these top 25 exports constituted more than 90 percent of exports of all parts and components. For Brazil, the top exports were in parts of motor vehicles and accessories, followed by parts of telecommunication equipment. For

Argentina, it was parts of motor vehicles and accessories and parts of construction machinery. For NAFTA members, the top Mexico exports were parts of telecommunication equipment and parts of motor vehicles and accessories. The top exports for the United States were parts of electronic components and parts of motor vehicles. In contrast, the top four parts and components exports for China (not shown in the table) were parts of telecommunication equipment (US\$ 84,966 million), textile yarn, fabrics and made-up materials (US\$49,234 million), parts of office and adding machinery (US\$34,686 million) and parts of electronic components (US\$29,209 million). In the Americas, exports of electronic components were dominated by the United States, Mexico and Canada. In East Asia (not shown in the table), the large exporters of electronic components were more evenly spread out, with exports from China (US\$ 29,209 million), Hong Kong (US\$37,881 million), Japan (US\$41,725 million), Korea (US\$ 28,486 million), Singapore (US\$ 67,861 million), Taiwan (US\$ 44,681 million) and Philippines (US\$16,973 million).

Table 9 shows a very similar pattern. Parts of telecommunication equipment, parts of motor vehicles and accessories and parts of electronic components were all among the top two imports of parts and components for major economies such as Brazil, Argentina, Mexico and the United States. This implies that countries are simultaneously exporting and importing parts and components of the same classification or type. For Latin and North America, the top import item was again parts of telecommunication equipment, followed by parts of motor vehicles and accessories. For East Asia, parts of electronic components were the top imports, followed by parts of telecommunication equipment. In contrast to Latin and North America, parts of motor vehicles were not among the top five in East Asia.

There was a production network on parts of motor vehicles in Latin and North America, followed by parts of telecommunication equipment and electronic components. But the network was primarily within the United States, Mexico and Canada, with Brazil also playing a role. For East Asia, the motor vehicle parts network was not as significant, but the electronic components network was much wider and deeper.

-Tables 8 and 9 -

Table 8: The Largest 25 Parts and Components Exports of North and Latin American Countries in 2006

SITC	Product of Parts and Components	Exporter (\$ '000)													
		Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Mexico	Paraguay	Peru	Uruguay	Venezuela	Canada	USA	Nam(13)
784	Parts & motor vehicles and accessories	960,595	923	3,993,075	87,094	95,770	1,418	11,591,724	131	2,893	64,814	47,179	13,547,770	33,950,091	64,343,477
776	Parts of electronic components	1,523	2	159,571	6,607	4,878	359	2,158,278	1	405	104	36	2,164,907	53,044,292	57,540,962
764	Parts of telecommunication equipment	30,844	469	3,176,072	19,005	36,722	20,277	13,448,414	4,163	5,382	2,589	2,795	8,195,024	28,809,110	53,750,864
759	Parts of office and adding machinery	10,823	169	67,632	3,267	5,610	1,634	2,670,090	1,056	2,156	312	156	1,638,343	21,314,885	25,716,135
772	Parts of switchgear	49,980	92	318,346	18,588	40,830	923	6,100,143	16	1,589	5,404	560	1,693,793	16,412,873	24,643,137
7929	Parts of aircraft	506	102	180,255	13,467	49,125	390	71,994	0	170	0	1,122	1,758,441	20,713,042	22,788,613
65	Textile yarn, fabrics & made-up materials	331,905	16,837	1,373,794	112,013	383,067	56,207	2,193,963	28,171	201,313	170,814	9,410	2,368,297	12,627,105	19,872,894
7149	Parts of other engines and motors	2,893	3,442	51,781	2,423	1,237	8,459	656,900	0	162	0	1,293	1,248,974	14,401,363	16,378,927
7239	Parts of construction machinery	769,065	5,942	350,035	85,564	4,687	4,884	1,804,712	32	7,783	0	5,947	1,152,352	10,816,231	15,007,236
7132	Internal combustion engines for vehicles	118,531	11	1,300,099	7,510	256	17	1,858,168	0	362	11	117	2,527,368	8,302,730	14,115,181
7139	Parts of internal combustion engines	151,306	104	1,497,939	6,501	7,700	226	2,380,602	37	1,404	1,445	1,277	1,629,176	4,517,155	10,194,872
625	Rubber tyres for wheels	214,170	0	1,031,691	146,965	126,375	29,274	291,392	803	36,048	2,329	23,530	1,756,275	3,337,473	6,996,326
82119	Parts of chairs and seats	59,992	0	79,637	804	3,391	237	3,117,024	1,676	81	9,591	0	1,241,480	2,057,306	6,571,219
7783	Internal electric equipment for automotive	63,935	12	279,216	1,191	3,130	4,495	1,969,130	6	263	2	295	338,867	2,331,738	4,992,280
72849	Parts of machines for other special indust	4,640	92	28,489	1,324	1,902	183	108,755	81	437	345	92	815,122	3,331,925	4,293,387
8749	Parts of instruments and accessories	6,602	61	37,197	684	6,834	106	518,535	0	137	54	516	188,618	3,412,497	4,171,842
88411	Parts of unmounted optical elements	2,974	6	50,747	748	321	0	385,953	0	22	61	2,632	84,938	3,191,498	3,719,901
691	Parts of structure in iron and steel	31,682	1,003	88,074	41,150	66,063	2,799	488,434	262	2,784	3,137	19,611	1,526,666	1,388,974	3,660,640
7499	Parts of other non-electric machinery	22,954	36	62,761	3,006	31,408	1,115	301,499	6	4,520	9	4,047	998,433	1,860,181	3,290,885
7169	Parts of rotating electric motors	4,826	6	332,333	1,100	274	194	290,289	1,596	117	3	63	224,767	1,729,685	2,585,253
81242	Parts of lighting fittings and base metals	13,327	6	19,262	636	10,378	71	1,103,998	190	693	218	114	363,040	895,353	2,407,286
7449	Parts of lifting and loading machinery	4,186	74	21,852	2,060	4,021	134	167,529	13	108	6	83	463,204	1,732,150	2,395,421
79199	Parts of railway vehicles and equipment	6,487	6	131,935	37	325	0	137,197	0	129	0	0	508,707	1,545,869	2,363,691
7429	Parts of the pumps for liquids	30,548	59	90,282	9,268	2,719	957	125,690	0	3,293	2	372	311,067	1,488,830	2,060,087
69911	Locks and parts	1,789	0	46,913	1,539	6,502	237	931,072	0	3,557	222	150	114,156	790,342	1,896,479
	All above parts & components	2,896,086	29,453	14,768,987	572,549	893,526	134,596	54,871,487	38,240	275,810	262,383	121,397	46,859,782	254,002,699	375,726,995
	As % of all parts & components (%)	96.2	85.1	94.9	90.1	92.9	97.2	96.5	80.3	93.7	97.8	97.8	93.2	94.2	94.4
	As % of all goods exports (%)	6.5	0.8	11.3	1.1	3.9	1.1	22.8	2.5	1.2	6.8	0.2	13.0	26.0	19.4

Source: Computations based on UN COMTRADE Statistics.

Table 9: The Largest 25 Parts and Components Imports of North and Latin American Countries in 2006

SITC	Product of Parts and Components	Importer (\$ '000)													
		Argentina	Bolivia	Brazil	Chile	Colombia	Ecuador	Mexico	Paraguay	Peru	Uruguay	Venezuela	Canada	USA	Nam(13)
764	Parts of telecommunication equipment	1,997,097	36,443	3,785,771	1,212,703	1,682,662	419,101	16,113,053	204,555	570,124	133,454	1,761,060	7,560,611	66,217,653	101,694,287
784	Parts & motor vehicles and accessories	1,816,524	16,463	2,519,412	258,618	392,974	158,671	11,928,701	55,300	95,279	101,214	392,287	20,692,056	45,496,581	83,924,081
776	Parts of electronic components	307,441	7,921	3,893,659	142,151	76,983	18,568	11,946,282	6,323	42,231	7,649	44,605	4,143,858	28,128,266	48,765,938
759	Parts of office and adding machinery	322,303	5,257	1,359,996	198,412	149,535	68,572	4,833,998	404,875	112,798	29,220	237,856	3,030,132	35,287,941	46,040,896
65	Textile yarn, fabrics & made-up materials	819,544	50,387	1,591,971	537,035	868,729	197,497	5,995,066	78,863	366,138	107,470	521,833	4,413,141	23,543,342	39,091,014
772	Parts of switchgear	311,246	16,029	1,382,186	235,337	151,662	66,583	9,669,359	19,519	117,091	25,951	231,124	3,914,238	18,095,256	34,235,580
7132	Internal combustion engines for vehicles	472,492	2,234	360,116	44,542	7,500	5,995	2,987,913	1,440	14,687	979	23,013	6,132,866	8,341,394	18,395,170
625	Rubber tyres for wheels	312,034	47,863	460,759	294,039	332,525	105,926	1,536,897	110,230	152,148	36,406	217,570	2,278,786	9,260,608	15,145,792
7139	Parts of internal combustion engines	264,205	8,969	816,286	75,206	118,273	39,215	1,800,671	21,906	64,875	6,710	84,821	2,316,991	7,882,619	13,500,746
7149	Parts of other engines and motors	80,872	4,699	541,128	40,962	52,217	9,505	593,637	31	30,714	10	83,795	1,973,076	8,645,187	12,055,833
7929	Parts of aircraft	1,956	368	1,003,390	2,951	191,142	4,022	72,519	111	7,842	45	36,296	2,785,240	6,673,801	10,779,681
7239	Parts of construction machinery	99,566	26,458	318,003	171,532	185,019	149,979	317,827	4,652	108,672	2,577	229,529	1,961,744	6,582,909	10,158,366
7783	Internal electric equipment for automotive	143,321	2,574	302,943	43,222	50,936	22,911	1,297,167	8,289	28,497	5,747	68,126	1,322,695	5,355,900	8,652,329
82119	Parts of chairs and seats	72,862	253	85,959	6,337	12,225	2,181	634,159	503	1,438	401	28,278	1,536,261	6,104,235	8,485,090
81242	Parts of lighting fittings and base metals	22,149	2,698	42,203	50,178	22,603	20,663	250,197	4,192	16,500	6,737	31,500	897,927	6,303,150	7,670,695
7499	Parts of other non-electric machinery	73,123	4,245	187,955	58,260	61,664	26,113	1,370,487	8,116	35,364	5,244	111,157	629,795	2,403,348	4,974,872
691	Parts of structure in iron and steel	52,005	24,604	47,330	73,282	24,870	13,746	275,841	5,372	57,955	10,740	39,250	776,845	3,404,554	4,806,393
72849	Parts of machines for other special indust	45,683	1,344	115,385	37,472	29,088	6,596	415,553	3,607	13,908	3,617	20,057	609,743	2,714,779	4,016,832
82199	Parts of other furniture materials	10,002	2,178	18,314	17,149	11,743	6,871	149,994	1,213	6,888	2,443	21,618	525,002	3,164,728	3,930,144
8749	Parts of instruments and accessories	38,436	2,233	126,613	25,141	28,144	3,942	711,161	514	9,794	1,229	18,929	445,432	2,138,809	3,550,378
7169	Parts of rotating electric motors	95,588	1,187	93,144	15,401	19,354	6,854	695,055	107	9,465	14,429	16,956	579,339	1,724,595	3,271,273
7429	Parts of the pumps for liquids	41,102	3,804	124,509	41,080	50,335	16,367	202,062	1,708	28,901	2,351	65,339	595,935	1,807,604	2,981,096
69911	Locks and parts	48,602	2,303	71,732	18,357	13,849	15,133	571,747	3,626	9,172	2,190	15,796	392,731	1,695,747	2,860,984
82122	Mattress supports and cushion for furnitur	13,848	831	9,250	17,524	2,496	3,988	62,538	2,187	6,224	7,492	8,520	331,689	2,269,754	2,736,338
88411	Parts of unmounted optical elements	26,925	1,332	54,293	22,534	28,288	8,349	387,991	1,464	8,827	3,270	22,767	357,121	1,720,990	2,644,152
	All above parts & components	7,488,925	272,677	19,312,305	3,639,424	4,564,813	1,397,150	74,819,872	948,701	1,915,532	517,574	4,332,081	70,203,256	304,963,651	494,375,960
	As % of all parts & components (%)	95.0	91.3	93.8	89.0	94.2	94.5	95.4	96.8	88.0	93.7	93.7	93.7	94.0	94.1
	As % of all goods imports (%)	23.1	10.6	22.5	11.8	18.5	12.2	30.6	16.7	14.2	11.6	15.1	21.4	16.9	18.9

Source: Computations based on UN COMTRADE Statistics.

4. Some Analysis of Trade in Parts and Components in North and Latin American Economies

In this section we will perform some simple analysis on trade in parts and components in the region. In particular, we will examine the revealed comparative

advantage (RCA) indices of these countries in their trade of parts and components. The exporting RCA index for country i and product j is given as:

$$RCA_{ij} = (x_{ij}/X_{it}) / (x_{wj}/X_{wt})$$

where x_{ij} is value of product j exported by country i , X_{it} is the total exports of country i , x_{wj} is world exports of product j and X_{wt} is total world exports. All these are calculated for the year 2006 in Table 10. A country i is generally assumed to have comparative advantage in product j if the export RCA index is greater than one.

For the region as a whole, the products that seem to have relatively high RCA include parts of other engines and motors, locks and parts, parts of harvesting machinery, parts of construction machinery, parts of machine tools for special for special industry, etc. For Brazil, among the products that have RCAs that are greater than one include parts of cooking and heating apparatus, internal combusting engines for vehicles, parts of combustion engines, parts of rotating electric motors, etc. For Mexico, products with high RCAs include locks and parts, internal combustion engines for vehicles, parts of internal combustion engines, parts of cultivating equipment, parts of construction machinery, etc. These RCAs can also be calculated for imports, as is shown in Table 11.

5. Some Comparisons with East Asia

We next calculate the percentage of parts and components that have RCAs greater than one for each country. The larger the RCAs, the greater the country's comparative advantage in exporting parts and components. We further assume that having a larger percentage of products with higher RCAs in exporting implies that the country is at the higher end of the production chains, while having a higher percentage of imported parts and components with RCAs greater than one implies that the country is at the lower end of the production chains, i.e. more in assembly than production, then we can compare these ratios across different countries and see if we can discern any patterns.

For comparisons, we also include some Asian economies as well as the average figures for East Asia as a whole. According to Table 12, in 2006, the United States, Mexico, Canada and Brazil all had high percentages of exported parts and components with RCAs greater than one. However, both China and Korea had higher figures than all Latin and North American economies except the United States. Malaysia had a figure that was similar to Brazil. The average East Asian economy had higher percentage of parts and components with RCAs greater than one than all economies in the Americas except the members of NAFTA. On the import side, however, China was like an average North American and Latin American economy and in fact it had a slightly higher percentage than these economies if we took out the United States and Canada. These observations, together with an examination of the relevant percentages over time, seem to suggest that while China has been increasing its comparative advantage in exporting parts and components, it remains an assembler for a large fraction of the products. However, for East Asia as a whole as compared to North and Latin America, East Asia seems to have a greater comparative advantage in exporting parts and components. In fact, we know from Table 6 that in 2006 the North and Latin American economies imported 45.2 percent of parts and components from East Asia. China alone accounted for 17.2 percent of their imports and Japan contributed another 9.9 percent. In contrast, these economies exported 20.4 percent of their world exports of parts and components to East Asia, with 3.9 percent to China.

-Table 12 -

Table 12: The Percentage of Parts and Components Products with Comparative Advantage in North & Latin American (Nam13) Countries

Country/ Group	Exports - Production Operations (% of Products with RCA > 1)			Imports - Assembly Operations (% of Products with RCA > 1)		
	1985	1995	2006	1985	1995	2006
Argentina	1.3	9.3	8.0	32.0	36.0	38.7
Bolivia	0.0	0.0	1.3	44.0	22.7	26.7
Brazil	6.7	14.7	20.0	28.0	34.7	48.0
Chile	1.3	0.0	0.0	40.0	33.3	28.0
Colombia	4.0	4.0	4.0	30.7	34.7	33.3
Ecuador	0.0	1.3	1.3	45.3	34.7	20.0
Mexico	17.3	22.7	28.0	62.7	41.3	38.7
Paraguay	0.0	0.0	2.7	29.3	17.3	14.7
Peru	2.7	1.3	1.3	48.0	34.7	33.3
Uruguay	4.0	4.0	4.0	14.7	26.7	20.0
Venezuela	0.0	0.0	0.0	57.3	37.3	29.3
Canada	17.3	20.0	28.0	76.0	52.0	54.7
United States	61.3	64.0	58.7	37.3	38.7	37.3
Average above LAIA (11)	3.4	5.2	6.4	39.3	32.1	30.1
Average above Nam (13)	8.9	10.9	12.1	41.9	34.2	32.5
China	12.0	20.0	34.7	40.0	44.0	32.0
Korea Rep.	10.7	16.0	30.7	28.0	37.3	20.0
Malaysia	8.0	13.3	20.0	52.0	36.0	37.3
Average East Asia (13)	16.5	19.3	24.8	37.1	38.3	29.0

Note: Percentages based on the 75 products of parts and components listed in tables 48 and 49.

Data for Mexico in 1985 is used 1986 instead due to the missing data.

Source: Computations based on UN COMTRADE Statistics.

How do various East Asian economies compare with the North and Latin American economies in terms of their importance in exporting parts and components to the world? Table 13 highlights these results. It is clear that China exported about the same amount of parts and components as the United States to the world. The top players in the Americas are the United States, Mexico, Canada and Brazil. But China, Japan, Hong Kong, Singapore, Korea, Taiwan all had higher world export shares than all the NAM 13 economies except the United States.

-Table 13 -

Table 13: Major Exporters and Importer of Parts & Components in East Asia and Latin America, 2006

Reporter	Trade in Parts & Components					
	Exports (\$ million)	Market Share in World Exp	Share of All Manuf Exports	Imports (\$ million)	Market Share in World Imp	Share of All Manuf Imports
China	269,579	11.2	30.1	252,402	10.7	43.6
Japan	182,914	7.6	31.2	85,081	3.6	28.6
Hong Kong, China	139,875	5.8	45.9	146,480	6.2	48.1
Singapore	125,909	5.2	58.8	101,839	4.3	58.2
Korea, Rep.	109,382	4.6	37.7	57,210	2.4	32.2
Taiwan, China	94,127	3.9	46.5	51,620	2.2	37.5
Malaysia	56,486	2.4	47.9	55,535	2.3	55.0
Thailand	30,768	1.3	31.3	32,166	1.4	37.5
Philippines	25,174	1.0	61.6	27,775	1.2	69.2
Indonesia	10,886	0.5	24.5	7,073	0.3	22.1
Vietnam	3,141	0.1	15.4	8,673	0.4	29.1
Cambodia (2004)	34	0.0	1.2	938	0.0	57.8
Mongolia	9	0.0	5.8	196	0.0	22.8
Above East Asia (13)	1,048,282	43.7	37.2	826,988	34.9	42.1
United States	269,770	11.2	32.6	324,275	13.7	24.0
Mexico	56,871	2.4	30.1	78,404	3.3	37.1
Canada	50,279	2.1	23.3	74,914	3.2	27.4
Brazil	15,561	0.6	22.7	20,580	0.9	32.1
Argentina	3,011	0.1	20.4	7,885	0.3	26.7
Colombia	961	0.0	11.1	4,848	0.2	22.5
Chile	635	0.0	10.6	4,091	0.2	18.2
Peru	294	0.0	10.6	2,177	0.1	20.9
Uruguay	268	0.0	21.0	552	0.0	19.3
Ecuador	139	0.0	12.5	1,479	0.1	17.6
Venezuela	124	0.0	4.0	4,624	0.2	21.8
Paraguay	48	0.0	15.7	980	0.0	20.9
Bolivia	35	0.0	8.0	299	0.0	13.6
Above North & Latin America (13)	397,996	16.6	29.7	525,107	22.2	26.0
World	2,401,111	100.0	28.9	2,367,313	100.0	28.6

Notes: Parts and components items are defined as those products with official description of "Parts of" and other noble components in SITC Revision 2, including textiles and garments (65+61), machinery and transport equipment (7), metal manufacturing (69), and other miscellaneous manufactured goods (8). All manufacturing goods are classified as those products under SITC 5+6+7+8-68.

Source: Computations based on UN COMTRADE Statistics.

Finally, we can put both exports and imports of parts and components in East Asia and Latin America (as well as some selected economies) and compare them with all other regions or groups such as the ASEAN 10, EU, Central and Eastern European Countries (CEEC) and the Commonwealth of Independent States (CIS). The results are shown in Table 14 over the years 1985, 1990, 1995, 2000 and 2006.

-Table 14 -

Table 14: Geographic Distribution of Trade in Parts and Components in the World Markets

Region/Country Group	Value of Trade (\$ million)					Share in Trade (%)				
	1985	1990	1995	2000	2006	1985	1990	1995	2000	2006
WORLD EXPORT TO:										
World	272,519	605,612	1,060,112	1,487,677	2,401,379	100.0	100.0	100.0	100.0	100.0
East Asia and Pacific	38,968	123,162	305,450	438,022	782,725	14.3	20.3	28.8	29.4	32.6
Of which: East Asia (13)	38,355	121,789	303,093	434,996	779,095	14.1	20.1	28.6	29.2	32.4
- China	6,511	13,903	40,622	68,873	228,493	2.4	2.3	3.8	4.6	9.5
- Japan	6,851	20,665	41,824	63,774	81,466	2.5	3.4	3.9	4.3	3.4
- ASEAN (10)	12,476	40,244	116,663	153,679	217,256	4.6	6.6	11.0	10.3	9.0
Australia and New Zealand	6,381	8,905	14,049	15,411	23,716	2.3	1.5	1.3	1.0	1.0
Euro Economic Area (31)	107,232	270,498	387,414	514,733	857,397	39.3	44.7	36.5	34.6	35.7
Of which: EU (27)	99,344	253,579	364,415	485,724	806,595	36.5	41.9	34.4	32.6	33.6
- EU (15)	96,196	246,452	342,064	443,797	696,374	35.3	40.7	32.3	29.8	29.0
- Germany	20,998	53,739	87,214	105,094	174,518	7.7	8.9	8.2	7.1	7.3
Other Europe and Central Asia	5,475	12,469	36,998	63,681	176,928	2.0	2.1	3.5	4.3	7.4
Of which: CEEC (11)	3,370	7,658	26,269	49,863	127,568	1.2	1.3	2.5	3.4	5.3
CIS (12)	..	..	7,280	9,726	41,241	..	..	0.7	0.7	1.7
North and Latin America	76,623	149,404	273,990	428,809	532,980	28.1	24.7	25.8	28.8	22.2
Of which: NAM (13)	74,501	145,864	268,307	420,029	517,271	27.3	24.1	25.3	28.2	21.5
- NAFTA (3)	67,981	135,661	242,710	386,774	462,832	24.9	22.4	22.9	26.0	19.3
- United States	44,486	90,684	171,395	263,394	325,685	16.3	15.0	16.2	17.7	13.6
- ANDEAN (5)	1,491	2,049	4,959	4,836	10,200	0.5	0.3	0.5	0.3	0.4
- LAIA (11)	12,526	23,686	47,721	87,250	118,423	4.6	3.9	4.5	5.9	4.9
- MERCOSUR (4)	3,086	5,318	15,623	22,629	33,438	1.1	0.9	1.5	1.5	1.4
Middle East and North Africa	20,328	22,743	31,313	39,197	83,693	7.5	3.8	3.0	2.6	3.5
South Asia	3,436	5,644	10,323	13,060	34,996	1.3	0.9	1.0	0.9	1.5
Sub-Saharan Africa	6,590	9,766	13,302	14,320	34,145	2.4	1.6	1.3	1.0	1.4
WORLD IMPORT FROM:										
World	251,538	569,892	1,000,283	1,457,080	2,367,599	100.0	100.0	100.0	100.0	100.0
East Asia and Pacific	63,053	174,625	385,076	564,747	1,117,710	25.1	30.6	38.5	38.8	47.2
Of which: East Asia (13)	62,917	174,318	384,601	564,192	1,117,106	25.0	30.6	38.4	38.7	47.2
- China	4,201	12,556	36,869	87,160	364,955	1.7	2.2	3.7	6.0	15.4
- Japan	34,943	86,828	160,640	170,457	211,293	13.9	15.2	16.1	11.7	8.9
- ASEAN (10)	8,629	24,046	78,229	145,520	240,643	3.4	4.2	7.8	10.0	10.2
Australia and New Zealand	977	2,031	3,750	4,322	5,790	0.4	0.4	0.4	0.3	0.2
Euro Economic Area (31)	110,096	258,170	362,709	476,827	792,267	43.8	45.3	36.3	32.7	33.5
Of which: EU (27)	104,223	245,319	344,745	455,388	756,393	41.4	43.0	34.5	31.3	31.9
- EU (15)	102,062	240,452	330,895	425,146	664,335	40.6	42.2	33.1	29.2	28.1
- Germany	31,133	70,965	102,330	119,683	213,062	12.4	12.5	10.2	8.2	9.0
Other Europe and Central Asia	2,718	6,406	18,815	39,837	115,588	1.1	1.1	1.9	2.7	4.9
Of which: CEEC (11)	1,824	4,154	15,701	33,935	101,498	0.7	0.7	1.6	2.3	4.3
CIS (12)	..	..	1,636	3,873	8,113	..	..	0.2	0.3	0.3
North and Latin America	68,149	117,930	215,586	364,537	386,793	27.1	20.7	21.6	25.0	16.3
Of which: NAM (13)	67,707	117,410	214,758	361,077	377,631	26.9	20.6	21.5	24.8	15.9
- NAFTA (3)	64,741	112,808	207,143	350,997	357,046	25.7	19.8	20.7	24.1	15.1
- United States	48,997	85,635	161,283	259,440	251,708	19.5	15.0	16.1	17.8	10.6
- ANDEAN (5)	329	667	889	1,041	1,866	0.1	0.1	0.1	0.1	0.1
- LAIA (11)	7,015	12,332	24,314	49,993	76,594	2.8	2.2	2.4	3.4	3.2
- MERCOSUR (4)	2,686	4,004	6,537	8,469	17,957	1.1	0.7	0.7	0.6	0.8
Middle East and North Africa	1,664	3,703	6,674	12,298	18,769	0.7	0.6	0.7	0.8	0.8
South Asia	2,314	5,391	10,540	13,748	23,553	0.9	0.9	1.1	0.9	1.0
Sub-Saharan Africa	558	885	1,824	3,055	5,016	0.2	0.2	0.2	0.2	0.2

Note: The classifications of country groups are defined as follow:

East Asia (13) = Cambodia, China, Hong Kong, Indonesia, Japan, Korea Rep., Malaysia, Mongolia, Philippines, Singapore, Taiwan, Thailand and Vietnam.

ASEAN (10) = Brunei, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

Euro Economic Area (31) = European Union (27) plus Iceland, Norway, Switzerland, and Turkey.

European Union (27) = EU 25 members plus Bulgaria and Romania.

EU (15) = Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom.

Other Europe and Central Asia = All European and Central Asia countries, excluding EU15 members.

CEEC (11) = Bulgaria, Czech Rep., Estonia, Hungary, Latvia, Lithuania, Romania, Poland, Slovak Rep., Slovenia and Turkey.

CIS (12) = Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Rep., Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

NAM (13) = Canada, United States, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

NAFTA (3) = Canada, Mexico and United States.

ANDEAN (5) = Bolivia, Colombia, Ecuador, Peru and Venezuela.

LAIA (11) = Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.

Mercosur (4) = Argentina, Brazil, Paraguay and Uruguay.

Source: Computations based on UN COMTRADE Statistics.

In absolute terms, the largest increase in exports of components and parts came between 2000 and 2006, with East Asia (particularly China) and EU having a sizable rise. There was an increase in North and Latin America as well, particularly with NAFTA. In percentage terms, the increase in exports of parts and components was particularly impressive with China. By 2000, it has already exceeded Japan's share of exports. By 2006, China has also surpassed Germany's share. However, the United States, with a share of 13.6% in 2006, was still larger than that of China. Without the United States and Canada, the LAIA (11) actually registered a declining share of the world's exports of parts and components. Overall, East Asia (13), Other Europe and Central Asia as well as CEEC also witnessed increases in their shares.

A similar pattern emerges in imports of parts and components from the world. There was again a very large increase for China between 2000 and 2006. The EU share held steady, but there was an increase of the share by East Asia (13). In contrast, there was a significant drop in the share of North and Latin American imports.

6. Conclusion

In this paper we aim to provide an empirical analysis of the extent and characteristics of production sharing in Latin and North America as well as in East Asia. We adopted a methodology of using globally consistent international trade data rather than domestic production data as a way to judge and characterize production fragmentation. We made several contributions in our paper. We updated the analysis to the most current year where comparable data are available. We explicitly provided a comparative analysis of trade in parts and components in two of the most dynamic regions in the world—Latin America as well as East Asia. We were also able to highlight trade in parts and components for several highly relevant and important countries, including the United States, China, Mexico, Brazil, etc. Finally we also calculated the revealed comparative advantage indices across many products for all our countries.

Exports of parts and components from Latin and North America constituted 29.7% of the region's exports of manufactured goods to the world. Both exports and imports of parts and components were declining shares of trade in manufactured goods or trade in all goods. A large amount of trade in parts and components in the region was with members of NAFTA, particularly the United States. Imports from East Asia and from China were increasingly important. There was a production network on parts of motor vehicles in Latin and North America, followed by parts of telecommunication equipment and electronic components. But the network was primarily within the United States, Mexico and Canada, with Brazil also playing an important role. For East Asia, the motor vehicle parts network was not as significant, but the electronic components network was much wider and deeper. Our analysis of revealed comparative advantage indices showed that East Asia gained comparative advantage over the production operations of parts and components from 1985 to 2006, while North and Latin America registered a modest increase. In particular, China increased its comparative advantage substantially over the period 1985 to 2006, even though it was still substantially engaged in assembly operations in many products as well.

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