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## **Has the Offshore Service Network Been Expanded by Japanese Firms?**

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## Abstract

Using the Basic Survey on Overseas Business Activities and the Basic Survey of Japanese Business Structure and Activities from the Ministry of Economy, Trade and Industry (METI) covering 1996-2014, we document how headquarter-foreign subsidiary network in service (hereafter offshore service network) has been expanded relative to the network of manufacturing. The main question is whether service network (inputs and outputs) co-move with the manufacturing network of Japanese multinational firms. This analysis intends to clarify the “trade co-movement puzzle,” or the missing propagation mechanism between trade and economy in macroeconomic research. We break down the affiliates' purchasing modes into local sellers and imports and, in the same manner, their supplying modes into local buyers and exports. Then we aggregate these flows for each country. In contrast to Johnson (2014) which found “near-zero correlations” between goods and services on the country level, we suggest evidence for co-movement of manufacturing and service, transmitting international shocks through bilateral trades.

*Keywords:* Multinational firms, Service network, FATS

*JEL classification:* F15, F44, F61

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# 1 Introduction

For researchers engaging in firm-level empirical economic analysis, there is almost no question that international trades transmit supply shocks or demand shocks across borders. For example, Boehm et al. (2015) use a rich firm-level dataset from the US Census Bureau and analyze the shock propagation of 2011 Tohoku earthquake. They find that US firms with high dependence on Japanese inputs (especially, foreign affiliates of Japanese multinational firms in automobile or durable goods sector) suffered from large output losses following the earthquake. Global supply chains with Japan, therefore, play an important role in the cross-country transmission of shocks.

In contrast, for researchers engaging in macro-level economic analysis, it still remains as a puzzle whether international trades influence the GDP or contribute to business-cycle synchronization. In fact, there is a limited evidence for correlation. For example, Kose and Yi (2006) assess whether the standard international business-cycle framework can replicate the intuitive results, i.e., such as trade transmitting shocks and synchronizing economic activity across borders. However, the model prediction still falls short of the quantitative magnitude of the empirical correlation. They call this the “trade-comovement puzzle”.

To summarize, at the micro level, there are some empirical evidence on how the activities of the different areas of multinational firms are interrelated at business-cycle frequencies. However, we do not yet know of the effects outside the multinational firms’ network. At the macro level, it is yet to be established whether multinational production matters quantitatively for aggregate co-movement.

It is important to fill the gap between the micro-view and the macro-view, to get the real picture for shock transmission mechanism. We therefore examine this issue using semi-macro level data. The semi-macro data we use record the transaction of Japanese-owned foreign affiliates by sector-level (Primary, Manufacturing, and Services) where each parent and an affiliate are assigned to one of the three sectors. Then we aggregate these affiliate-level transaction data.

If the information is kept disaggregated at an entity-level or at a firm-level, the analysis will be focused on intra-firm direct effects of production shocks. However, the intra-firm results are not likely to match those of some representative firms of each economy. In contrast, if the information is highly aggregated to a macroeconomic input-output table, the analysis may miss the role of foreign firms in each host country who transmit shocks to local economies.

We therefore argue that the inter-industrial relation between home parents and foreign affiliates at each host country is the key in determining whether and how economic shocks propagate throughout the economy and

shape aggregate outcomes.

The recent empirical work has also turned attention to the role of semi-macro data. For example, Ng (2010) documents that proxies for bilateral production fragmentation predict bilateral GDP correlations, while Di Giovanni and Levchenko (2010) document that bilateral intermediate goods trade is more important than the gross trade volume in explaining output co-movement for home and foreign sectors that use each other as intermediates. Furthermore, Burstein et al. (2008) show that countries that intensively engage in intra-firm trade with the US multinational parents display higher manufacturing output correlations with the United States.

Johnson (2014) calibrates the effect of shocks on cross-border economy, using data from the World Input Output Database (WIOD). With correlated productivity shocks, the model yields high trade-comovement correlations for goods, but surprisingly the model suggests “near-zero correlations” for services. Thus, he estimates low aggregate correlations of the trade partners, suggesting as an answer to the “trade-comovement puzzle”.

We therefore investigate (1) whether the service activity at foreign economy was disconnected from the manufacturing supply chains, and (2) whether manufacturing or service activities of the Japanese-owned foreign affiliates are linked to the bilateral trade movement with major trade partners.

The organization of the paper is as follows. In the next section, we provide literature reviews on micro-level and macro-level analysis of value chains. Next we show how we construct the data for analysis. Then we discuss whether manufacturing (output of goods) and services are correlated. In addition, we ask whether manufacturing and service flows are explained by bilateral trade linkages. The last section concludes the discussion with some prospects of research in the future.

## 2 Literature Review

### 2.1 Micro-view of the Global Supply Linkages

With micro-view, it is rather taken for granted that the productivity levels transfer between parents and affiliates.<sup>1</sup> Therefore the question has been the weights of source-specific and destination-specific component that explain the similarity between parents and affiliates. Such intra-firm relations are heavily investigated so far.

We here focus on not only intra-firm relations, but also inter-firm ones. We note that firms engaged in global manufacturing are vulnerable to some unexpected shocks to their supply chains. To avoid such shocks, managers have to keep adequate amount of inventories, at the expense of storage

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<sup>1</sup>It has been a standard assumption in many studies. Some recent papers include Ramondo and Rodríguez-Clare (2013), Cravino and Levchenko (2016).

cost. To be more efficient, managers then have to take the risk of “just in time” (i.e. no inventories) production. In Japan, efficient procedures embedded in supply chain management became a bottleneck in the 2011 Tohoku earthquake. Indeed, soon after the disaster, production slowdowns and even disruptions began to occur in many of the Japanese affiliates abroad and in some foreign industries relying on Japanese inputs. For example, a foreign automobile manufacturer realized that the shortage of only one engine part could shut-down the whole assembly line.

Escaith and Gonguet (2011) visualize the supply-side transmission channels of a disruptive shock originating in Japan. The model is based on international supply-use tables to measure the intensity of forward linkages of (representative) firms with a Ghosh matrix. The results track the transmission of direct and indirect supply shocks brought about by an exogenous increase in the cost of intermediate supplies.

Bénassy-Quéré et al. (2009) give a very simple accounting example showing that, if relative prices are held constant, fragmented trade flows within global supply chains should react proportionally to a fall in the world GDP. Then they validate and generalize this finding via a simulation based on a multi-country, multi-sector CGE model. Their simulation shows that, if all trade flows are deflated by their specific prices (rather than the world GDP deflator) and GDP flows are aggregated at the world level using current exchange rates (as done for trade flows), the measured drops in trade volumes and GDPs converge to roughly the same values.

## 2.2 Macro-view of the Global Supply Linkages

Drozd and Nosal (2008) show that, macroeconomic shock transmission crucially depends on dynamic properties of trade elasticity. They demonstrate how trade elasticity is important to relate economic models to cross-sectional variation of business cycle in the data. They therefore advocate the use of models consistent with dynamic elasticity.

Liao and Santacreu (2015) investigate the role of trade by some detailed decomposition. They decompose trade into its extensive and intensive margins. They find that extensive margins explain most of the tradeTFP and tradeoutput comovement.

We also cite an evidence from international I-O tables with respect to Japan. The OECD reports for GVCs (Global Value Chains) state the importance of service sectors for competitiveness in manufacturing. The report for Japan, OECD (2013) points out that “Almost one third of the value of Japanese manufacturing exports represents service value added: especially business services, distribution services and financial services. The importance of service for manufacturing exports has not grown between 1995 and

2009 but has remained stable, in contrast to most other OECD countries.”<sup>2</sup>

The stability of service contents in manufacturing goods raises another question: whether service networks could expand, relative to those by the manufacturing goods. If service network shows some enhanced presence, Japan’s role in the global value chains could be much more cultivated.

### 3 Data

#### 3.1 Sector-level Data and the Method of Aggregation

The main data for the analysis comes from *the Basic Survey on Overseas Business Activities* (METI) from 1996-2014. The database includes individual observations on around 6,000 parent firms in Japan and about 20,000 Japanese-owned foreign affiliates in some recent years. As of 2014, the number of reporting firms and reporting rates are both increasing, keeping three quarters of the applicable firms answer the questionnaire. The data includes information on the location, industry, sales, employment, employee compensations, net value of plant, property and equipment, and the year of establishment for each business. The unique feature of the data set is that the subsidiaries and the headquarters are reported separately.

Every year, firms are asked to report their sources of purchase and destinations of sales. The affiliates report how much they “purchase locally” from domestic markets, “import from Japan”, or “import from third countries”. Similarly, they report how much they “sell locally”, “export to Japan”, or “export to third countries”.

Every three year from 1996 to 2008 (1996, 1999, 2002, 2005, 2008), and annually from 2010 to 2014, the questionnaire is designed to more detail. These detailed surveys ask whether they “sell locally to local firms”, “sell locally to Japanese-owned local firms”, “export to the parent firm in Japan”, “export to other firms in Japan”, “export to affiliate firms in third countries”, and “export to other firms in third countries”. Similarly, the detailed survey asks whether they “purchase locally from local firms”, “purchase locally from Japanese-owned local firms”, “import from the parent firm in Japan”, or “import from other firms in Japan”, “import from affiliate firms in third countries”, and “import from other firms in third countries”.

This is one of the unique features of this firm-level statistics. However, there are caveats in applying the information into analysis. The reporting rates of these finely-decomposed sales and purchase are low, from around 20 percent to 50 percent of those who declare the total sales and purchases.

Given the insufficient reporting, we aggregate the values into sector-level values, so that we can follow the data without discontinuity throughout the

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<sup>2</sup>See [www.oecd.org/sti/ind/GVCs20-20JAPAN.pdf](http://www.oecd.org/sti/ind/GVCs20-20JAPAN.pdf), and Ueno (2014), for example.

19 years. We can also regard the sector-level aggregated values as representative values.

Insert Table 1 here.

Table 1 shows the method to aggregate the sector-level data. We classify by the industry of the parent and the affiliate. The pivot table on the top shows the number of affiliates as of 2014, for example. The combination of the parent sector (in row) and the affiliate sector (in column) classifies the sector of value added.

First, all the local outputs and inputs of the affiliates in Manufacturing sector are classified into manufacturing outputs or inputs. Second, we assume that outputs of the third (service) sector exported to Japanese manufacturing incorporate manufacturing-related service contents. Similarly, the inputs of the second sector, imported from the parents of the third sector involve manufacturing-related service contents. Lastly, the service inputs and outputs of the affiliates in the service sector are classified as the service inputs and outputs as a convention.

We replicate these process for all 19 countries and 19 years. We select 19 major foreign economies where Japanese firms form large networks (measured by the number of local affiliates). Due to the page limit, we just show the values for the initial year (1996) of the statistics in Table 2, and the most recent (2014) statistics in Table 3. The whole documentation of the data is available upon request.

Insert Table 2 here.

Insert Table 3 here.

From these time-series data, it is without a question that the network of Japanese-owned multinational firms has expanded in quite a large scale.<sup>3</sup> Table 4 picks up the number of foreign affiliate in each sector and in each country. In Asian economies, for example, the number of affiliates has been more than doubled in Hong Kong, Indonesia, South Korea, Philippines, Singapore, and Taiwan. We also observe some sharp expansion of the network in India, Thailand, and China. Especially, the number of Japanese affiliates in China has increased more than seven fold.

Insert Table 4 here.

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<sup>3</sup>The increase in reporting rates of the survey may exaggerate the results to a certain extent. However, even when we assume the unchanged reporting rates, the values have been increasing.

### 3.2 Service, and Manufacturing-related Service Network

In this subsection, we document the transitions of manufacturing value added, manufacturing-related service value added, and service value added. We observe how they have expanded in size, and how service value has changed relatively to manufacturing value added.

Insert Table 5 here.

In all the economies except the UK, the total value added from the multinational firms' network has expanded in size. In North America, the value added has become more than doubled. In other OECD economies, the value added has expanded between 1 to 4 times. In Asian countries, the network value added has expanded from 2 times to 8 times. The value added expansion from Chinese affiliates shows an exceptionally high score (more than 37 times from 1996 to 2014), even exceeding the change in the number of affiliates.

Here, we discuss whether service network or manufacturing-related service network shows an over-proportional increase, or less-than-proportional increase. In countries such as the USA, the UK, Netherlands, Canada, Australia, Mexico, Hong Kong, Singapore, and China, we observe more than proportional increase in value added of manufacturing-related services, whereas, we observe less than proportional increase in services value added.

In contrast, countries such as India, South Korea, Malaysia, Philippines, and Taiwan, we observe more than proportional increase in value added of independent services. To explain these country-level difference, we then next analyze whether the gravity-type bilateral trade is a significant factor to promote these value added expansion.

## 4 Estimation Methodology and Results

### 4.1 Comovement with Bilateral Trade

Following the idea of Johnson (2014), we regress value added, gross outputs, and gross inputs of each sector on the logarithm of the bilateral trade volumes with its relative size compared with the sum of GDPs. (See the definition below.) The dependent variables are gross inputs, gross output, and the real value-added of manufacturing, manufacturing-related services, and independent services.

$$\log \left( \frac{EX_{ijt} + EX_{jit}}{GDP_{it} + GDP_{jt}} \right),$$

Insert Table 6 here.



In Table 6, we find that the bilateral trade volume is the significant variable to explain the co-movement of trade and gross output in manufacturing. The significant correlations also hold for the manufacturing-related service. In contrast, we observe that the co-movement of service and bilateral trade shows rather weak correlation. This partly supports the findings of Johnson (2014).

Insert Table 7 here.

However, in Table 7, we find that the service outputs show some significant correlation, too. We here take the relative term of service outputs to total outputs. In this manner, we can control for the fluctuations in service outputs.

Therefore, according to the sectoral aggregation data of multinational firms, we overall observe the significant correlation of bilateral trade with each of manufacturing, manufacturing-related service, and service.

Insert Table 8 here.

In Table 8, we add a variable, the ratio of foreign subsidiaries to domestic subsidiaries in number, as a new explanatory variable. The new variable shows the relative importance of Japanese multinational firms in each host economy, compared with the parent firms' ownership over domestic entities. We conjecture that, higher the ratio of foreign subsidiaries, the larger the magnitude of co-movement. The results for the manufacturing and independent services show that the importance of foreign firms (measured by the number of affiliates) explains the positive correlation of bilateral trade and local activities. To our surprise, local independent service infer the significant correlations, too.

Regarding the transmission of shocks, the scores are quite lower than the previous evidence from firm-level data such as Cravino and Levchenko (2016). However, in contrast to the "near-zero correlation" stated by Johnson (2014), the multinational firms' network shows a stronger co-movement in services.

## 5 Conclusion

Multinational firms encompass production facilities in multiple countries, and thus it is natural to conjecture that they have an impact on the international transmission of economic shocks. Indeed, it appears that the most-closely integrated countries experienced an increase in business cycle synchronization over the past three decades (Kose et al. (2008)), which coincide with the dramatic growth in multinational production. However, the relationship between multinational firms and the transmission of shocks is

not yet well-understood. At the micro level, there is limited empirical evidence on how the activities of the different parts of multinational firms are interrelated. At the macro level, it is yet to be established whether multinational production matters quantitatively for aggregate co-movement.

Our analysis goes from the micro patterns to the semi-macro implications. We aggregate multinational sales to the source-destination level (e.g. combined sales of all Japanese multinational affiliates operating in China), and estimate whether the variation in source-destination growth rates is driven by source-specific or destination-specific factors.

We have found that the bilateral factors account for about roughly 20 percent of the variation of the local value added, especially in the manufacturing sector. Our results also describe the weak (but non-zero) correlation of the service value added with the bilateral trade.

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Table 1

The Decomposition of the Affilites' Output into Manufacturing, Manufacturing-related Service, and Independent Services (The Example of Chinese Affiliates in 2014)

	Japanese Parents	Number of affiliates, by Sector		
		Primary	Secondary	Third
China (Host)	Primary	4	2	4
	Secondary	4	3,491	954
	Third	10	570	1,897

(Unit: Million Yen)

Parents	Sales Locally			Purchase Locally		
	Primary	Secondary	Third	Primary	Secondary	Third
Primary	6	176	224	333	17	252
Secondary	805	8480136	2984134	578	5390227	1020651
Third	1631	1679111	2453652	220	277662	1277261

Parents	Export to Japan			Import from Japan		
	Primary	Secondary	Third	Primary	Secondary	Third
Primary	452	598	264	0	0	2
Secondary	41	3507895	179993	0	1954989	863513
Third	265	380672	243112	0	112624	229176

Parents	Export to the third economies			Export to the third economies		
	Primary	Secondary	Third	Primary	Secondary	Third
Primary	372	0	1	0	0	1
Secondary	221	4257797	169590	0	769664	140941
Third	0	166012	136163	0	159928	140707

	Manufacturing Output		Manufacturing Input
	Mfg-Related Service Output		Mfg-Related Service Input
	Service Output		Service Input

Table 2

Japanese Owned Foreign Affiliates, Sales and Purchase activity																						
1996		Number of Affiliates			Sales Locally			Purchase Locally			Export to Japan			Import from Japan			Export to the Third economies			Import from the Third economies		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
USA	Parents																					
	1	10	2	2	3124	9	0	2055	2713	869	2440	2748	883	23	0	0	39	0	0	0	0	0
	2	19	843	516	34853	8182635	4984957	17033	3594512	2363492	3547	220637	255931	0	2215610	2013797	1830	467108	523581	0	381731	74689
	3	7	145	701	5421	383297	4415208	9011	268355	1772791	4834	11217	1971450	154	41405	449550	468	39077	1001194	0	7947	236539
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		843	661	701	8182635	5368254	4415208	3594512	2631847	1772791	220637	267148	1971450	2215610	2055202	449550	467108	562658	1001194	381731	82636	236539
UK	1	4			20			0			4853			0			0			0		
	2	4	188	128	1015	712778	736857	0	304713	376651	973	207737	286577	0	258263	175549	121	847274	65158	0	348244	354810
	3			17		54610	702430			31544	682380			441	318428			34278	3082387		7527	896641
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS
		188	145	163	712778	791467	702430	304713	408195	682380	207737	287018	318428	258263	201128	216941	847274	99436	3082387	348244	362337	896641
France	1		1			912				568			0						0			
	2	1	78	55	0	185719	253028	0	69092	38172	0	6366	463	0	37167	84676	0	57394	18169	0	65587	65379
	3			7		176865	1148977			30056	221626			138	86878			15241	53261		90652	521076
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS
		78	62	58	185719	429893	1148977	69092	68228	221626	6366	601	86878	37167	101424	101457	57394	33410	53261	65587	156031	521076
Germany	1																					
	2		154	137		750395	789166			139223	134342			8621	9760			328158	279909		155300	128318
	3		7	76		36333	376287			14922	86660			32	78828			2369	166971		10597	148662
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS
		154	144	76	750395	825499	376287	139223	149264	86660	8621	9792	78828	495827	478148	125376	328158	282278	166971	155300	138915	148662
Netherlands	1																					
	2	2	52	110	1680	191701	105978	541	25278	36424	20	665	6925	0	93798	47924	210	119079	66644	260	22737	39027
	3	1	6	73	0	3241	67230	0	590	8655	0	0	2619	0	1830	6801	0	1958	50341	0	1527	23273
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS
		52	116	73	191701	109219	67230	25278	37014	8655	665	6925	2619	93798	49754	6801	119079	68602	50341	22737	40554	23273
Canada	1	4			7			10			0			0			0			0		
	2	8	66	60	0	272320	201310	509	192370	39071	654	32941	7436	0	66961	81295	0	305531	680	0	30448	29580
	3	3	14	62	77	8468	158343	59	16030	55935	0	2312	140551	0	1634	2747	35513	15087	33875	0	1563	1457
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS
		66	74	62	272320	209778	158343	192370	55101	55935	32941	9748	140551	66961	82929	2747	305531	15767	33875	30448	31143	1457

Japanese Owned Foreign Affiliates, Sales and Purchase activity																						
1996		Number of Affiliates			Sales Locally			Purchase Locally			Export to Japan			Import from Japan			Export to the Third economies			Import from the Third economies		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Australia	1	5		1	1591		116	2141		303	6776		169	0		0	2308		102	0		0
	2	14	68	67	1020	233220	324795	14975	68999	31799	18814	37506	11185	0	95914	172120	2622	7849	4119	0	7705	29445
	3	30	28	115	3518	44032	327260	38012	36533	69548	41985	1452	553457	0	2786	15389	29576	1199	125613	22	1620	27701
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
Brazil	1	68	95	115	233220	368827	327260	68999	68332	69548	37506	12637	553457	95914	174906	15389	7849	5318	125613	7705	31065	27701
	2		1			1163			573			0			0			0			0	
	3		12	80	23	13775	294221	6818	501	96621	671	9115	1892	249	10	28571	2156	62	17657	28	35	25826
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
Mexico	1	80	42	41	294221	194298	98662	96621	22227	43047	1892	27607	109185	28571	4243	21225	17657	64702	73071	25826	1901	25557
	2	1	54	13	766	35924	3166	0	19042	77	592	3626	45	0	13027	1249	0	23518	43	0	8522	585
	3	12	21		9068	15554		5889	24294		695	23261		7312	5159		24430	30850		7401	10005	
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
Hong Kong	1	54	25	21	35924	12234	15554	19042	5966	24294	3626	740	23261	13027	8561	5159	23518	24473	30850	8522	7986	10005
	2		186	125		182811	281155		148633	63643		159646	57772		139234	185792		173434	223508		85830	157509
	3	2	36	249	0	18399	697738	3128	13324	270759	0	41461	432976	0	6279	299099	3265	38014	1034468	0	70431	1033906
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
India	1	186	161	249	182811	299554	697738	148633	76967	270759	159646	99233	432976	139234	192071	299099	173434	261522	1034468	85830	227940	1033906
	2		39	3		259136	4087		97181	8		827	0		44355	44		2770	0		7446	5
	3		3	5		0	166		150	0		183	0		26	0		104	0		0	0
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
Indonesia	1	39	6	5	259136	4087	166	97181	158	0	827	183	0	44355	70	0	2770	104	0	7446	5	0
	2	3			48			455			526			3			0			0		0
	3	4	211	12	2	482728	12401	207	121100	8348	1273	33390	200	90	222692	302	0	119882	0	0	110021	0
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
	211	63	60	482728	226400	243565	121100	27299	35047	33390	25688	38684	222692	138946	1874	119882	18916	18785	110021	25826	743	

Japanese Owned Foreign Affiliates, Sales and Purchase activity																							
2014		Number of Affiliates			Sales Locally			Purchase Locally			Export to Japan			Import from Japan			Export to the Third economies			Import from the Third economies			
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
South Korea	1																						
	2		200	21		473262	28506		232500	14757		116797	231		143508	341		57626	0		30839	3	
	3		11	23		18333	10585		1270	24804		5034	1681		5898	190		2522	23641		422	0	
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	
		200	32	23	473262	46839	10585	232500	16027	24804	116797	5265	1681	143508	6239	190	57626	2522	23641	30839	425	0	
Malaysia	1					0			0														
	2		1	278	28	161	495860	41570	327	279143	9364	140	353161	333	0	264142	8345	59	406399	8048	0	191096	8568
	3		2	29	71	644	47642	99722	38	28160	58562	3869	8594	8772	0	8927	26918	1915	30629	10933	0	7544	7436
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	
		278	57	71	495860	89212	99722	279143	37524	58562	353161	8927	8772	264142	17272	26918	406399	38677	10933	191096	16112	7436	
Phillipines	1		3			65			152			89			0			0			0		
	2		1	103	18	0	133170	1665	0	30081	294	0	38054	101	0	62607	166	0	14307	19	0	17527	11
	3		8	22	26	2579	9810	12085	32	5353	4594	1048	11572	37	0	10785	2352	0	17640	0	0	7214	2
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	
		103	40	26	133170	11475	12085	30081	5647	4594	38054	11673	37	62607	10951	2352	14307	17659	0	17527	7225	2	
Singapore	1																						
	2		234	133		614006	246157		296258	51053		231033	329498		302573	209873		496393	282451		278870	441396	
	3		32	197		31962	758049		7509	228033		1219	191980		5467	65285		2059	574789		7515	402939	
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	
		234	165	197	614006	278119	758049	296258	58562	228033	231033	330717	191980	302573	215340	65285	496393	284510	574789	278870	448911	402939	
Thailand	1		1			0			0			0			0			0			0		
	2		334	36		968650	228029		423861	100969		272526	2492		367521	15900		199635	25813		69278	2146	
	3		2	68	137	859	107792	408279	3573	49238	255603	2685	14737	108331	0	49069	74762	35	51101	190633	0	20154	118592
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	
		334	104	137	968650	335821	408279	423861	150207	255603	272526	17229	108331	367521	64969	74762	199635	76914	190633	69278	22300	118592	
Taiwan	1																						
	2		300	54		755377	93897		320513	10127		140667	9946		228052	38904		186169	559		36471	5623	
	3		1	29	68	3593	19514	317349	6874	9053	132850	4109	5165	25197	110	4760	120318	0	14857	94244	0	2343	126855
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	
		300	83	68	755377	113411	317349	320513	19180	132850	140667	15111	25197	228052	43664	120318	186169	15416	94244	36471	7966	126855	
China	1		8	1	2	18	0	53	97	0	204	430	0	150	6	0	0	418	0	40	0	0	0
	2		9	578	35	4074	256555	12364	3119	112312	2760	3395	162578	1774	485	190737	620	0	135311	474	0	83638	2334
	3		5	154	91	3618	20077	80184	6618	4426	25885	3439	19119	33891	0	11274	13476	0	30228	34813	0	6078	2915
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	
		578	189	91	256555	32441	80184	112312	7186	25885	162578	20893	33891	190737	11894	13476	135311	30702	34813	83638	8412	2915	

MM Both Parents and Affiliates are in the Manufacturing Sector  
SM Parents are in the Service Sector, and the Affiliates are in the Manufacturing Sector  
MS Parents are in the Manufacturing Sector, and the Affiliates are in the Service Sector  
SS Both Parents and Affiliates are in the Service Sector

Table 3

Japanese Owned Foreign Affiliates, Sales and Purchase activity																							
2014		Number of Affiliates			Sales Locally			Purchase Locally			Export to Japan			Import from Japan			Export to the Third economies			Import from the Third economies			
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Parents	USA	1	13		3	23041		0	5517		0	365		0	524		0	691		0	0		0
		2	8	1,011	1,024	65394	1.09E+07	6757479	189	3691132	1703530	7115	367591	347054	0	2017880	2883100	0	4028377	6103734	0	634493	467603
		3	22	111	930	25284	320670	3616157	13148	72057	2947419	540	8614	534347	0	36233	290610	61386	149257	1628852	0	11575	282432
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		1011	1135	930	10900000	7078149	3616157	3691132	1775587	2947419	367591	355668	534347	2017880	2919333	290610	4028377	6252991	1628852	634493	479178	282432	
UK	UK	1	6		1	16579		780	0		426	0		0		2	0		0	0		0	3
		2	1	156	222	0	352440	1035262	0	81013	18337	0	16172	427135	0	59716	178463	0	889555	680363	0	113109	593425
		3	15	28	241	12748	12511	674536	0	10610	279547	0	29	86322	0	27089	96335	0	41109	230839	0	2006	119004
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		156	250	241	352440	1047773	674536	81013	28947	279547	16172	427164	86322	59716	205552	96335	889555	721472	230839	113109	595431	119004	
France	France	1	2			3706			807			219		61			2186			1256			
		2	1	90	115	0	298311	373352	0	171919	8266	0	10109	4611	0	29918	103351	0	270154	25557	0	127798	181137
		3		6	71		1418	25806		407	9417		220	4909		220	2007		22241	483572		50	7313
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		90	121	71	298311	374770	25806	171919	8673	9417	10109	4831	4909	29918	103571	2007	270154	47798	483572	127798	181187	7313	
Germany	Germany	1																					
		2		136	293		1031819	1719042		203905	259768		53790	16792		237556	859055		631959	468923		145065	476349
		3		10	130		4021	162561		1277	50845		320	52427		270	90507		3102	169620		223	28649
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		136	303	130	1031819	1723063	162561	203905	261045	50845	53790	17112	52427	237556	859325	90507	631959	472025	169620	145065	476572	28649	
Netherlands	Netherlands	1	3			399			0			30		0			1			0			
		2	6	57	151	137	539547	698039	0	284223	43646	1099	8822	8805	96	150403	347680	301	697967	635528	0	283132	288014
		3	15	3	131	0	0	54391	0	0	14383	0	0	5219	0	0	4867	115045	9341	46522	0	0	18700
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		57	154	131	539547	698039	54391	284223	43646	14383	8822	8805	5219	150403	347680	4867	697967	644869	46522	283132	288014	18700	
Canada	Canada	1	4		1	2580		460	97		340	0		0		0	0		0	0		0	
		2	7	60	79	0	324776	510640	0	189183	38881	13488	2124	1471	0	55192	222084	1607	1153278	1720	0	84956	113604
		3	12	15	73	47043	51459	126467	0	41819	70715	0	15194	41173	0	31	21036	4186	33128	64607	0	0	40364
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		60	94	73	324776	562099	126467	189183	80700	70715	2124	16665	41173	55192	222115	21036	1153278	34848	64607	84956	113604	40364	



Japanese Owned Foreign Affiliates, Sales and Purchase activity																						
2014		Number of Affiliates			Sales Locally			Purchase Locally			Export to Japan			Import from Japan			Export to the Third economies			Import from the Third economies		
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Australia	1	4		3	774		1136	2332		0	1680		0	0		0	9622		0	0		0
	2	17	61	120	56448	153252	1126986	22568	45806	112150	138848	30362	17715	125	26744	525795	71910	54465	128286	67	4293	89713
	3	65	30	175	22309	30357	321689	8324	20669	111040	44467	24518	68035	0	67	36795	316640	65993	187508	0	3562	14016
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		61	150	175	153252	1157343	321689	45806	132819	111040	30362	42233	68035	26744	525862	36795	54465	194279	187508	4293	93275	14016
Brazil	1	2			3491			0			7			191			255			907		
	2	5	116	77	193	688599	103468	16	304077	30491	0	64257	4432	0	68927	15345	0	864787	72553	0	73032	20267
	3	8	21	81	10	102742	126171	8	15284	27920	0	2509	4337	0	0	1836	0	31543	242223	0	0	954
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		116	98	81	688599	206210	126171	304077	45775	27920	64257	6941	4337	68927	15345	1836	864787	104096	242223	73032	20267	954
Mexico	1	2			3108			918			0			0			0			0		
	2	1	124	65	0	334332	182496	0	159736	28421	0	4656	21	0	44922	88262	0	328542	3456	0	44410	38073
	3		21	72		61904	35832		597	2426		0	889		7750	9564		11730	25913		11545	18729
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		124	86	72	334332	244400	35832	159736	29018	2426	4656	21	889	44922	96012	9564	328542	15186	25913	44410	49618	18729
Hong Kong	1																					
	2		227	453		857774	913342		370388	418962		552589	549302		527254	1043037		343392	1314131		237395	641899
	3	1	35	596	0	13525	723300	0	18619	485441	0	21309	405153	0	14046	384764	0	42820	660290	0	3993	437813
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		227	488	596	857774	926867	723300	370388	437581	485441	552589	570611	405153	527254	1057083	384764	343392	1356951	660290	237395	645892	437813
India	1	1		1	22		451	0		96	22		54	206		279	610		4	210		1
	2		206	113		1253675	165756		753097	40221		13292	6364		88785	20091		481999	23498		41739	36276
	3	1	21	144	0	47168	70140	0	25817	34299	413	425	7941	0	3281	7309	0	2055	30998	0	6331	11509
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		206	134	144	1253675	212924	70140	753097	66038	34299	13292	6789	7941	88785	23372	7309	481999	25553	30998	41739	42607	11509
Indonesia	1																					
	2	6	511	69	10	2125723	281380	12	1249952	172031	1129	394880	284	14	434194	28389	0	1116693	4357	0	315440	40583
	3	3	78	256	22341	106928	376403	4353	57493	169819	3782	30776	18517	0	29677	47839	115864	77257	136726	0	26218	61125
		MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		511	147	256	2125723	388308	376403	1249952	229524	169819	394880	31060	18517	434194	58066	47839	1116693	81614	136726	315440	66801	61125

Japanese Owned Foreign Affiliates, Sales and Purchase activity																							
2014		Number of Affiliates			Sales Locally			Purchase Locally			Export to Japan			Import from Japan			Export to the Third economies			Import from the Third economies			
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
South Korea	1	1			1636		43	154		196	141		207	305		0	11		0	50		0	
	2		321	238		1506597	376761		682325	59766		162688	28801		376983	217642		513444	73693		211830	26643	
	3		19	261		17673	721896		14758	532446		5492	69327		299	28998		2308	155043		501	42962	
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
Malaysia	1	1	1		0	444		0	40		0	0		0	35		0	0		0	180		
	2		389	116		479504	427539		315315	285159		461952	23745		161539	43260		723958	70841		258476	111356	
	3		2	40	228	0	46499	189268	0	12666	97333	0	11462	9320	0	5442	15744	0	11624	89004	0	6602	22970
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
Phillipines	1	3			3611			0			362			0			0			0			
	2	7	219	63	451	529536	18724	10	196575	10014	28132	386134	3798	0	316789	1614	0	277272	2076	0	109521	2873	
	3	3	32	166	330	23634	94250	104	8271	50027	22	101833	16341	63	15670	10419	0	3870	16866	0	26943	8437	
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
Singapore	1				529536	42358	94250	196575	18285	50027	386134	105631	16341	316789	17284	10419	277272	5946	16866	109521	29816	8437	
	2	1	206	372	0	639025	554471	130	444247	241844	1268	192181	277911	680	152153	528378	9079	686236	906612	9369	365201	606103	
	3	2	21	498	0	31985	891383	0	4317	614306	0	670290	572666	0	11277	195837	0	1258701	1350639	0	6315	763562	
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
Thailand	1	2			1546			68			162			8			69			0			
	2		1,044	259	4787914	520787		3423901	396438		1133945	46598		934131	66416		2401506	780062		442215	43508		
	3	3	131	602	8	506887	1475911	15	156667	630883	18	41596	82471	3	55456	170231	13	81162	262217	0	137532	137297	
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
Taiwan	1	3			2286			1919			50			0			314			182			
	2		380	256	949162	648395		273715	110402		277705	57897		374975	406075		366332	188461		130590	45834		
	3		27	281	31839	437720		15840	269065		3630	59291		2732	57321		11558	178009		7964	38283		
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
China	1	4	2	4	6	176	224	333	17	252	452	598	264	0	0	2	372	0	1	0	0	1	
	2	4	3,491	954	805	8480136	2984134	578	5390227	1020651	41	3507895	179993	0	1954989	863513	221	4257797	169590	0	769664	140941	
	3	10	570	1,897	1631	1679111	2453652	220	277662	1277261	265	380672	243112	0	112624	229176	0	166012	136163	0	159928	140707	
			MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS	MM	SM,MS	SS
		3491	1524	1897	8480136	4663245	2453652	5390227	1298313	1277261	3507895	560665	243112	1954989	976137	229176	4257797	335602	136163	769664	300869	140707	

MM Both Parents and Affiliates are in the Manufacturing Sector  
SM Parents are in the Service Sector, and the Affiliates are in the Manufacturing Sector  
MS Parents are in the Manufacturing Sector, and the Affiliates are in the Service Sector  
SS Both Parents and Affiliates are in the Service Sector

Table 4

Table The Number of Japanese-Owned Foreign Affiliates, by Sector at Host, and by Sector of Parent Firms at Home

2014		Foreign Affiliates			
	Parents	Primary	Second	Third	
USA	Primary	13		3	16
	Second	8	1,011	1,024	2043
	Third	22	111	930	1063
		43	1122	1957	3122
UK	Primary	6		1	7
	Second	1	156	222	379
	Third	15	28	241	284
		22	184	464	670
France	Primary	2			2
	Second	1	90	115	206
	Third		6	71	77
		3	96	186	285
Germany	Primary				0
	Second		136	293	429
	Third		10	130	140
		0	146	423	569
Netherlands	Primary	3			3
	Second	6	57	151	214
	Third	15	3	131	149
		24	60	282	366
Canada	Primary	4		1	5
	Second	7	60	79	146
	Third	12	15	73	100
		23	75	153	251
Australia	Primary	4		3	7
	Second	17	61	120	198
	Third	65	30	175	270
		86	91	298	475
Brazil	Primary	2			2
	Second	5	116	77	198
	Third	8	21	81	110
		15	137	158	310
Mexico	Primary	2			2
	Second	1	124	65	190
	Third		21	72	93
		3	145	137	285
2014		Foreign Affiliates			
	Parents	Primary	Second	Third	
Hong Kong	Primary				0
	Second		227	453	680
	Third	1	35	596	632
		1	262	1049	1312
India	Primary	1		1	2
	Second		206	113	319
	Third	1	21	144	166
		2	227	258	487
Indonesia	Primary				0
	Second	6	511	69	586
	Third	3	78	256	337
		9	589	325	923
South Korea	Primary	1		1	2
	Second		321	238	559
	Third		19	261	280
		1	340	500	841
Malaysia	Primary	1	1		2
	Second		389	116	505
	Third	2	40	228	270
		3	430	344	777
Philippines	Primary	3			3
	Second	7	219	63	289
	Third	3	32	166	201
		13	251	229	493
Singapore	Primary				0
	Second	1	206	372	579
	Third	2	21	498	521
		3	227	870	1100
Thailand	Primary	2			2
	Second		1,044	259	1303
	Third	3	131	602	736
		1044	390	602	2036
Taiwan	Primary	3			3
	Second		380	256	636
	Third		27	281	308
		380	283	281	944
China Mainland	Primary	4	2	4	10
	Second	4	3,491	954	4449
	Third	10	570	1,897	2477
		3491	1524	1897	6912

  

1996		Foreign Affiliates			
	Parents	Primary	Second	Third	
USA	Primary	10	2	2	14
	Second	19	843	516	1378
	Third	7	145	701	853
		36	990	1219	2245
UK	Primary	4			4
	Second	4	188	128	320
	Third		17	163	180
		8	205	291	504
France	Primary		1		1
	Second	1	78	55	134
	Third		7	58	65
		1	86	113	200
Germany	Primary				0
	Second		154	137	291
	Third		7	76	83
		0	161	213	374
Netherlands	Primary				0
	Second	2	52	110	164
	Third	1	6	73	80
		3	58	183	244
Canada	Primary	4			4
	Second	8	66	60	134
	Third	3	14	62	79
		15	80	122	217
Australia	Primary	5		1	6
	Second	14	68	67	149
	Third	30	28	115	173
		49	96	183	328
Brazil	Primary		1		1
	Second	12	80	23	115
	Third	3	19	41	63
		15	100	64	179
Mexico	Primary				0
	Second	1	54	13	68
	Third		12	21	33
		1	66	34	101
1996		Foreign Affiliates			
	Parents	Primary	Second	Third	
Hong Kong	Primary				0
	Second		186	125	311
	Third	2	36	249	287
		2	222	374	598
India	Primary				0
	Second		39	3	42
	Third		3	5	8
		0	42	8	50
Indonesia	Primary	3			3
	Second	4	211	12	227
	Third	2	51	60	113
		9	262	72	343
South Korea	Primary				0
	Second		200	21	221
	Third		11	23	34
		0	211	44	255
Malaysia	Primary	1			1
	Second	1	278	28	307
	Third	2	29	71	102
		4	307	99	410
Philippines	Primary	3			3
	Second	1	103	18	122
	Third	8	22	26	56
		12	125	44	181
Singapore	Primary				0
	Second		234	133	367
	Third		32	197	229
		0	266	330	596
Thailand	Primary	1			1
	Second		334	36	370
	Third	2	68	137	207
		3	402	173	578
Taiwan	Primary				0
	Second		300	54	354
	Third	1	29	68	98
		1	329	122	452
China Mainland	Primary	8	1	2	11
	Second	9	578	35	622
	Third	5	154	91	250
		22	733	128	883

Table 5

Table: Relative Change in the Volume of Value Added by Foreign Affiliates from 1996 (scaled to 1) to 2014

Value Added from Foreign Affiliates of Japanese Firms (1996=1)						Value Added from Foreign Affiliates of Japanese Firms (1996=1)					
2014	Value Added	Manufacturing	Mfg-Related	Service	Value Added in 2014	2014	Value Added	Manufacturing	Mfg-Related	Service	Value Added in 2014
	Total	Value Added	Value Added	Value Added			Total	Value Added	Value Added	Value Added	
USA	2.18	3.34	5.96	0.46	19,724,068	Hong Kong	2.09	4.35	4.37	0.86	1,813,316
	Ratio in VA						Ratio in VA				
	1996	30%	16%	55%			1996	16.4%	18.8%	64.8%	
	2014	45.4%	43.2%	11.5%			2014	34.1%	39.4%	26.5%	
UK	0.85	1.17	6.62	0.22	2,867,619	India	8.76	7.61	27.35	337.12	1,034,556
	Ratio in VA						Ratio in VA				
	1996	25.4%	6.1%	68.5%			1996	96.4%	3.5%	0.1%	
	2014	35.0%	47.7%	17.3%			2014	83.6%	10.9%	5.4%	
France	1.33	3.21	0.97	1.11	878,457	Indonesia	3.88	8.99	1.86	0.96	2,037,164
	Ratio in VA						Ratio in VA				
	1996	11.7%	20.9%	67.3%			1996	34.7%	15.0%	50.2%	
	2014	28.3%	15.3%	56.4%			2014	80.4%	7.2%	12.4%	
Germany	2.16	3.81	1.75	0.82	1,960,907	South Korea	5.07	3.79	5.80	31.33	1,438,570
	Ratio in VA						Ratio in VA				
	1996	32.6%	38.6%	28.7%			1996	84.9%	11.3%	3.8%	
	2014	57.7%	31.4%	10.9%			2014	63.4%	12.9%	23.8%	
Netherlands	4.11	3.12	11.71	0.84	1,269,133	Malaysia	1.97	1.79	1.93	5.72	1,208,854
	Ratio in VA						Ratio in VA				
	1996	55.0%	18.6%	26.4%			1996	84.9%	10.7%	4.3%	
	2014	41.6%	53.0%	5.4%			2014	76.9%	10.5%	12.5%	
Canada	2.19	3.59	2.98	0.37	1,448,172	Philippines	7.36	7.57	5.21	11.32	717,181
	Ratio in VA						Ratio in VA				
	1996	48.7%	10.0%	41.3%			1996	77.3%	17.4%	5.3%	
	2014	79.5%	13.6%	6.9%			2014	79.5%	12.3%	8.2%	
Australia	1.10	1.52	5.71	0.46	1,218,516	Singapore	2.80	1.20	13.50	1.50	4,098,560
	Ratio in VA						Ratio in VA				
	1996	9.5%	10.1%	80.4%			1996	31.7%	11.7%	56.6%	
	2014	13.2%	52.7%	34.1%			2014	13.6%	56.2%	30.3%	
Brazil	2.86	7.20	0.91	1.79	1,749,488	Thailand	5.36	6.07	5.82	3.42	5,526,381
	Ratio in VA						Ratio in VA				
	1996	26.6%	42.2%	31.2%			1996	56.3%	18.7%	25.1%	
	2014	67.0%	13.5%	19.5%			2014	63.8%	20.3%	16.0%	
Mexico	7.92	18.62	5.69	1.06	535,336	Taiwan	2.36	1.64	4.83	5.47	1,477,203
	Ratio in VA						Ratio in VA				
	1996	33.2%	22.1%	44.7%			1996	79.3%	11.7%	9.1%	
	2014	78.2%	15.9%	6.0%			2014	55.1%	23.9%	21.0%	
						China	37.17	48.47	52.78	11.12	12,300,924
						Ratio in VA					
						1996	50.7%	17.1%	32.2%		
							2014	66.1%	24.3%	9.6%	

Table 6

Table Trade-Comovement Regressions

<b>Dependent Variable</b>	<b>Manufacturing Output (Gross)</b>	<b>Mfg-Related Service Output (Gross)</b>	<b>Independent Service Output (Gross)</b>
log bilateral trade	0.004*** (0.001)	0.002*** (0.000)	0.0008*** (0.0001)
Observations	361	361	361
R <sup>2</sup>	0.21	0.13	0.03
<b>Dependent Variable</b>	<b>Manufacturing Output (Real Value Added)</b>	<b>Mfg-Related Service Output (Real Value Added)</b>	<b>Independent Service Output (Real Value Added)</b>
log bilateral trade	0.003*** (0.001)	0.003*** (0.000)	0.0005 (0.0005)
Observations	361	361	361
R <sup>2</sup>	0.11	0.14	0.03
<b>Dependent Variable</b>	<b>Manufacturing Input (Gross)</b>	<b>Mfg-Related Service Input (Gross)</b>	<b>Independent Service Input (Gross)</b>
log bilateral trade	0.008*** (0.002)	0.004*** (0.001)	0.002 (0.001)
Observations	361	361	361
R <sup>2</sup>	0.3	0.21	0

\*\*\* Significant at the 1 percent level

\*\* Significant at the 5 percent level

\* Significant at the 10 percent level

Table 7

Table Trade-Comovement Regressions (Relative to the Total Input or Output)

<b>Dependent Variable</b>	<b>Manufacturing Output (Relative to Total Output)</b>	<b>Mfg-Related Service Output (Relative to Total Output)</b>	<b>Independent Service Output (Relative to Total Output)</b>
log bilateral trade	4.231*** (1.136)	3.544** (1.802)	8.231*** (3.400)
Observations	361	361	361
R <sup>2</sup>	0.28	0.11	0.33
<b>Dependent Variable</b>	<b>Manufacturing Output (Relative to Total Value Added)</b>	<b>Mfg-Related Service Output (Relative to Total Value Added)</b>	<b>Independent Service Output (Relative to Total Value Added)</b>
log bilateral trade	3.100* (1.699)	4.980* (2.510)	8.111** (3.330)
Observations	361	361	361
R <sup>2</sup>	0.05	0.05	0.11
<b>Dependent Variable</b>	<b>Manufacturing Input (Relative to Total Input)</b>	<b>Mfg-Related Service Input (Relative to Total Input)</b>	<b>Independent Service Input (Relative to Total Input)</b>
log bilateral trade	1.008*** (0.402)	3.220*** (1.023)	7 (6.331)
Observations	361	361	361
R <sup>2</sup>	0.29	0.21	0

\*\*\* Significant at the 1 percent level

\*\* Significant at the 5 percent level

\* Significant at the 10 percent level

Table 8

Table Trade-Comovement Regressions (Relative to the Total Input or Output)

<b>Dependent Variable</b>	<b>Manufacturing Output (Relative to Total Output)</b>	<b>Mfg-Related Service Output (Relative to Total Output)</b>	<b>Independent Service Output (Relative to Total Output)</b>
log bilateral trade	4.000* (2.209)	3.341** (1.700)	7.855*** (1.021)
The ratio of foreign/home subsidiaries	1.032*** (0.210)	5.409 (18.23)	1.800*** (0.403)
Observations	361	361	361
R <sup>2</sup>	0.29	0.11	0.34
<b>Dependent Variable</b>	<b>Manufacturing Output (Relative to Total Value Added)</b>	<b>Mfg-Related Service Output (Relative to Total Value Added)</b>	<b>Independent Service Output (Relative to Total Value Added)</b>
log bilateral trade	3.100*** (1.333)	5.21 (4.32)	7.698** (3.259)
The ratio of foreign/home subsidiaries	1.099*** (0.330)	6.001 (20.11)	1.323*** (0.339)
Observations	361	361	361
R <sup>2</sup>	0.31	0.01	0.19
<b>Dependent Variable</b>	<b>Manufacturing Input (Relative to Total Input)</b>	<b>Mfg-Related Service Input (Relative to Total Input)</b>	<b>Independent Service Input (Relative to Total Input)</b>
log bilateral trade	1.009*** (0.349)	3.111** (1.546)	5.095 (3.999)
The ratio of foreign/home subsidiaries	0.320 (0.299)	7.231 (7.988)	3.121 (9.231)
Observations	361	361	361
R <sup>2</sup>	0.2	0.15	0.01

\*\*\* Significant at the 1 percent level

\*\* Significant at the 5 percent level

\* Significant at the 10 percent level

The number of home subsidiaries are the number of domestic subsidiaries of the parent firms who own foreign subsidiaries. The information of domestic and foreign activities are matched with *the Basic Survey of Japanese Business Structure and Activities* for the same firm and same year, then aggregated for each foreign value-added category.