

AUSTRALIA–JAPAN RESEARCH CENTRE

ANU COLLEGE OF ASIA & THE PACIFIC

CRAWFORD SCHOOL OF ECONOMICS AND GOVERNMENT

WILL NEW TRENDS IN FOREIGN DIRECT INVESTMENT CHANGE THE STRUCTURE OF INTRA-INDUSTRY TRADE BETWEEN CHINA AND JAPAN?

Tao Tao



ASIA PACIFIC ECONOMIC PAPERS

No. 375, 2008

ASIA PACIFIC ECONOMIC PAPER NO. 375

2008

**Will New Trends in Foreign Direct
Investment Change the Structure of Intra-
industry Trade between China and Japan? ***

Tao Tao
Peking University

AUSTRALIA–JAPAN RESEARCH CENTRE
CRAWFORD SCHOOL OF ECONOMICS & GOVERNMENT
ANU COLLEGE OF ASIA AND THE PACIFIC

© TAO TAO 2008

This work is copyright. Apart from those uses which may be permitted under the Copyright Act 1968 as amended, no part may be reproduced by any process without written permission.

Asia Pacific Economic Papers are published under the direction of the Editorial Committee of the Australia–Japan Research Centre (AJRC). Members of the Editorial Committee are:

Professor Jenny Corbett
Executive Director
Australia–Japan Research Centre
The Australian National University, Canberra

Professor Emeritus Peter Drysdale
Crawford School of Economics and Government
The Australian National University, Canberra

Professor Christopher Findlay
Professor of Economics
University of Adelaide
Adelaide, South Australia

Professor Stuart Harris
Department of International Relations
The Australian National University, Canberra

Dr Kazuki Onji
Crawford School of Economics and Government
The Australian National University, Canberra

Papers submitted for publication in this series are subject to double-blind external review by two referees. The views expressed in APEPs are those of the individual authors and do not represent the views of the Australia–Japan Research Centre, the Crawford School, or the institutions to which authors are attached.

The Australia–Japan Research Centre is part of the Crawford School of Economics and Government, The Australian National University, Canberra.

ISSN 0 728 8409
ISBN 0 86413 329 4
AUSTRALIA–JAPAN RESEARCH CENTRE

CRAWFORD SCHOOL OF ECONOMICS AND GOVERNMENT
THE AUSTRALIAN NATIONAL UNIVERSITY
CANBERRA ACT 0200

TELEPHONE: (61 2) 6125 3780
FACSIMILE: (61 2) 6125 0767
E-MAIL: AJRC@ANU.EDU.AU
URL: [HTTP://WWW.CRAWFORD.ANU.EDU.AU](http://www.crawford.anu.edu.au)

WILL NEW TRENDS IN FOREIGN DIRECT INVESTMENT CHANGE THE STRUCTURE OF INTRA-INDUSTRY TRADE BETWEEN CHINA AND JAPAN?*

It is generally believed that Japan's cost-oriented and export-oriented direct investment has introduced a bilateral intra-industry trade pattern in China–Japan trade through which China imports accessories from Japan, processes them and exports the product to Japan. Based on investment and trade data in the machinery sector, this paper discusses whether Japan's market-oriented investment in China since 2000 has changed the structure of the trade between two countries. We conclude that the vertical division of labour, as described by the ‘flying-geese’ model and applied to the machinery industry, is gradually disappearing. In its place, no stereotypical East Asian vertical division of labour has been formed in transport machinery industry, despite it being the sector into which investment has grown fastest since 2000. Rather, factor endowment is the main determinant of intra-industry trade in the machinery industry between the two countries.

Introduction

It is well known that the vertical intra-industry division of labour between the developing and developed countries is becoming more prominent, a trend explained by two theories. Firstly, the neo-classical comparative advantage theory (Falvey 1981), which holds that goods of different quality may exist in the same sequence of a commodity statistics due to different investment of relative factors. According to factor endowments theory, developed countries should produce and export human power-intensive high-quality products, and import labour-intensive low-quality products, while developing countries should do the opposite. This theory is also known as ‘new factor endowments theory.’ East Asian exports to Europe and the United States of low-priced cotton clothing, and parallel imports of high-end fashion brands provides an example of such a theory in practice.

Another theory is based on the ‘flying-geese’ model (Akamatsu 1962). According to this theory, through direct investment the developed countries/regions in East Asia relocated their ‘marginal’ industries to least developed countries (LDCs). Efficiency (cost)-oriented and export-oriented direct investment aims to benefit from developing countries’ cheap labour and thus enhance cost-related comparative advantage. In this way, a vertical intra-industry trade structure formed between East Asian countries/regions, within which more developed economies export accessories to less developed areas that

in turn sell back finished goods.

In other words, the comparative advantage that encourages vertical intra-industry trade between the developed and developing countries/regions can theoretically be sourced from either their difference of factor endowment or from the direct investment made by the former in the latter. A large number of empirical studies show that Chinese machinery products trade (processing trade) since the 1990s fits the latter model. Kwan (2002) compares trade structures in East Asian countries and finds them to be in line with the country's economic development without exception. In general, no evidence from China's economic rise challenges the 'flying-geese' model. Even in the information technology (IT) area, a sector growing at high speed in China, the country still lags far behind Japan and other Asian countries in terms of export competitiveness. In this way, a clear division of labour exists between Japan and China: the former specialising in high-value-added products and the latter in low-value-added products. Kyoji Fukao, Hikari Ishido and Keiko Ito (2003) take the electronic machinery industry trade data as an example, and find that the vertical intra-industry trade between Japan and East Asian countries (including China) is closely related to the overseas production of Japanese transnational corporations. That is, implicitly, that Japan's direct investment in East Asian countries has played a major role in the vertical industry trade and investment.

Such studies reveal a number of important features of the Sino-Japanese trade and investment structure: Japanese capital to China is from its marginal industries, such as the machinery industry; these investments are cost-oriented and export-oriented; and finally that the investment leads to vertical intra-industry trade between the two countries.

Meanwhile, it is interesting to observe changes in the trend of Japanese investment in China since the beginning of the 21st century. Though most Japanese investment in China remains in the machinery industry, there has been a greater increase in the transport machinery sector than in the general machinery and electrical machinery sectors, to the point that investment in the transport machinery sector now occupies the largest proportion of the Japanese investment in China.

Three generally known facts suggest that Japanese FDI in the transport sector does not utilise low-cost labour nor displace marginal industries, but rather aims to compete within the Chinese market itself: (1) the transport machinery sector is not a 'marginal' industry in Japan, but an industry with comparative advantage; (2) the transport machinery sector, especially the automotive industry, is one of the fastest-growing industries in China; (3) the Chinese automotive industry remains inwardly-focused. In turn, it would appear that the objective of Japanese investment has changed from cost and export-oriented investment to domestic market-oriented investment. This then leads to questions: if Japan no longer invests in its marginal industries and also if the purpose of its investment

is no longer solely cost-related and export-oriented, can the vertical intra-industry trade of machinery products explained by ‘flying-geese’ pattern remain? Indeed, has change taken place? More specifically, is there a new trend in the investment structure of the intra-industry trade between the two countries? This paper discusses these questions so as to shed light on the trends of Sino-Japanese trade and investment structure as well as to provide a test of the relevant theories.

The second section of this paper analyses the change of Japan's direct investment in Chinese machinery industry; the third section, which utilises the intra-industry trade index and the vertical/level intra-industry trade index, discusses the change of the vertical intra-industry trade structure in machinery industry between Japan and China; the fourth section forms the conclusion and provides further explanation.

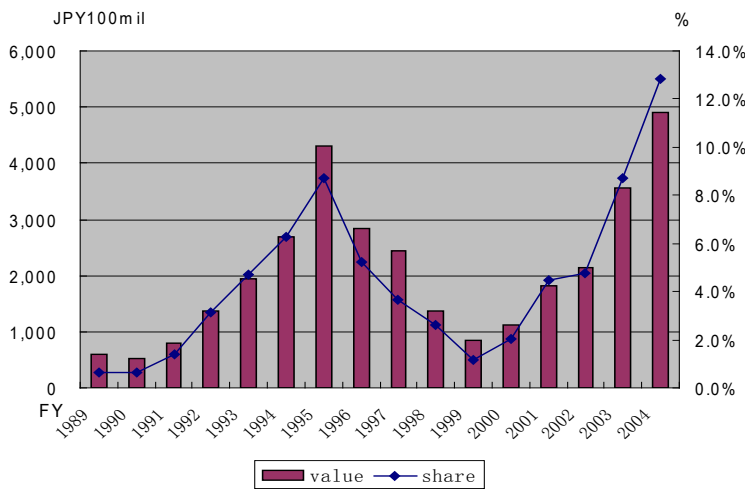
** An early version of this paper was presented at the Economics Segment of the Japanese Studies Association of Australia biennial conference held at the Australian National University in July 2007.*

New trends in Japanese FDI in China’s machinery industry

The appreciation of the yen in 1985 was followed by an increase in Japan’s overseas investment, mainly in developed countries. After the 1990s, however, the proportion of investment in East Asia rose. Specifically in the case of China, Japan’s investment grew slowly up to the 1980s, and after China entered a new stage of reform and opening in 1992, Japanese investment rose further, peaking in 1995. Following the Asian financial crisis of 1998 investment fell noticeably, but recovered soon after. Finally, China’s accession to the World Trade Organisation in 2001 helped to induce a further rise in Japan’s investment in China, as well as opening doors to new forms of investment.

In particular, Japan’s investment in China increased rapidly in terms of scale. The actual amount in 2004 reached nearly 5,000 billion yen, surpassing the peak of the 1990s (Figure 1), and also comprising a larger amount than Japan’s investment in the ASEAN 4 and newly industrialising economies (NIEs). Specifically, while Japanese investment in China accounted for nine per cent of total overseas investment at the peak of the 1990s, by 2004 this had soared to 13 per cent.

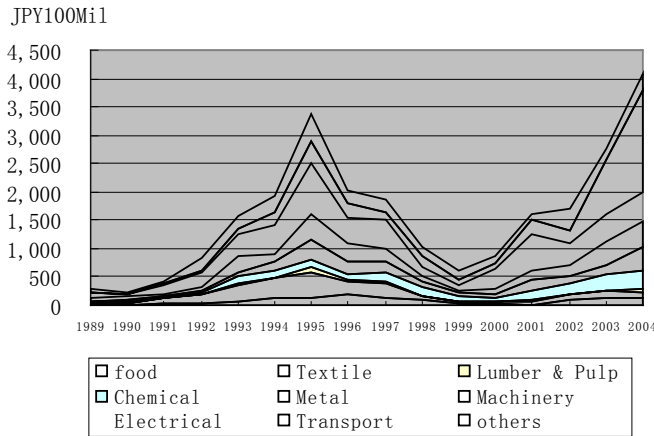
Figure 1 Japan’s Outward FDI to China



Source: Outward and Inward Direct Investment Statistics, Japanese Ministry of Finance, www.mof.go.jp

As in the 1990's, Japan's investment in China remains concentrated in the manufacturing sector, with machinery industry a continued preference. Within three of the machinery industry sectors, Japanese investment indeed accounted for more than 50 per cent of the total, and two-thirds of that in manufacturing industry (see Figure 2).

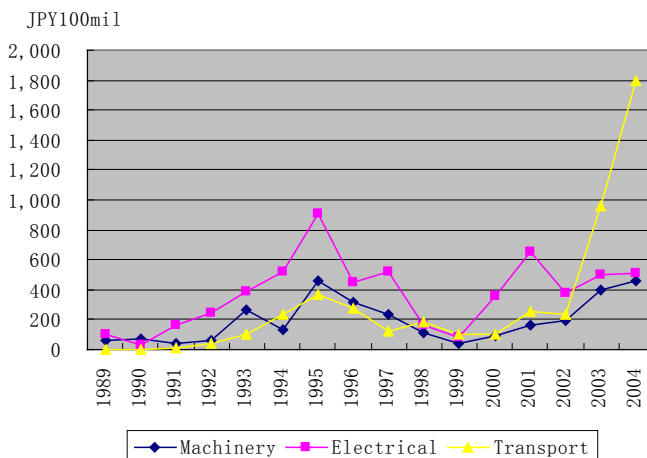
Figure 2 Japanese FDI in China's Manufacturing Sector



Source: Outward and Inward Direct Investment Statistics, Japanese Ministry of Finance, www.mof.go.jp

However, a recent and significant change in investment in machinery industry is characterised by the growth rate of investment in the transport machinery sector, which since 2002 has been higher than that in electrical machinery industry. Particularly, from 2003 to 2004, the investment in transport machinery industry was higher than within the general machinery and electrical machinery sector, reaching as high as 36.6 per cent of the total investment in China (see Figure 3). According to statistics from China, the contract amount of Japanese investment in the automotive industry from 2002 to 2004 was 1.095 billion, US\$, 1.853 billion US\$ and 1.128 billion US\$ respectively. In turn, this made Japan the single most important investing foreign country in China's automotive industry (the total investment levels being 2.852 billion, 4.875 billion and 3.899 billion US\$ respectively).¹

Figure 3 Japanese FDI in China's Machinery Industries



Source: Outward and Inward Direct Investment Statistics, Japanese Ministry of Finance, www.mof.go.jp

As mentioned earlier, and given the incremental fall in the proportion of Japanese processing for export, these increasing investment trends in the transport sector, particularly the automotive industry, are more clearly now aimed at China's potential domestic automobile market rather than for export processing. This accords with the overall trend of Japanese investment into China, and is recognition that the Chinese market itself is more and more attractive. In asking why China was regarded as a promising target for operations, a 2006 Japan Bank for International Cooperation survey found that the number answering the 'growth potential of the domestic market' greatly exceeded those answering 'as a base for exporting (either to Japan or other countries).'²

Table 1: China's merits as an offshore business base

	2003	2004	2005
Superior human resources	24.2	19.0	17.6
Low-cost labour	74.9	66.1	62.8
Low-cost materials and parts	34.2	21.4	23.7
Base for supplying assembly plants	28.6	28.6	27.5
Has industrial clusters	14.3	16.1	16.5
Disperses country risk	4.5	2.7	3.1
Base of exporting to Japan	22.4	19.4	18.6
Base for exporting to other countries	21.9	20.8	24.2
Both above reasons	44.3	40.2	42.8
Large market	19.7	23.9	27.0
Growth potential of market	82.3	83.3	80.2
Base for developing local products	7.8	6.7	3.8
Infrastructure in place	9.4	3.3	5.0
Preferential taxation on investment	17.4	17.4	13.2
Stable policies for foreign capital	4.5	4.2	1.3
Stable political and social conditions	4.0	4.2	2.0

Source: 2006 JETRO White Paper on International Trade and Foreign Direct Investment, www.jetro.org.jp.

We find also that this round of investment in the automotive industry is concentrated in automobile parts rather than in car assembly, as in the previous phase. Further, according to the China Automotive Industry Yearbook, there were 20 new Sino-foreign joint ventures in 2002, eight of which, comprising 40 per cent of total, were parts enterprises; while new Sino-foreign joint ventures in 2003 numbered 52, 57.7 per cent of which were parts enterprises (30). In 2004 meanwhile, the proportion was 60 per cent, increasing to 79.5 per cent in 2005, but falling back to 53.3 per cent in 2006. It is generally believed that joint ventures in the car parts sectors are designed to meet endogenous company demand, and provide a means of reducing cost in a fiercely price-competitive environment. Moreover, after China became a WTO member in 2001, the relaxation of restrictions on investment in car parts sector made investment in China possible.

The above analysis has attempted to explain how, at the turn of the twenty-first century, Japan's direct investment in China tended to be concentrated in the domestic

market-oriented area represented by the automobile industry. This marks a significant change from the export-oriented and cost-oriented investment structure of early Japanese investment in Chinese machinery industry. Previous studies have shown that Japanese investment in Chinese machinery industry in the 1990s aimed to process its products with the advantage of China's cheap labour. This in turn resulted in a vertical division of labour between the two countries, as well as in the Sino-Japanese vertical intra-industry trade patterns. Therefore, it is necessary to clarify whether this new investment trend has in any way altered established vertical intra-industry trade structures. The next section of this paper is devoted to this question. Specifically, it analyses the intra-industry trade index and vertical/horizontal intra-industry trade index of Sino-Japanese trade of machinery products.

Intra-industry trade of Sino-Japanese machinery products

Samples and data

This paper uses data from the Ministry of Finance of Japan concerning machinery products trade. The data uses the HS classification, of which the 16th (machinery, mechanical appliances, electrical equipment and parts thereof; tape recorders and aloud, TV images, sound recording and playback equipment and spare parts, accessories) and 17th (vehicles, aircraft, vessels and transport equipment) categories are machinery products. This paper undertakes analysis at the four-digit industry level. According to the general definition of IIT, where there is just one-way trade (export or import) in a four-digit industry this is called inter-industry trade; while parallel export and import within a four-digit industry code is called intra-industry trade(IIT). HS (2002) 84 and 85 within the 16th category code have 133 four-digit industries in total, HS (2002) 87 within the 17th category (railway and tram road vehicles except the vehicles and their spare parts, annex) has 16 four-digit industries, involving a total of 149 4-digit machinery industries.

In order to exclude those industries with low trade value, we rank the export and import value of HS 4-digit industries and select the top 10 industries based on trade statistics data from the Japanese MOF with a time span from 1990 to 2006. Thus we have 25 industries by export value, 20 industries by import value, with a total of 35 industries involved, a reduced number owing to import and export industry overlap. Among these, 11 industries belong to HS84, 20 belong to HS85, and 4 belong to HS87. In addition, we add two more industries (8707 and 8714). While these were not important in a top ten context, they remain high in terms of trade value, and adding them to our sample group ensured an appropriate sample size for category HS87. Thus, we have 37 sample industries in total, among which 16 are parts industries with the remainder as final goods

industries, the names of which are listed in Appendix Table 1.

The trend of IIT index

The general formula of IIT is $IIT = 1 - \frac{|X - M|}{X + M}$. We adjust to reflect the direction of trade, $IIT = \frac{X - M}{X + M}$. It is (exports - imports) / (exports + imports). The closer the value is to 1, the greater the degree of Japan's export specialisation, while the closer the value is to -1, the greater the degree of import specialisation. A value near 0 (total exports = total imports) indicates parity in the trade relationship. That is, Japan both exports and imports a specific category of product to China, and the degree of IIT between Japan and China is maximised.

According to the movements (as seen in Appendix Figures 1 to 4) of IIT index, 37 samples can be divided into seven industry groups. As evident in Table 2, the former three groups have clear trend of one-way trade, such as Japanese export industries, Japanese import industries, as well as those industries which changed from Japanese export industries to its import industries.

Table 2: Groups by the trend of IIT in machinery industries

No.	Trend of IIT	sample industries
1	One-way trade: Japan export→Japan import	8415, 8471, 8517, 8521, 8528, 8711
2	One-way trade: Japan export on the over time	8428, 8445, 8479, 8507, 8540, 8703, 8704,
3	One-way trade: Japan import on the over time	8470
4	IIT: growing up	8409, 8414, 8418, 8419, 8473, 8501, 8518, 8529, 8532, 8534, 8542, 8707, 8708, 8714
5	IIT: no change	8536, 8542, 8543
6	IIT→Japan import	8504, 8516, 8519, 8527, 8544
7	no clear trend	8525

Note: Shaded samples are parts industries; those using bold font and underlined belong to transport machinery industries.

Source: Calculation based on Trade Statistics, Ministry of Finance Japan, www.mof.go.jp

There are 22 industries with a clear trend of intra-industry trade, accounting for 60 per cent of total samples. Those for which intra-industry trade has deepened are the majority, comprising 14 sample industries (the 4th group). They either changed from the original one-way trade into intra-industry trade sectors, or deepened from the original intra-industry. Those with no change in the degree of IIT are five industries (the 5th group). These two groups account for 46 per cent of the total samples.

Among the 11 general machinery industry samples, five demonstrate a deepening of intra-industry trade, including three parts and components industries. Meanwhile, nine of 20 electrical machinery industry samples experience the same deepening or at least maintain a constant related trend, of which six belong to the parts and components

industry. The intra-industry trade index of five of the 20 electrical machinery industry samples declines. Three of six samples of transport machinery industry enhance the degree of intra-industry trade, of all which fall within the parts and components industry category.

To this end, it can be seen that, the Sino-Japanese machinery product trade on the whole has experienced a deepening of intra-industry trade, especially in parts and components industry. This is consistent with Japan having enhanced its investment in the Chinese machinery industry, particularly in the parts and components sectors. With regard to this deepening trend in the intra-industry trade of the parts and components industry, the question remains as to whether this is same as the original vertical intra-industry trade (that is, are imports comprised of low value-added components, and then processed and exported as high value-added components)? Or rather, is this a continued version of vertical intra-industry trade but based on differences in factor endowment (that is, imports of high value-added products and exports of low value-added products), or is it more likely to reflect horizontal intra-industry trade? The answer depends on the trend of horizontal/vertical intra-industry trade index to be considered in the next section.

Firstly, however, an additional observation arising from the earlier analysis lies in the finding that Sino-Japanese final product trade in the transport machinery industry (vehicle product) remains a one-way trade (Japan exports cars, imports motorcycles), while this kind of one-way trade in the parts and components products industry is changing to intra-industry trade between the two countries. From this it can be seen firstly that the pattern of trade in the automotive industry in which China imports parts and components, processes these and then supplies the domestic market, has not been affected by the new FDI trends. In other words, the increase of Japanese FDI in the Chinese transport industry has not shaped a vertical intra-industry trade similar to the experience of the general machinery and electrical machinery industries in 1990s. Secondly, the deepening of intra-industry trade of parts and components industry shows that some change in the division of labour in the transport machinery industry has taken place. To be able to draw further conclusions from these trends, further examination to assess whether this intra-industry trade is horizontal or vertical is required.

Trends in the VIIT/HIIT Index

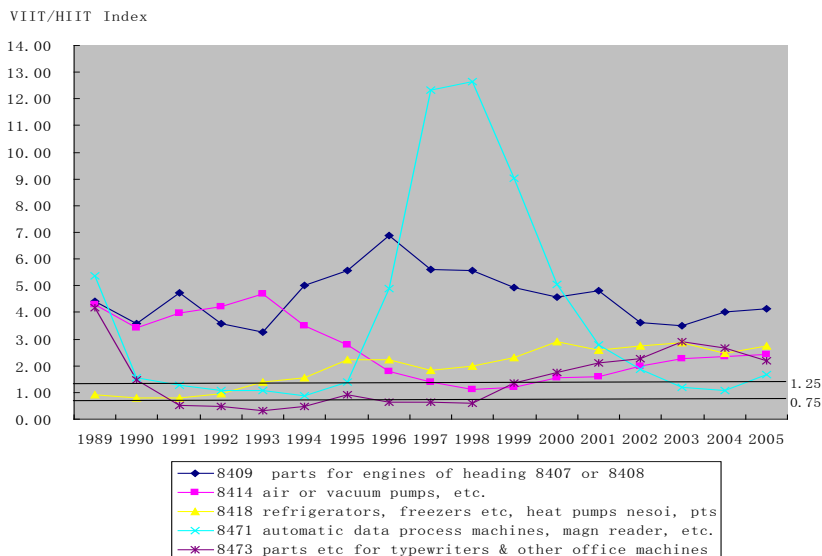
We identify some industries belonging to the HS84, HS85 and HS87 categories in groups 4 and 5 of Table 2, and decide whether their intra-industry trade is vertical or horizontal, and whether changes are related to the changes in FDI.

To calculate the vertical or horizontal intra-industry trade index (VIIT/HIIT Index) so as to judge whether the intra-industry trade is vertical or horizontal, the formula

$\frac{U_x}{U_M}$ is used. The closer the value of $\frac{U_x}{U_M}$ is to 1, the closer the unit value of export and import of the same categories are, indicating that horizontal IIT is dominant; In contrast, the farther the value is from 1, the greater the gap in unit value of export and import of the same category, indicating that vertical IIT is dominant in this category. Taking into account transport costs and insurance premiums, and on the assumption that the same product's imported price exceeds 25 per cent of export prices, VIIT/IIIT index values between 0.75-1.25 reflect horizontal intra-industry trade, while values of less than 0.75 reflect the vertical intra-industry trade of Japan's export of finished parts and imports of components, a vertical division of labour accompanied by FDI. Finally, values greater than 1.25 comprise those of the vertical intra-industry trade of Japan's high value-added export and value-added imports from China, a vertical division of labour based on the comparative advantages.

Based on the study of the five samples in machinery industry, only one (8473) illustrates a typical vertical intra-industry trade as explained by the 'flying-geese' model of the 1990s, and which has begun to shift toward comparative advantages-based vertical intra-industry trade during the late 1990s. See Figure 4 below. The other four sample industries on the whole reflect the comparative advantages-based vertical intra-industry trade. Thus, we do find evidence to support the typical vertical intra-industry trade explained by the 'flying-geese' model.

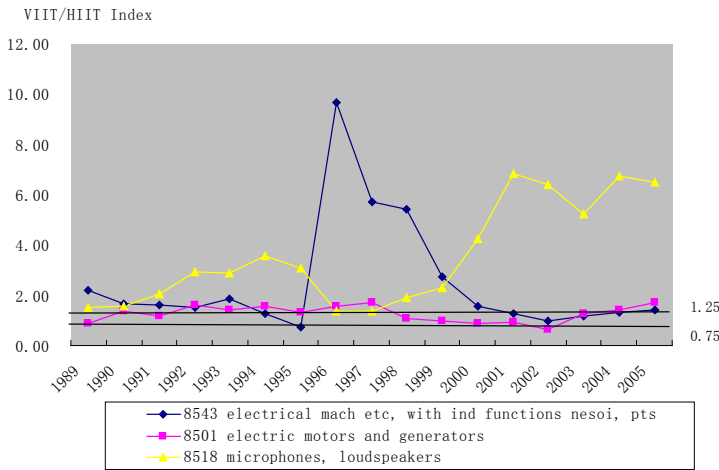
Figure 4: VIIT/IIIT Index of Samples of General Machinery Industry



Source: Author's calculations based on Trade Statistics, Ministry of Finance Japan, www.mof.go.jp

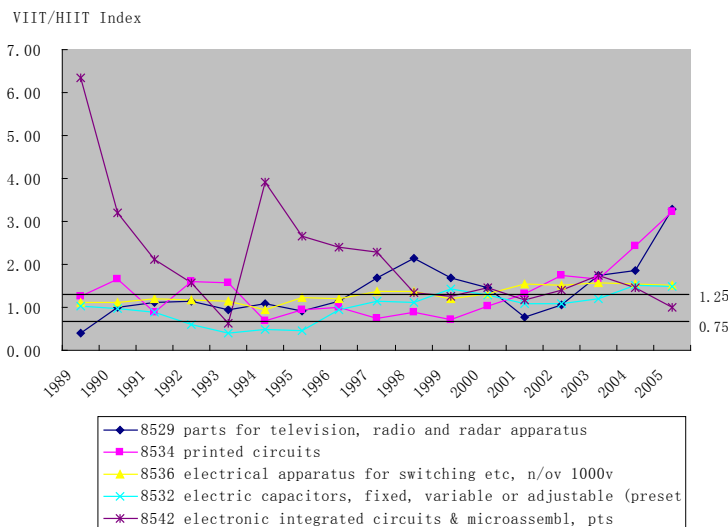
In the electrical machinery industry, two of the three final goods sample industries illustrate horizontal intra-industry trade characteristics since the turn of the century, while another reflects vertical intra-industry trade based on factor endowment. The trends can be seen in Figure 5.

Figure 5: VIIT/HIIT Index of Final Goods Industry Samples in Electrical Machinery Industries



Source: Author's calculations based on Trade Statistics, Ministry of Finance Japan, www.mof.go.jp

Figure 6: VIIT/HIIT Index of Parts and Components Industry Samples in Electrical Machinery Industries

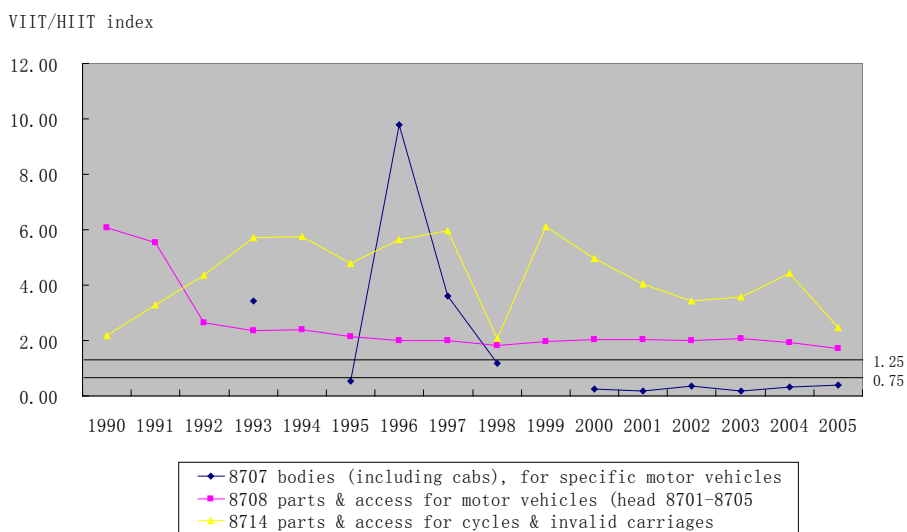


Source: Author's calculations based on Trade Statistics, Ministry of Finance Japan, www.mof.go.jp

In the parts and components industries of the electrical machinery industry, only one (8532) can be explained by the ‘flying-geese’ model in the 1990s, following which, in the later 1990s the shift toward the factor endowment-based vertical intra-industry began. The other four sectors for the most part reflect horizontal intra-industry trade, as Figure 6 illustrates.

With regard to the transport machinery industry, after 2000, the parts industry becomes characterised by the vertical intra-industry trade based on the ‘flying-geese’ pattern. And two parts industries have always been the vertical intra-industry trade based on differences of two countries’ factor endowment. Finally, after 2002 it is clear that Japan’s rapid increase of investment in China’s transport machinery industry has not contributed to the formation of a vertical division of labour system as has been identified in the electrical machinery industry.

Figure 7: VIIT/HIIT Index of Transport Machinery Industry



Source: Author’s calculations based on Trade Statistics, Ministry of Finance Japan, www.mof.go.jp

Conclusions and further explanation

Firstly, in the 21st century, the degree of intra-industry trade in the machinery industry as a whole remains positive relevant to Japan's investment: the extent of the intra-industry trade continues to deepen with the continuous increase in investment itself. Despite this, evidence of a vertical intra-industry trade structure based on the ‘flying-geese’ model in the general machinery and electrical machinery industry is lacking.

Meanwhile, Tables 4 to 6 illustrated the presence of horizontal intra-industry

trade in most of the samples from the 1990s. After 2000 however, vertical intra-industry trade re-emerged as a result of differences in factor endowment rather than in line with a 'flying-geese' pattern. The impact of factor endowment gaps as a basis for intra-industry trade was especially identified within the parts and components industry. That is, Japan demonstrates a pattern of exporting high value-added machinery products to China and importing low value-added machinery products from China. This result is different from the findings of early related studies, and we believe that the changed pattern may be related to the following factors:

- (1) This paper uses the bilateral trade statistics data, from which conclusions can only be applied to trade trends in the Sino-Japanese machinery industry. These cannot however be extended to the trade structure of Chinese machinery industry as a whole.
- (2) The horizontal division of labour structure of Sino-Japanese machinery industry may embody China's technological progress and export structure upgrade that has been promoted by foreign investment. Compared to the Chinese traditional comparative advantage in labour-intensive products, machinery products export have been reflected in the upgrading of the export structure, with a horizontal division of labour having particularly been established in some parts and components industries with a limited technology level. Despite that this division of labour may be low-level, the promotion of foreign investment itself cannot be ignored.
- (3) A final explanation may lie in the rise of labour costs in line with China's economic development that have resulted in alternative and lower cost countries being selected to host Japan's marginal industries

Secondly, Japan's rapid increase of investment in China's transport machinery industry since 2002 has not led to the establishment of a vertical division of labour system as earlier found in the electrical machinery industry we believe may result from the following:

- (1) A increasingly large component of transport machinery investment coming from Japanese parts production enterprises, which set up factories in China, do so mainly to meet the growing demand of China's domestic auto market rather than to utilise Chinese low-cost labour. We believe this to be the primary explanation.
- (2) This investment boom in the car parts and components sectors is to a certain extent affected by policy, and thus may not in any case reflect a stable and long-term trend. This point is elaborated on in the following paragraphs.

On April 1, 2005, the 'Measures for the Administration of Import of Automobile Components & Parts Featuring Complete Vehicles' come into effect in an attempt to stimulate investment in Chinese parts and components industry. The 'measures' prescribe that if the value of imported parts and components is more than 60 per cent of a com-

plete vehicle, the imported vehicle parts will incur a 25 per cent tariff, the same customs duties level applied to completed vehicles. Meanwhile, if the value of vehicle parts and components account for a proportion of no more than 60 per cent, they will incur only a 10 per cent tariff. Such a policy in turn means that costs will increase and profit will decline sharply for the auto companies with CKD, SKD production pattern. In this way, producing parts and components in China reduces costs, and hence the related increase in investment.

In contrast however, other Chinese policies may discourage investment. For example, rumours that from 2005 income tax would be the same level for both foreign-funded enterprises and the domestic enterprises affected the pace of foreign investment in China. Regardless, since 2005 Japan's investment in the transport industry in China has started to slow: in 2004 Japanese actual investment in the automotive industry was USD 8.8 billion, accounting for 26.2 per cent of the foreign investment into China's automobile industry in that year; in 2005 actual investment in automotive industry decreased to USD510 million, accounting for only 15 per cent of the foreign investment into China's automobile industry in that year. By 2006 investment was only USD150 million, accounting for only seven per cent of the foreign investment entering China's automobile industry in that year.³

- (3) Taking into account the volatility of investment trend in Chinese machinery industry, the time-delay of impact on the trade, as well as samples with shorter time series and other factors, our conclusion however can only be temporary.

Thirdly, it is very important that the main reason for Japanese investment in parts and components industries is to meet the growing Chinese automobile market demand, and reduce production costs in China. However, this does not rule out a global strategy based on multinational corporations considerations, using Chinese cheap raw materials and labour, and taking China as a global production base, that is a global supplier around the world for plant parts or components manufacturers. Japanese multinational corporates gradually take China as an important cost-effective manufacturing base of parts products and expand the proportion of purchasing in China to reduce manufacturing costs in other areas, reaching a scale of lower global costs or higher profits. This may indicate that Japan's investment in the transport machinery industry may skip the stage which can be explained by 'flying-geese' pattern, and may directly enter a pattern of the production chain segmentation and division of global production networks.

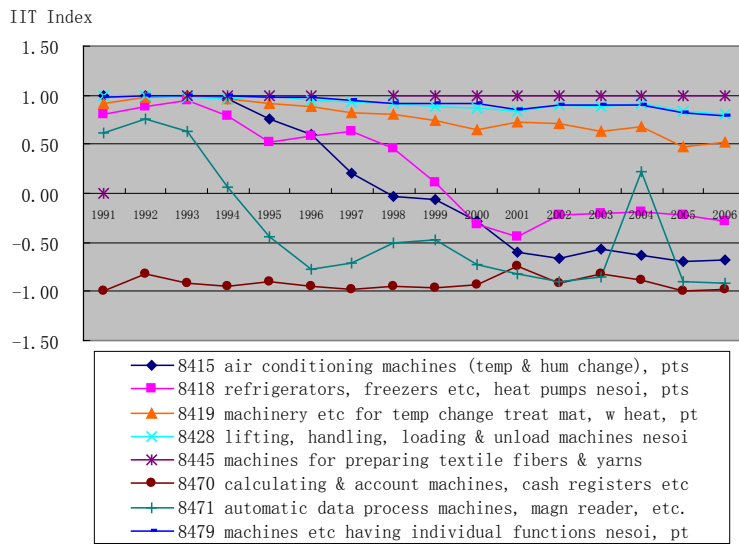
So, the further research which we need to do in following years is to observe continually trade structure of the two countries and to test the relationship between Japanese direct investment and the bilateral intra-industry trade pattern.

Appendix Table 1: Name of samples industries

General machinery	8409	parts for engines of heading 8407 or 8408	
	8414	air or vacuum pumps, compressors & fans, hoods & fans, parts	
	8415	air conditioning machines (temp & hum change), parts	
	8418	refrigerators, freezers etc, heat pumps, parts	
	8419	machinery etc for temp change treat mat, w heat, parts	
	8428	lifting, handling, loading & unload machines	
	8445	machines for preparing textile fibers & yarns	
	8470	calculating & account machines, cash registers etc	
	8471	automatic data process machines, magnetic reader, etc.	
	8473	parts etc for office machines computer accessories	
	8479	machines etc having individual functions, parts	
	Electric machinery	8501	electric motors and generators
		8504	electric transformers, static converters
8507		electric accumulators	
8516		electric heaters	
8517		electric apparatus for line telegraphy	
8518		microphones, loudspeakers	
8519		turntables, record & cassette players etc	
8521		video recording or reproducing apparatus	
8525		trans apparatus for radiotelephony etc, tv cameras cordless telephones	
8527		reception apparatus for radiotelephony etc	
8528		television receivers	
8529		parts for television, radio and radar apparatus	
8532		electric capacitors, fixed, variable or adjustable (preset)	
8534		printed circuits	
8536		electrical apparatus for switching etc, 1000v	
8540	thermionic, cold cathode or photocathode tubes, parts		
8541	semiconductor devices, light-emit diodes etc, parts		
8542	electronic integrated circuits & micro-assembly, parts		
8543	electrical machinery etc, with ind functions , parts		
8544	insulated wire, cable etc, opt sheath fib cables		
Transport machinery	8703	motor cars & vehicles for transporting persons	
	8704	motor vehicles for transport of goods	
	8708	parts & access for motor vehicles (head 8701-8705	
	8711	motorcycles (incl mopeds) & cycles with aux motor	

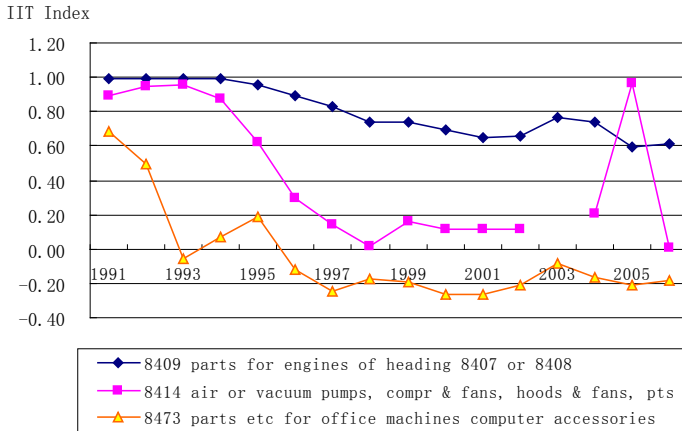
Source: Based on data in the Foreign Trade On-line website. Available at: <http://www.foreign-trade.com/REFERENCE/hscod.htm>

Appendix Figure 1 IIT Index of general machinery industries



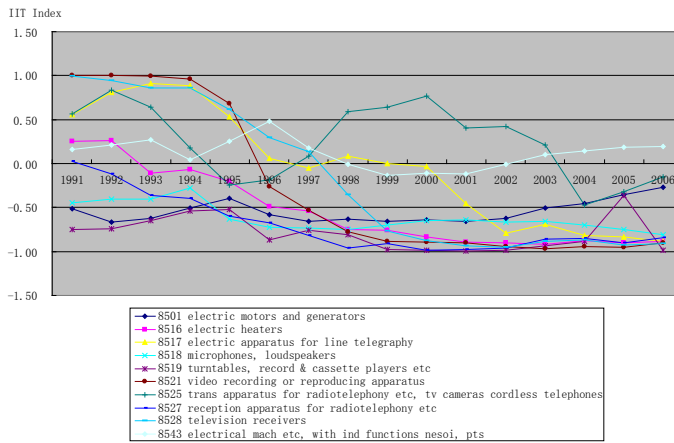
Source: Trade Statistics, Ministry of Finance Japan, www.mof.go.jp

Appendix Figure 2: IIT Index of parts of general machinery industries



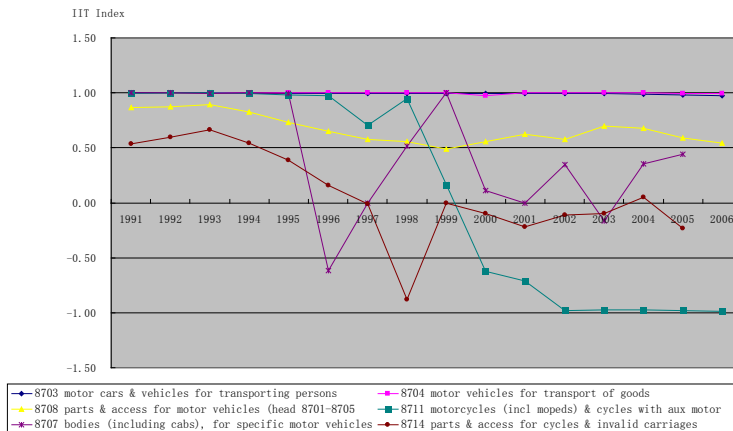
Source: Trade Statistics, Ministry of Finance Japan, www.mof.go.jp

Appendix Figure 3: IIT Index of Electric machinery Industries



Source: Trade Statistics, Ministry of Finance Japan, www.mof.go.jp

Appendix Figure 4: IIT Index of transport industries



Source: Trade Statistics, Ministry of Finance Japan, www.mof.go.jp

Notes

- 1 See China Automotive Industry Yearbook 2003, 2004, 2005.
- 2 2006 JETRO White Paper on International Trade and Foreign Direct Investment, www.jetro.org.jp.
- 3 See Ministry of Commerce of China, Chinese FDI Inward Report, www.fdi.gov.cn

References:

- Akamatsu, K., 1962. 'A historical pattern of economic growth in developing countries, Developing Economies (preliminary issue), Japan Institute for Developing Economies, Tokyo.
- China Ministry of Commerce, Chinese FDI Inward Report, various years
Available at: <http://english.mofcom.gov.cn/statistic/statistic.html#>.
- China Department of Mechanical Industry, various years. China Automotive Industry Yearbook (Zhongguo Qiche Gongye Nianjian), Zhongguo Jixie Gongye Chubanshe, Beijing.
- Greenaway, D., R. Hine and C. Milner, 1995. 'Vertical and Horizontal Intra-Industry Trade: A Cross Industry Analysis for the United Kingdom' *Economic Journal*, Vol.105.
- Falvey, R. E., 1981. 'Commercial Policy and Intra-Industry Trade', *Journal of International Economics* 11 (4): 495–511.
- Fukao, K., Ishido, H., and Ito, K., 2003. 'Vertical Intra-Industry Trade and Foreign Direct Investment in East Asia', RIETI Discussion Paper Series 03-E-001.
- Japan Ministry of Finance, Trade Statistics, various issues, Tokyo.
Available at: http://www.customs.go.jp/toukei/info/index_e.htm.
- Japan Ministry of Finance, Outward and Inward Direct Investment Statistics
Available at: <http://www.mof.go.jp/english/e1c008.htm>
- Japan External Trade Organisation (JETRO), 2006. White Paper on International Trade and Foreign Direct Investment, Tokyo. Available at: www.jetro.org.jp
- Kwan, C.H., 2002. 'The Rise of China and Asia's Flying-Geese Pattern of Economic Development: An Empirical Analysis Based on US Import Statistics', RIETI Discussion Paper Series 02-J-009.

Previous *Asia Pacific Economic Papers*

- 374 Competition Policy in ASEAN: Case studies
Johannah Branson, 2008
- 373 Can the New Antimonopoly Act Change the Japanese Business Community? The 2005 Amendment to Antimonopoly Act and Corporate Compliance.
Kazukiyo Onishi, 2008
- 372 Immunising future trade against protectionists: preventing the emergence of more sensitive sectors
Andrew Elek, 2008
- 371 Tax law asymmetries and income shifting: evidence from Japanese Capital KEIRETSU
Kazuki Onji and David Vera, 2008
- 370 The response of firms to eligibility thresholds: evidence from the Japanese value-added tax
Kazuki Onji, 2008
- 369 China and East Asian Energy: Prospects and Issues Vol. 1 & 11
Peter Drysdale, Kejun Jiang and Dominic Meagher, 2008
- 368 Measuring trade and trade potential
Shiro Armstrong, 2007
- 367 APEC and infectious disease: meeting the challenge
Joel Gilbourd, 2007
- 366 The flow of funds through a government – A case study on Japan
Jun Ikeda, 2007
- 365 The puzzle of small farming in Japan
Yoshihisa Godo, 2007
- 364 How should one evaluate fiscal conditions? A study based on the comparison between Japan and Australia
Jun Ikeda, 2007
- 363 Political institutions and distributive politics in Japan: getting along with the opposition
Yusaku Horiuchi, 2007
- 362 Negotiating the Australia–Japan basic treaty of friendship and cooperation: reflections and afterthoughts
Garry Woodard, Moreen Dee and Max Suich, 2007
- 361 China and East Asian energy: prospects and issues Vol. 1
Peter Drysdale, Kejun Jiang and Dominic Meagher, 2007
- 360 Agriculture and political reform in Japan: the Koizumi legacy
Aurelia George Mulgan, 2006
- 359 Nothing new in the (north) east? Interpreting the rhetoric and reality of Japanese corporate governance
Luke Nottage, 2006
- 358 Multinational corporations and Pacific regionalism
Philippa Dec, 2006
- 357 Reliability of structural shocks estimates from a bivariate SVAR model: the case of Southeast Asian countries
Arief Ramayandi, 2006
- 356 RMB exchange rate and local currency price stability: the case of China and ASEAN+3
Xiao Bing Feng, 2006
- 355 Technical efficiency and its determinants in Gansu, West China
Sizhong Sun, 2006
- 354 The making of Asia's first bilateral FTA: Origins and regional implications of the Japan–Singapore

Previous *Asia Pacific Economic Papers*

- 373 Can the New Antimonopoly Act Change the Japanese Business Community? The 2005 Amendment to Antimonopoly Act and Corporate Compliance.
Kazukiyo Onishi, 2008
- 372 Immunising future trade against protectionists: preventing the emergence of more sensitive sectors
Andrew Elek, 2008
- 371 Tax law asymmetries and income shifting: evidence from Japanese Capital KEIRETSU
Kazuki Onji and David Vera, 2008
- 370 The response of firms to eligibility thresholds: evidence from the Japanese value-added tax
Kazuki Onji, 2008
- 369 China and East Asian Energy: Prospects and Issues Vol. 1 & 11
Peter Drysdale, Kejun Jiang and Dominic Meagher, 2008
- 368 Measuring trade and trade potential
Shiro Armstrong, 2007
- 367 APEC and infectious disease: meeting the challenge
Joel Gilbourd, 2007

Annual subscription rate for twelve issues:

Individuals A\$65.00 (includes GST) A\$60 (overseas)

Institutions A\$110.00 (includes GST) A\$100 (overseas)

Cost for single issues:

A\$16.50 (includes GST) A\$15.00 (overseas)

A\$10.00 (Students)

No postage required within Australia

Available from:

Publications Department
Australia–Japan Research Centre
Crawford School of Economics and Management
ANU College of Asia and the Pacific
The Australian National University
Canberra ACT 0200, Australia
Facsimile: (61 2) 6125 0767
Telephone: (61 2) 6125 3780
Email: ajrc@anu.edu.au
URL: <http://www.crawford.anu.edu.au>