Empirical decomposition of intra industry trade economics essay

Economics

AbstractThis paper attempts to investigate the different patterns of IIT in the agri-food sector between Japan and East Asian countries from 1997 to 2005 at the HS 9-digit level. Our empirical results show that the large portion of agri-food trade between Japan and East Asian countries is still one-way trade while IIT, particularly the share of VIIT has not grown rapidly from 1997 to 2005. Particularly, the fact that Japan imports high-quality agri-food products more than exports reflects in the opposite direction of quality ladder story based on Flam and Helpman type vertically differentiated trade model. The weak positive relationship between the share of VIIT and the factor endowment may be a result of the rising share of foreign direct investment due to multinational corporations in agri-food trade. Agri-Food Sector1. IntroductionRecent studies on intra-industry trade (IIT) have brought to light rapid increases in vertical IIT (VIIT) and horizontal IIT (HIIT). Despite the potential importance of this issue and the fact that theory suggests that the determinants of VIIT and HIIT differ, most of previous empirical studies on IIT have focused on total IIT without distinguishing between VIIT and HIIT. The motivation for this paper stems from the recent development in foreign direct investment (FDI) and the rapid expansion of processed food exports in many East Asian economies. We focus on the agriculture and food sector not only because this is an important sector within the region, but also because it is one of the most critical sectors for the success of future trade reform and economic integration. In recent literature, the growing importance of the ASEAN Free Trade Agreement (AFTA) and its implications on the major trading partners have attracted a lot of attentions. It is particularly relevant when discussing future bilateral trade agreements where trade partners

expect trade adjustments to take place within industries, rather than across industries. This paper employs the bilateral share of IIT, VIIT, and HIIT between Japan and 8 East Asian countries (Indonesia, Malaysia, Philippines, Thailand, China, Singapore, Korea and Taiwan) over the period 1997-2005 and discusses the characteristics and determinants for each share of IIT patterns in agri-food sector. 11 This paper defines ��agricultural goods�� basically according to Agreement on Agriculture (AOA) of WTO. AOA covers HS01 to 24 less fish and fish products, plus HS 290543 (mannitol), 290544 (sorbitol), 3301 (essential oils), 3501-3505 (albuminoidal substances, modified starches, glues), 380910 (finishing agents), 382360 (sorbitol n. e. p.), 4101-4103 (hides and skins), 4301 (raw furskins), 5001-5003 (raw silk & silk waste), 5101-5103 (wool & animal hair), 5201-5203 (rawThe rest of this paper is organized as follows. Section 2 presents the conceptual framework for the IIT and connects illustrative theoretical models with the empirical method. Section 3 provides detailed analysis of IIT for horizontally and vertically differentiated products and examines the nature and characteristics of agri-food trade patterns with 8 East Asian countries. Section 4 presents the results of the regression analysis. The last section concludes. 2. Conceptual framework for the intra-industry trade2. 1 Empirical decomposition of intra-industry tradeAlthough the Grubel-Lloyd IIT index is popular for its ease of computation, it has a flaw in being unable to distinguish between HIIT and VIIT; when in fact theory suggests that their determinants do differ. This has been reconfirmed in a number of empirical studies in recent years. 2 HIIT refers to trade in similar products but different characteristics or attributes, while VIIT involves trade in similar products of

different qualities and intra-firm, inter-processed trade (fragmentation). Krugman (1979) has demonstrated that HIIT is influenced by scale economies and preference diversity, while Falvey (1981) has shown that factor endowment determines VIIT. Moreover, Jones and Kierzkowski (1990) and Deardorff (2001a, 2001b) showed that location advantage with cost of service links determines either inter-industry trade or VIIT. Thus, IIT must be decomposed into horizontally and vertically differentiated products and analyzed separately. Confounding both may produce contradictory results. In order to identify VIIT and HIIT, we adopt a threshold-based methodologycotton, waste & cotton carded or combed), 5301 (raw flax), 5302 (raw hemp). In thispaper, we include fish and fish products while excluding additional products for avoiddigit-different mixing up. See, for example, Fontagne and Freudenberg (1997). used by major preceding studies, such as Abd-el-Rahman (1991), Greenaway et al. (1994, 1995), Fontagne and Freudenberg (1997), Fontagne et al. (1997), Fontagne and Freudenberg (2002), Fukao et al. (2003), Kimura and Ando (2003), and Ferto (2005). The basic idea is to give a definition of IIT which is closer both to reality and economic theory. On a conceptual framework, we start from the apprehension of IIT at the product level, and at the same time to distinguish between horizontal and vertical product differentiation. To operate on the concept of IIT in similar products, it is necessary to define what a product is empirically, what a similar product is, and what IIT is. The detailed composition of classification is the best guarantee for avoiding the empirical problems of sectoral aggregation. The data we use are published by World Trade Atlas based on HS 9-digit level and are sufficiently detailed for

products to be distinguished by their principle, technical characteristics. Products would differ clearly by their quality inside the item of aggregation level. Here, it is assumed that differences in prices (unit values) reflect quality differences. Therefore, products whose unit values are close are considered as similar. Trade in an item is considered to be IIT when the value of the minority trade flow represents at least 10% of the majority flow. If trade flows of a particular product with a partner country fulfill these criteria of similarity and overlap, we qualify imports as well as exports as IIT in similar products. We will decompose trade pattern into one-way trade, horizontal and vertical IIT by detailed commodity and discuss the changing trade patterns between Japan and 8 East Asian countries in the third section. 2. 2 Connection with theoretical frameworkIn the past twenty years, a number of theoretical studies have discussed for country and industry specific influences on IIT. Table 1 presents the connection between empirical threshold decomposition method and theoretical framework of IIT based on nature of trade, theoretical foundation, market structure and determinants of trade. Two of the most common assumptions made in theoretical models of HIIT are that trade is associated with imperfectly competitive product markets and that the output of relevant industries consists of sufficiently differentiated products. Both assumptions have important implications for the analysis of the gains from trade and trade policy. Spence (1976) , Dixit and Stiglitz (1977), Krugman (1979), Lancaster (1980) present a number of model of HIIT based on monopolistic competition markets. Empirical studies argued that HIIT plays a particularly large role in the trade in manufactured goods among advanced industrial nations. Over time, industrial countries

have become increasingly similar in their levels of technology and in the availability of capital and skilled labor. Since major trading nations have become similar in technology and resources, there is often no clear comparative advantage within an industry, and much of international trade therefore takes the form of intra-industry specialization that is probably driven in large part by economies of scale and other reasons rather than inter-industry specialization driven by comparative advantage. Shaked and Sutton (1984) shows the mechanism of vertical differentiation based on quality under imperfect competition (natural oligopoly). They point out that international trade takes the form of intra-industry specialization that driven by economies of scale which is likely to be of practical relevance to high technology industries where the main burden of quality improvement falls on fixed (R&D) costs, so that unit variable costs rise only slowly with quality. As Falvey (1981) points out in his neo Heckscher-Ohlin model, commodities of the same statistical group but of different quality may be produced by using different mixes of factor inputs. Moreover, developed economies may export physical and human capital-intensive products of high-quality and import unskilled labor-intensive products of low-quality from developing economies. Through this mechanism, an increase in VIIT may have a large impact on factor demands and factor prices. VIIT is likely to be driven by differences in factor endowments. Consequently, we expect VIIT to be more pronounced between developing and developed economies. As being shown by Falvey and Kierzkowski (1987), the share of VIIT will be correlated with the average market size of the two countries in spite of a distinctly different pattern of specialization. Flam and Helpman (1987) developed a model of North-South

trade based on vertical product differentiation in which the North exports high-quality and the South exports low-quality industrial products. Faster technical progress in the Southern industrial sector leads the North to introduce new high-quality products and the South to abandon low-quality products. Production of Northern low-quality products is shifted to the South. This is a sort of ��quality ladder�� story. Durkin and Krygier (2000) finds evidence of a positive and significant relationship between differences in GDP per capita and the share of VIIT and support the view that IIT may be positively related to differences in relative wages. IIT that trade economists have recently referred to as ��intra-firm, inter-processed�� trade in relation to the fragmentation has been reconfirmed in a number of studies recently. While this type of IIT is often seen within the framework of multinational corporations, Northern firms can also make subcontracting arrangements with Southern counterparts, thereby enabling them to exploit economies of scale at various stages of production. Deardorff (2001b) discusses fragmentation across different cones that is maybe useful in understanding the pictures of vertical production chains. Fragmentation becomes economical when the cost of service links (SL) connecting production blocks (PB) is low enough. The emergence of IIT tends to be a concomitant of enhanced fragmentation. As Helpman and Krugman (1985) points out, there still exist higher barriers against intra-regional trade in East Asia than in the EU and NAFTA. These barriers are likely to reduce IIT within East Asia. On the other hand, there is a huge income gap among countries in East Asia. Probably this gap enhances VIIT because of the differences in labor costs and other factor prices. At the same time, this gap is likely to

reduce HIIT because of the differences in industrial structure and preferences. 2. 3 Relevance to agri-food intra-industry trade between Japan and East AsiaThe developments of international trade in the whole East Asia reveal that the large portion of trade pattern is still inter-industry trade, which presents a sharp contrast with European trade where IIT has a substantial share. 3Fukao et al. (2003) finds that a major pattern is still inter-industry trade while VIIT with vertical foreign direct investment (FDI) increases its importance in East Asia. Their analysis reveals that, although still much lower than in the EU, IIT, and particularly VIIT, in East Asia has grown rapidly in importance in overall intra-regional trade. This is especially the case in the electrical machinery industry and the general and precision machinery industry. However, while for most EU countries, the share of IIT remained almost constant during the period from 1996 to 2000, it expanded quickly for East Asian countries. Their empirical results imply that in the East Asian region FDI played a significant role in the rapid increase of VIIT in recent years. Moreover, they find the largest part of total IIT growth in the region is attributable to the growth of VIIT and not of HIIT that have relatively large share in the EU region. However, there are relatively few papers that focus on the IIT nature of agri-food trade, despite its growing importance especially towards closer economic integration between East Asian countries. Ferto (2005) reviews some of the empirical studies on agri-food trade particularly in the latter half of the 1990s (Chang et al., 2001; Christodolou, 1992; Hirschberg et al., 1994; Pieri et al., 1997; Qasmi and Fausti, 2001; Sun and Koo, 2002; Ferto, 2005) relating to the sign and significance of GDP per capita. See, for example, Fontagne and Freudenberg

(2002). 3. Measurement of Vertical and Horizontal Intra-industry TradeThe previous section reviews various kinds of trade models. This section provides detailed analysis of IIT for horizontally and vertically differentiated products and examines the nature and characteristics of agri-food trade patterns between Japan and 8 East Asian countries. 3. 1 The threshold decomposition methodFollowing Abd-el-Rahman (1991), Greeenaway et al. (1994, 1995) and so on, we decompose bilateral trade flows between Japan and 8 East Asian countries by classifying each detailed commodity category into one of the following patterns: (a) inter-industry trade (one-way trade), (b) horizontal IIT (HIIT), and (c) vertical IIT (VIIT). Three steps are required to obtain the share of each type of trade for the sector concerned, by using the threshold-based index. First, we have to identify whether bilateral trade of commodity j is one-way trade or intra-industry trade. Min(XMij , ij). 0. 1 (3. 1)Max(XM,)ij ijwhere Xij : value of Japan��s exports of commodity j to economy i, Mij : value of Japan��s imports of commodity j from economy i. Bilateral trade of commodity j is regarded as one-way trade when equation (3. 1) holds and as IITotherwise. Second, we then have to distinguish whether IIT of commodity j is horizontal IIT or vertical IIT. IIT of commodity j is regarded as horizontal IIT when the following equation (3. 2) holds and as vertical IIT otherwise: 119Agri-Food Sector1 UVij X. M . 1. 25 (3. 2)1. 25 UVijwhere UVij X : average unit value of Japan��s exports of commodity j to economy i, UVij M : average unit value of Japan��s imports of commodity j from economy i. Finally, the share of each trade type in a broader commodity category iscalculated as:.(Xij n + Mij n)j (3. 3) .(Xij + Mij) jwhere n denotes one of the three trade types, i. e., ��one-way trade�� (OWT)��horizontal intra-

industry trade�� (HIIT) and ��vertical intra-industry trade��(VIIT) . For our analysis, we chose to indentify one-way trade or intra-industry tradeby using the threshold 10% due to empirically classification like previous papersemploy. 4 We chose to identify HIIT mainly by using the range of relative4 Fontagne and Freudenberg (1997) not only gives some detailed theoretical foundations of the empirical measurement of IIT but also debates traditional GL type measures and their shortcomings due to biases arising from aggregation. They pointed out that criteria referred to above are based on the degree of overlap in trade and on differences in unit values. Inevitably, the thresholds of 10% for trade overlap and 15% for unit value differences are to a large extent arbitrary. One of the possibilities would have been to apply e. g. different similarity criteria for different product groups 15, but applying one and the same criteria to all products leads to more understandable results. Sensitivity tests showing how trade types can be influenced by the choice of different thresholds were showed in Table 3 of Fontagne and Freudenberg (1997), p. 35. The reasoning behind this is that below 10%, minority flows cannot be considered significant as they do not represent a structural feature of trade. Of course, any other threshold (20% might be a good candidate as well) could have be used. But in fact, what matters here is not so much which value is chosen as threshold, but that one is chosen. The problem associated with the interpretation ofexport/import unit values of 1/1. 25 (i. e., 0. 8) to 1. 25. Although most previous studies in Europe mainly use a 15% threshold to distinguish between horizontally and vertically differentiated products, we employ a 25% threshold as a rather strict definition for VIIT. 5 For the analysis on trade patterns, we use the

World Trade Atlas published by the Global Trade Information Services, Inc. This dataset provides us with bilateral trade data of almost all the countries including Taiwan at the HS 9-digit level. For the calculation of the IIT, we use importing countries�� data. Unit values of imports are obtained at the HS 9-digit level by dividing import values by the corresponding quantities, which are also available from the World Trade Atlas. Following Kimura and Ando (2003), bilateral export data are used for commodities that have discordance in units of quantities of imports between two countries when we distinguish IIT between HIIT and VIIT. Some commodities with discordant units still remain even after adjustment, but such commodities become much smaller than the case without adjustment. 6the GL indicator is that the majority flow (exports or imports, whichever is larger), is both of an intra- and inter-industry nature. Trade types avoid this problem: both exports and imports will be either inter-industry or intra-industry. Graph 5 in Fontagne and Freudenberg (1997), p. 40 is a synthesis of the approaches following GL measures as well as those following Abd-el-Rahman (1991). Greenaway et al. (1994, 1995) focus on the extent of trade overlap, in the line of GL index, which interprets IIT as the balanced part of trade flows . In these " traditional" approaches, the majority flow is both of intra- and inter-industry nature: the dividing line is thus within the majority flow. In contrast, trade types reject the traditional dividing line between intra and inter-industry trade. If the minimum (arbitrary) threshold of overlap is attained, both exports and imports are part of two-way trade, be it in horizontal or vertical differentiation, otherwise both flows are considered as part of one-way trade. Basically, these two approaches are supplementary rather than substitutes,

since each one tries to answer a specific question. GL related indicators yield information on the intensity of overlap in trade, whereas the approach proposed here measures the relative importance of each of the three trade types in all trade. 5 We also employ a 15% threshold, but do not change significantly. 6 Among intra-industry trade, trade of commodities with discordant units even after the adjustment with export data is categorized into ��not classified.��3. 2 Comparison of changing trade patterns between Japan and East AsiaNext, Table 2 and Table 3 are summarized tables of share and values for threshold decomposition of trade between Japan and 8 East Asian countries. Commodities are classified into three types of trade at the HS 9-digit level and are aggregated in each type. These tables tell us various stories of agri-food trade, but here we would like to emphasize three points. First, one-way trade is still dominant in agri-food trade between Japan and each East Asian country. It seems natural for Japan-China trade (99. 53% for 9-years average) to be relatively large one-way trade in our samples because of large differences in development stages and income levels between them. However, large shares of one-way trade for Japan-Taiwan (99. 48% for 9-years average) and Japan-Korea (99. 15% for 9-years average) may be unexpected. On the other hand, Japan imports from partner��s countries more than exports to them besides the case of Japan and Singapore. This result means that most of traded agri-food even between developed countries are dominated by one-way trade. Second, the share of HIIT are lower than those of VIIT despite the fact that we find the share of HIIT is larger than the share of VIIT in the case of 9-years average for Japan-Philippine and Japan-Thailand. That is, most of trade in

differentiated agri-food is according to the difference in quality of goods. Third, as for the unit value of exported vertically differentiated goods, it seems to follow quality-ladder story only in case of Japan-Singapore and Japan-Taiwan. That is, it is considered that developed countries export high quality products and imports low quality ones. However, it does not seem to follow in case of agri-food trade between Japan and the other East Asian countries. The share of the agri-food exported by the other partners with more expensive unit value is larger than that by Japan. This contrast implies that quality on agri-food can be less approximated by stages of economic development as found in Ferto (2005). Although these aggregated numbers are useful for examining how many traded agricultural goods in a mass are differentiated or not, the numbers mask detailed pictures on each agricultural product. Therefore, we present the disaggregated figures in Table 4. From this table, we can find statistically that many differentiated products in some agri-food are traded between Japan and East Asian countries. In the case of Japan��s significant share of high-quality exports which are larger than partner��s share are as follows. The sign I > J in column ��One-way�� implies Indonesia is larger than Japan in export for listed aggregated industry. The sign J > I in column ��Intra-industry�� implies Japan��s share of high-quality exports which are larger than Indonesia��s share based on export (F. O. B) unit value and vice versa. 1. Japan-Indonesia: HS130239000 (Mucilages and thickeners, derived from vegetable products, n. e. s.), HS150410000 (Fish-liver oils and their fractions, not chemically modified), HS151530000 (Castor oil and its fractions, not chemically modified) and HS2203000000 (Beer made from malt). 2. Japan-

Malaysia: HS22029002000 (Waters, including mineral waters and aerated waters, containing added sugar or other sweetening matter or flavoured, containing apple juice) and HS190590100 (Arare, Senbei and other bakers' wares, of rice). 3. Japan-Philippine: HS120999000 (Other seeds, fruit and spores, of a kind used for sowing). 4. Japan-Thailand: HS121300000 (Cereal straw and husks, unprepared) and HS151530000 (Castor oil and its fractions, not chemically modified). 5. Japan-China: HS180500000 (Cocoa powder, not containing added sugar or other sweetening matter) and HS151419000 (Low erucic acid rape or colza oil and its fractions thereof, not chemically modified). 6. Japan-Singapore: HS151710000 (Margarine, excluding liquid margarine) and HS220300000 (Beer made from malt). Intra-Industry Trade Patterns between Japan and East Asian Countries in the Agri-Food SectorTable 4. Share of Each Trade between Japan and East Asian CountriesUnit: Thousand US dollars, %Japan and Indonesia 1997-2005 Share ValueIn dustry One-way Intra-industry TotalExpor t Vertical (Export) Hori-zontal Not ClassI> J J> I I> J J> I0101-0106 L IVE AN IMALS 28. 67 71. 33 0. 00 0. 00 0. 00 0. 00 100. 00 2585510201-0210 MEAT 98. 87 1. 13 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 28370301-0307 F ISH AN D SEAF OOD 98. 96 0. 25 0. 59 > 0. 01 0. 20 0. 00 100. 00 7569180401-0410 DAIRY, EGGS, HON EY, ETC 87. 66 12. 34 0. 00 0. 00 0. 00 0. 00 100. 00 3380501-0511 OTHER OF AN IMAL ORIGIN 94. 96 3. 86 1. 19 > 0. 00 0. 00 0. 00 100. 00 31940601-0604 LIVE TREES AN D P LAN T S 99. 68 0. 32 0. 00 0. 00 0. 00 0. 00 100. 00 22930701-0714 VEGETABLES 98. 76 1. 23 0. 00 < 0. 01 0. 00 0. 00 100. 00 47780801-0814 EDIBL E FRUIT AND N UTS 74. 02 25. 98 0. 00 0. 00 0. 00 0. 00 100. 00 10120901-0910 SPICES, COFFEE AND TEA 99. 35 0. 09 0. 02 < 0. 36 0. 17 0.

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970601-0604 LIVE TREES AN D P LAN T S 99. 93 0. 07 0. 00 0. 00 0. 00 0. 00 100. 00 204050701-0714 VEGETABLES 63. 91 36. 09 0. 00 0. 00 0. 00 0. 00 100. 00 1770801-0814 EDIBL E FRUIT AND N UTS 21. 47 78. 53 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 2120901-0910 SPICES, COFFEE AND TEA 98. 78 1. 19 0. 00 0. 00 0. 03 0. 00 100. 00 221781001-1008 CEREAL S 56. 86 43. 14 0. 00 0. 00 0. 00 0. 00 100. 00 451101-1109 MIL L IN G; MAL T ; ST ARCH 81. 99 18. 01 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 46661201-1214 MISC GRAIN , SEED, FRUIT 84. 32 15. 68 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 16581301-1302 L AC; VEGETABL SAP, EXT RCT 9. 71 90. 29 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 7101401-1404 OTHER VEGETABLE 94. 27 5. 73 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 5031501-1522 F AT S AND OILS 98. 86 0. 86 0. 28 > 0. 00 0. 00 0. 00 100. 00 2398471601-1605 PREP ARED MEAT, F ISH, ET C 86. 11 13. 84 0. 00 < 0. 05 0. 00 0. 00 100. 00 97501701-1704 SU GARS 52. 03 47. 97 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 8971801-1806 COCOA 99. 92 0. 08 0. 00 0. 00 0. 00 0. 00 100. 00 136721901-1905 BAKIN G RELATED 80. 22 17. 94 0. 00 < 1. 84 0. 00 0. 00 100. 00 67652001-2009 PRESERVED FOOD 93. 68 6. 32 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 51162101-2106 MISCELL AN EOU S FOOD 56. 08 43. 92 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 143142201-2209 BEVERAGES 66. 18 28. 21 0. 00 < 5. 61 0. 00 0. 00 100. 00 69312301-2309 FOOD WASTE; ANIMAL FEED 60. 70 39. 30 0. 00 0. 00 0. 00 0. 00 0. 00 100. 00 40882401-2403 TOBACCO 49. 91 1. 20 48. 89 > 0. 00 0. 00 0. 00 0. 00 100. 00 5541T otal 64. 06 35. 57 0. 29 > 0. 05 0. 02 0. 00 100. 00 1150621Kuo-I Chang, Chung-Hsuan WeiTable 4. Share of Each Trade between Japan and East Asian CountriesUnit: Thousand US dollars, %Japan and Philippine 1997-2005 Share ValueIndustry One-way Intra-industry TotalExpor t Ver tic al (Export) Hori-zontal Not ClassP> J J> P

P> J J> P0101-0106 LIVE AN IMALS 30. 70 69. 30 0. 00 0. 00 0. 00 0. 00 100. 00 63028210201-0210 MEAT 95. 30 4. 70 0. 00 0. 00 0. 00 0. 00 100. 00 84080301-0307 F ISH AN D SEAF OOD 94. 06 1. 75 0. 18 > 0. 02 3. 99 0. 00 100. 00 14114460401-0410 DAIRY, EGGS, HON EY, ETC 5. 46 94. 54 0. 00 0. 00 0. 00 0. 00 100. 00 14830501-0511 OTHER OF AN IMAL ORIGIN 83. 10 15. 30 0. 00 < 1. 59 0. 00 0. 00 100. 00 90060601-0604 LIVE TREES AN D P LAN T S 99. 70 0. 14 0. 00 < 0. 16 0. 00 0. 00 100. 00 94800701-0714 VEGETABL ES 99. 85 0. 15 0. 00 0. 00 0. 00 0. 00 100. 00 1916180801-0814 EDIBLE FRUIT AND NUTS 99. 99 0. 01 0. 00 0. 00 0. 00 0. 00 100. 00 42761010901-0910 SPICES, COFFEE AND TEA 6. 16 89. 38 4. 46 > 0. 00 0. 00 0. 00 100. 00 14091001-1008 CEREAL S 98. 95 1. 05 0. 00 0. 00 0. 00 0. 00 100. 00 10591101-1109 MIL L IN G; MAL T ; ST ARCH 57. 93 42. 07 0. 00 0. 00 0. 00 0. 00 100. 00 51481201-1214 MISC GRAIN , SEED, FRUIT 61. 60 33. 49 0. 00 < 4. 91 0. 00 0. 00 100. 00 323061301-1302 LAC; VEGETABL SAP , EXT RCT 94. 16 5. 84 0. 00 0. 00 0. 00 0. 00 100. 00 139131401-1404 OTHER VEGETABL E 99. 05 0. 95 0. 00 0. 00 0. 00 0. 00 100. 00 65701501-1522 F AT S AND OILS 99. 16 0. 66 0. 00 < 0. 18 0. 00 0. 00 100. 00 2363391601-1605 P REP ARED MEAT , F ISH, ET C 94. 15 5. 83 0. 00 < 0. 02 0. 00 0. 00 100. 00 1445131701-1704 SUGARS 97. 66 2. 34 0. 00 0. 00 0. 00 0. 00 100. 00 478821801-1806 COCOA 45. 32 54. 68 0. 00 0. 00 0. 00 0. 00 100. 00 148201901-1905 BAKING RELATED 58. 91 41. 09 0. 00 0. 00 0. 00 0. 00 100. 00 227972001-2009 PRESERVED FOOD 99. 46 0. 54 0. 00 0. 00 0. 00 0. 00 100. 00 2053102101-2106 MISCELLAN EOU S FOOD 66. 41 33. 59 0. 00 0. 00 0. 00 0. 00 100. 00 1044212201-2209 BEVERAGES 67. 85 30. 14 0. 08 < 0. 44 1. 49 0. 00 100. 00 59504. 690582301-2309 FOOD WASTE; ANIMAL FEED

91. 59 7. 77 0. 64 > 0. 00 0. 00 0. 00 100. 00 62428. 679022401-2403 TOBACCO 0. 20 0. 30 0. 00 0. 00 0. 00 0. 00 100. 00 0Total 65. 30 34. 22 0. 02 > 0. 02 0. 43 0. 00 100. 00 13196428. 76Japan and Thailand 1997-2005 Share ValueIndustry One-way Intra-industry TotalExpor t Ver tic al (Export) Hori-zontal Not ClassT> J J> T T> J J> T0101-0106 L IVE AN IMALS 53. 93 46. 07 0. 00 0. 00 0. 00 0. 00 100. 00 81243870201-0210 MEAT 99. 98 0. 02 0. 00 0. 00 0. 00 0. 00 100. 00 19137550301-0307 F ISH AN D SEAF OOD 90. 13 7. 59 0. 86 > 0. 00 1. 42 0. 00 100. 00 62892780401-0410 DAIRY, EGGS, HON EY, ETC 94. 93 4. 27 0. 16 < 0. 64 0. 00 0. 00 100. 00 299290501-0511 OTHER OF AN IMAL ORIGIN 98. 41 1. 57 0. 00 < 0. 02 0. 00 0. 00 100. 00 955570601-0604 LIVE TREES AN D P LAN T S 99. 95 0. 02 0. 00 0. 00 0. 03 0. 00 100. 00 2967540701-0714 VEGETABL ES 99. 82 0. 18 0. 00 0. 00 0. 00 0. 00 100. 00 6070520801-0814 EDIBL E FRUIT AND N UTS 87. 54 12. 46 0. 00 0. 00 0. 00 0. 00 100. 00 1077570901-0910 SPICES, COFFEE AND TEA 97. 28 2. 72 0. 00 < 0. 01 0. 00 0. 00 100. 00 2526191001-1008 CEREAL S 99. 97 0. 03 0. 00 0. 00 0. 00 0. 00 100. 00 3680181101-1109 MIL L IN G; MAL T ; ST ARCH 77. 19 22. 77 0. 00 0. 00 0. 05 0. 00 100. 00 2298081201-1214 MISC GRAIN , SEED, FRUIT 75. 92 18. 02 0. 00 < 6. 06 0. 00 0. 00 100. 00 1217101301-1302 L AC; VEGETABL SAP, EXT RCT 94. 79 4. 26 0. 00 < 0. 95 0. 00 0. 00 100. 00 810471401-1404 OTHER VEGETABLE 98. 68 1. 32 0. 00 0. 00 0. 00 0. 00 100. 00 292431501-1522 F AT S AND OILS 83. 65 14. 25 0. 17 < 1. 38 0. 56 0. 00 100. 00 789821601-1605 PREP ARED MEAT, F ISH, ET C 99. 66 0. 34 0. 00 0. 00 0. 00 0. 00 100. 00 58592801701-1704 SUGARS 99. 35 0. 65 0. 00 0. 00 0. 00 0. 00 100. 00 14122421801-1806 COCOA 93. 03 4. 39 2. 59 > 0. 00 0. 00 0. 00 100. 00 473581901-1905 BAKIN G

RELATED 97. 13 2. 60 0. 00 < 0. 27 0. 00 0. 00 100. 00 7478482001-2009 PRESERVED FOOD 99. 54 0. 46 0. 00 0. 00 0. 00 0. 00 100. 00 9106012101-2106 MISCELL AN EOU S FOOD 84. 36 14. 96 0. 00 < 0. 58 0. 10 0. 00 100. 00 6697032201-2209 BEVERAGES 90. 14 8. 41 0. 64 > 0. 48 0. 33 0. 00 100. 00 2855222301-2309 FOOD WASTE; ANIMAL FEED 96. 69 3. 13 0. 08 > 0. 02 0. 08 0. 00 100. 00 16933432401-2403 TOBACCO 91. 09 8. 91 0. 00 0. 00 0. 00 0. 00 100. 00 27887T otal 84. 36 15. 09 0. 19 > 0. 06 0. 31 0. 00 100. 00 30279681Intra-Industry Trade Patterns between Japan and East Asian Countries in the Agri-Food SectorTable 4. Share of Each Trade between Japan and East Asian CountriesUnit: Thousand US dollars, %Japan and China 1997-2005 Share ValueIndustry One-way Intra-industry TotalExpor t Ver tic al (Export) Hori-zontal Not ClassC> J J> C C> J J> C0101-0106 LIVE AN IMALS 22. 94 77. 06 0. 00 0. 00 0. 00 0. 00 100 20596440201-0210 MEAT 99. 84 0. 12 0. 00 < 0. 04 0. 00 0. 00 100 2620570301-0307 F ISH AN D SEAF OOD 91. 68 6. 17 1. 75 > 0. 14 0. 25 0. 00 100 12575490401-0410 DAIRY, EGGS, HONEY, ETC 98. 67 1. 31 0. 00 0. 00 0. 02 0. 00 100 459380501-0511 OTHER OF AN IMAL ORIGIN 99. 41 0. 48 0. 11 > 0. 01 0. 00 0. 00 100 1955820601-0604 LIVE TREES AN D P LAN T S 94. 16 3. 37 0. 00 < 2. 42 0. 00 0. 05 100 298950701-0714 VEGETABL ES 99. 95 0. 04 0. 00 0. 00 0. 01 0. 00 100 10326390801-0814 EDIBLE FRUIT AND N UTS 99. 88 0. 11 0. 01 > 0. 00 0. 00 0. 00 100 1708040901-0910 SPICES, COFFEE AND TEA 99. 24 0. 73 0. 00 < 0. 03 0. 00 0. 00 100 1829571001-1008 CEREAL S 99. 98 0. 02 0. 00 0. 00 0. 00 0. 00 0. 00 100 1262771101-1109 MIL L IN G; MAL T ; ST ARCH 70. 52 29. 17 0. 00 < 0. 28 0. 02 0. 02 100 91181201-1214 MISC GRAIN , SEED, FRUIT 96. 57 2. 23 0. 00 < 1. 12 0. 07 0. 00 100 3312331301-1302 L AC; VEGET ABL

SAP, EXT RCT 92. 07 3. 27 0. 02 < 3. 95 0. 69 0. 00 100 287081401-1404 OTHER VEGETABL E 99. 40 0. 60 0. 00 0. 00 0. 00 0. 00 100 274171501-1522 F AT S AND OILS 67. 15 25. 63 0. 33 < 6. 58 0. 29 0. 03 100 173381601-1605 P REP ARED MEAT , F ISH, ET C 99. 54 0. 46 0. 00 0. 00 0. 00 0. 00 100 16767321701-1704 SU GARS 78. 67 20. 75 0. 00 < 0. 32 0. 04 0. 21 100 140471801-1806 COCOA 75. 01 5. 39 2. 94 < 14. 12 2. 54 0. 00 100 94121901-1905 BAKING RELATED 94. 09 5. 75 0. 00 < 0. 16 0. 00 0. 00 100 1523222001-2009 PRESERVED FOOD 99. 80 0. 20 0. 00 0. 00 0. 00 0. 00 100 7391942101-2106 MISCELL AN EOU S FOOD 62. 19 37. 20 0. 00 < 0. 31 0. 17 0. 14 100 1354812201-2209 BEVERAGES 92. 29 3. 52 1. 42 > 1. 03 1. 75 0. 00 100 807212301-2309 FOOD WASTE; ANIMAL FEED 96. 86 3. 14 0. 00 0. 00 0. 00 0. 00 100 1790312401-2403 TOBACCO 97. 35 0. 34 0. 00 < 2. 31 0. 00 0. 00 100 18398Total 79. 42 20. 10 0. 27 > 0. 14 0. 06 0. 00 100 8782492Japan and Singapore 1997-2005 Share ValueIndustry One-way Intra-industry TotalExpor t Ver tic al (Export) Hori-zontal Not ClassS> J J> S S> J J> S0101-0106 L IVE AN IMALS 23. 11 76. 89 0. 00 0. 00 0. 00 0. 00 100. 00 18625730201-0210 MEAT 18. 86 81. 14 0. 00 0. 00 0. 00 0. 00 100. 00 2580301-0307 F ISH AN D SEAF OOD 81. 79 17. 05 0. 28 < 0. 52 0. 35 0. 00 100. 00 526790401-0410 DAIRY, EGGS, HON EY, ETC 50. 82 49. 18 0. 00 0. 00 0. 00 0. 00 100. 00 5720501-0511 OTHER OF AN IMAL ORIGIN 26. 06 73. 94 0. 00 0. 00 0. 00 0. 00 100. 00 540601-0604 LIVE TREES AN D P LAN T S 99. 80 0. 19 0. 00 < 0. 01 0. 00 0. 00 100. 00 96590701-0714 VEGETABLES 0. 54 99. 46 0. 00 0. 00 0. 00 0. 00 100. 00 7780801-0814 EDIBL E FRUIT AND N UTS 1. 67 98. 33 0. 00 0. 00 0. 00 0. 00 100. 00 10750901-0910 SPICES, COFFEE AND TEA 60. 63 37. 95 0. 00 < 1. 42 0. 00 0. 00 100. 00

39861001-1008 CEREAL S 3. 63 96. 37 0. 00 0. 00 0. 00 0. 00 100. 00 2391101-1109 MIL L IN G; MAL T ; ST ARCH 0. 14 99. 86 0. 00 0. 00 0. 00 0. 00 100. 00 80241201-1214 MISC GRAIN , SEED, FRUIT 21. 16 78. 51 0. 20 > 0. 12 0. 00 0. 00 100. 00 15291301-1302 L AC; VEGET ABL SAP, EXTRCT 20. 42 77. 83 0. 00 < 1. 75 0. 00 0. 00 100. 00 4551401-1404 OTHER VEGETABLE 80. 04 19. 96 0. 00 0. 00 0. 00 0. 00 100. 00 1921501-1522 F AT S AND OILS 65. 52 27. 28 0. 00 < 7. 19 0. 01 0. 00 100. 00 172041601-1605 PREP ARED MEAT, F ISH, ET C 3. 83 96. 17 0. 00 0. 00 0. 00 0. 00 100. 00 61831701-1704 SU GARS 9. 51 90. 49 0. 00 0. 00 0. 00 0. 00 100. 00 32291801-1806 COCOA 95. 63 2. 24 0. 00 < 0. 81 1. 31 0. 00 100. 00 735681901-1905 BAKIN G RELATED 90. 56 8. 88 0. 00 < 0. 55 0. 00 0. 00 100. 00 805612001-2009 PRESERVED FOOD 15. 98 84. 02 0. 00 0. 00 0. 00 0. 00 100. 00 11532101-2106 MISCELL AN EOU S FOOD 74. 12 25. 88 0. 00 0. 00 0. 00 0. 00 100. 00 519802201-2209 BEVERAGES 23. 27 64. 61 0. 00 < 3. 28 8. 83 0. 00 100. 00 67122301-2309 FOOD WASTE; ANIMAL FEED 35. 14 64. 86 0. 00 0. 00 0. 00 0. 00 100. 00 21482401-2403 TOBACCO 0. 00 99. 99 0. 00 0. 00 0. 00 0. 00 100. 00 14621T otal 31. 04 68. 74 0. 01 < 0. 13 0. 08 0. 00 100. 00 2199431Kuo-I Chang, Chung-Hsuan WeiTable 4. Share of Each Trade between Japan and East Asian CountriesUnit: Thousand US dollars, %Japan and Korea 1997-2005 Share ValueIndustry One-way Intra-industry TotalExpor t Vertical (Export) Hori-zontal Not ClassK> J J> K K> J J> K0101-0106 LIVE AN IMALS 26. 86 73. 14 0. 00 0. 00 0. 00 0. 00 100. 00 13871710201-0210 MEAT 99. 58 0. 42 0. 00 0. 00 0. 00 0. 00 100. 00 1254590301-0307 F ISH AN D SEAF OOD 85. 86 13. 11 0. 96 > 0. 02 0. 04 0. 00 100. 00 7956230401-0410 DAIRY, EGGS, HON EY, ETC 64. 83 31. 42 0. 00

0. 00 3. 76 0. 00 100. 00 18610501-0511 OTHER OF ANIMAL ORIGIN 65. 80 34. 13 0. 07 0. 00 0. 00 0. 00 100. 00 93030601-0604 LIVE TREES AN D P LAN T S 98. 01 1. 67 0. 08 < 0. 19 0. 05 0. 00 100. 00 170130701-0714 VEGETABLES 99. 39 0. 55 0. 00 0. 00 0. 06 0. 00 100. 00 845920801-0814 EDIBLE FRUIT AND N UTS 99. 85 0. 02 0. 02 > 0. 01 0. 10 0. 00 100. 00 728610901-0910 SPICES, COFFEE AND TEA 85. 29 14. 34 0. 11 0. 26 0. 00 0. 00 100. 00 74241001-1008 CEREAL S 83. 83 16. 17 0. 00 0. 00 0. 00 0. 00 100. 00 351101-1109 MIL L IN G; MAL T ; ST ARCH 55. 15 33. 89 0. 00 < 10. 96 0. 00 0. 00 100. 00 9231201-1214 MISC GRAIN , SEED, FRUIT 84. 08 12. 43 1. 89 > 1. 48 0. 11 0. 01 100. 00 1027961301-1302 L AC; VEGET ABL SAP, EXT RCT 85. 61 12. 91 0. 00 < 0. 81 0. 67 0. 00 100. 00 457461401-1404 OTHER VEGETABL E 91. 53 7. 74 0. 00 < 0. 73 0. 00 0. 00 100. 00 9271501-1522 F AT S AND OILS 10. 18 69. 32 7. 35 < 13. 15 0. 00 0. 00 100. 00 147801601-1605 P REP ARED MEAT , F ISH, ET C 96. 21 1. 81 1. 47 > 0. 05 0. 46 0. 00 100. 00 1619351701-1704 SU GARS 26. 23 63. 87 0. 00 < 1. 97 7. 92 0. 00 100. 00 139141801-1806 COCOA 89. 62 6. 54 0. 96 < 2. 88 0. 00 0. 00 100. 00 243681901-1905 BAKING RELATED 93. 19 4. 74 0. 02 < 2. 03 0. 02 0. 00 100. 00 693702001-2009 PRESERVED FOOD 95. 11 4. 89 0. 00 0. 00 0. 00 0. 00 100. 00 883742101-2106 MISCELLAN EOU S FOOD 63. 16 36. 38 0. 00 < 0. 03 0. 00 0. 42 100. 00 1044122201-2209 BEVERAGES 93. 92 2. 91 0. 22 < 2. 52 0. 42 0. 00 100. 00 1104902301-2309 FOOD WASTE; ANIMAL FEED 47. 33 52. 28 0. 28 > 0. 06 0. 00 0. 04 100. 00 293592401-2403 TOBACCO 0. 91 96. 32 2. 71 > 0. 00 0. 07 0. 00 100. 00 39198Total 60. 77 38. 38 0. 45 > 0. 29 0. 10 0. 01 100. 00 3307934Japan and Taiwan 1997-2005 Share ValueIndustry One-way Intra-industry TotalExpor t T> J J> T

Vertical (Export) Hori-zontal Not ClassT> J J> T0101-0106 LIVE AN IMALS 41. 41 58. 59 0. 00 0. 00 0. 00 0. 00 100. 00 16562100201-0210 MEAT 98. 29 1. 70 0. 01 > 0. 00 0. 00 0. 00 100. 00 412310301-0307 F ISH AN D SEAF OOD 97. 09 2. 75 0. 00 < 0. 17 0. 00 0. 00 100. 00 7493230401-0410 DAIRY, EGGS, HON EY, ETC 58. 73 40. 98 0. 11 < 0. 18 0. 00 0. 00 100. 00 32260501-0511 OTHER OF AN IMAL ORIGIN 95. 59 4. 23 0. 18 > 0. 00 0. 00 0. 00 100. 00 786580601-0604 LIVE TREES AN D P LAN T S 87. 96 2. 30 7. 99 > 1. 06 0. 62 0. 08 100. 00 334360701-0714 VEGETABLES 87. 89 10. 64 0. 70 > 0. 67 0. 10 0. 00 100. 00 756570801-0814 EDIBLE FRUIT AND N UTS 67. 52 31. 43 0. 08 < 0. 84 0. 12 0. 00 100. 00 609910901-0910 SPICES, COFFEE AND TEA 92. 98 7. 02 0. 00 0. 00 0. 00 0. 00 100. 00 219181001-1008 CEREAL S 8. 45 91. 55 0. 00 0. 00 0. 00 0. 00 100. 00 4661101-1109 MIL L IN G; MAL T ; ST ARCH 5. 06 94. 94 0. 00 0. 00 0. 00 0. 00 100. 00 24321201-1214 MISC GRAIN , SEED, FRUIT 51. 86 38. 72 7. 37 > 1. 95 0. 00 0. 10 100. 00 195761301-1302 LAC; VEGETABL SAP, EXTRCT 61. 67 33. 47 0. 66 < 4. 20 0. 00 0. 00 100. 00 66021401-1404 OTHER VEGETABL E 88. 86 1. 90 0. 00 < 9. 24 0. 00 0. 00 100. 00 22161501-1522 F AT S AND OILS 30. 80 49. 76 14. 96 > 2. 37 2. 11 0. 00 100. 00 91121601-1605 P REP ARED MEAT , F ISH, ET C 65. 62 34. 23 0. 00 0. 00 0. 16 0. 00 100. 00 1055401701-1704 SU GARS 8. 08 88. 66 0. 00 < 3. 26 0. 00 0. 00 100. 00 118571801-1806 COCOA 0. 30 96. 30 3. 41 > 0. 00 0. 00 0. 00 100. 00 75041901-1905 BAKING RELATED 23. 06 67. 46 0. 00 < 9. 09 0. 38 0. 00 100. 00 407482001-2009 PRESERVED FOOD 72. 93 27. 03 0. 04 > 0. 00 0. 00 0. 00 100. 00 191822101-2106 MISCELL AN EOU S FOOD 27. 28 71. 97 0. 08 < 0. 66 0. 01 0. 00 100. 00 736152201-2209 BEVERAGES 6. 29 92. 52 0. 00 < 0. 91 0. 28

0. 00 100. 00 612072301-2309 FOOD WASTE; ANIMAL FEED 39. 74 57. 89 2. 27 > 0. 08 0. 00 0. 01 100. 00 137662401-2403 TOBACCO 0. 07 99. 93 0. 00 0. 00 0. 00 0. 00 100. 00 128027Total 56. 81 42. 67 0. 21 < 0. 28 0. 03 0. 00 100. 00 32225027. Japan-Korea: HS150420000 (Fats and oils and their fractions, of fish, other than liver oils) and HS110900000 (Wheat gluten, whether or not dried). 8. Japan-Taiwan: HS140110000 (Bamboos) and HS190590100 (Arare, Senbei and other bakers'' wares, of rice). In the opposite case of Japan''s significant share of high-quality imports which are larger than Japan''s share are as follows. 1. Japan-Indonesia: HS050800100 (Shells, unworked or simply prepared but not cut to shape) and HS030342000 (Yellowfin tunas (Thunnus albacares), excluding fillets and other fish meats, livers and roes, frozen), HS030375000 (Dogfish and other sharks, excluding fillets and other fish meat, livers and roes, frozen). 2. Japan-Malaysia: HS240220000 (Cigarettes containing tobacco). 3. Japan-Philippine: HS090210000 (Green tea (not fermented) in immediate packings of a content not exceeding 3 kg). 4. Japan-Thailand: HS180631000 (Chocolate and other food preparations containing cocoa, in blocks, slabs or bars, filled, weighing not more than 2 kg). 5. Japan-China: HS030311000 (Pacific salmon : Sockeye salmon (red salmon) (Oncorhynchus nerka), excluding fillets and other fish meat, livers and roes, frozen), HS030321000 (Trout (Salmo trutta, Oncorhynchus mykiss, Oncorhynchus clarki, Oncorhynchus aguabonita, Oncorhynchus apache and Oncorhynchus chrysogaster), excluding fillets and other fish meat, livers and roes, frozen) and HS220900000 (Vinegar and substitutes for vinegar obtained from acetic acid). 6. Japan-Singapore: HS120930000 (Seeds of herbaceous plants

cultivated principally for their flowers, of a kind used for sowing). 7. Japan-Korea: HS240220000 (Cigarettes containing tobacco), HS160416000 (Anchovies, prepared or preserved, whole or in pieces), and HS030346 (Southern bluefin tunas (Thunnus maccoyii), excluding fillets and other fish meat, livers and roes, frozen). 8. Japan-Taiwan: HS151800000 (Animal or vegetable fats and oils and their fractions), HS060210000 (Unrooted cuttings and slips), and HS120600000 (Sunflower seeds). We find that Japan significantly import more high-quality fishery products from trading partners due to recent high quality fishery products battle in international markets. Furthermore, the share of HIIT are still small, but they are larger than the share of VIIT for the case of Japan-Philippine and Japan-Thailand (Japan-Philippine: 0. 04 (0. 02+0. 02) < 0. 43, Japan-Thailand: 0. 25 (0. 19+0. 06) < 0. 31). In the case of Japan-Philippine and Japan-Thailand, fishery products of Bonito (HS030343000) are intra-industry transacted horizontally. In the case of Japan-Singapore and Japan-Korea, the share of HIIT are larger than the share of VIIT in Beverages (HS2201-HS2209) and Sugars (HS1701-1704), respectively. 4. DeterminantsThe relationship between factor endowments and the share of VIIT, HIIT and IIT arising from theory would be examined for Japan��s trade with 8 East Asian countries in agri-food products, respectively. The data set includes 8 East Asian countries and 9 years (1997-2005). �@However, there are no trade data of Japan-Malaysia of 2005 for VIIT and no HIIT between Japan and trading partners for 13 samples. Therefore, observations are 71, 59 and 72 for VIIT, HIIT and IIT, respectively. The difference in factor endowments is usually measured in empirical studies by bilateral in per capita GDP. 7 Therefore, we test the factorIn the model of

Flam and Helpman (1987), the number of varieties exported by the low-productively country depends on the relative wage, differences in technology and the extent to which income distribution overlap. The volume and share of intra-industry trade may be positively related to differences in the relative wage and , to the133Agri-Food Sectorendowments hypothesis controlling for distance between Japan and its trading partners. In addition, we include direct measure of factor endowment corresponding to land. Following Ferto (2005), we test the equation based on Flam and Helpman (1987) by following specification employing panel regression: IITijt n =α 0 +α1ln DGDPCijt +α2 ln GDPit +α3 ln GDPjt +α4 DISTANCEijt+α5 DLANDijt + vij +α`ijt (4. 1)where n denotes one of the three IIT share, i. e., ααVIITαα ααHIITαα and ααIITαα ; j is Japan , i is trading partner, and t is time. DGDPCijt denotes the difference in per capita GDP between i nad j calculated from database of Asian Development Bank . GDPit and GDPjt are the GDP in i nad j, both from database of Asian Development Bank. DISTANCEijt is the distance between Tokyo and the capital city of i, calculated from CEPII database. DLANDijt denotes thedifference in arable land in one thousand hectares between Japan and trading partners calculated from FAO database. The expected signs for total VIIT: α ,α ,α > 0 and α ,α <0. 125 34The est imated resu lt s using t he d ep endent vari ab le for the share of VIIT, HIIT, and IIT are listed in Table 5, respectively . The random effects model gave the best results in terms of statistical significance for the share of VIIT. In VIIT, the positive relationship between differences in the factor endowmentsextent that differences in GDP per capita and the relative wage are correlated, differences in per capita GDP. Durkin and Krygier (2000), p.

762 utilizes GDP per capita to proxy for the capital/labor ratio. They examine the relationship between per capita GDP differences and bilateral intra-industry trade shares and find a positive and significant relationship between GDP per capita differences and the trade shares only in the regressions on the vertically differentiated shares. Ferto (2005), p. 127 also applies bilateral inequality in per capita GDP to measure the differences in factor endowments. and the share of VIIT are obtained. The estimated coefficients of GDPi and GDPj have the expected signs and are significant, while the DISTANCE and DLAND variables have unexpected signs but significant. However, the results become insignificant in the share of HIIT and IIT. The weak positive relationship between the share of VIIT (also HIIT and IIT) and the factor endowment may be a result of the rising share of foreign direct investment due to multinational corporations in agri-food trade. Despite many previous papers pointed out the important role of foreign direct investment, we still could not find suitable data mining methods to fit the VIIT and agricultural or food foreign direct investment data in same disaggregated industry level. Particularly, agricultural or food foreign direct investment should be considered to be a cause of the rising share of VIIT with several particular trading partners and requires further examination. 5. Concluding remarksThis paper attempts to investigate the different patterns of IIT in the agri-food sector between Japan and East Asian countries from 1997 to 2005 at the HS 9-digit level. Our empirical results show that the large portion of agri-food trade between Japan and East Asian countries is still one-way trade while IIT, particularly the share of VIIT has not grown rapidly from 1997 to 2005. Particularly, the fact that Japan imports high-

quality agri-food products more than exports reflects in the opposite direction of quality ladder story based on Flam and Helpman type vertically differentiated trade model. The weak positive relationship between the share of VIIT (also HIIT and IIT) and the factor endowment may be a result of the rising share of foreign direct investment due to multinational corporations in agri-food trade. This may caused by famous restaurants located in large cities, who import high-quality agri-food products from East Asian countries as Michelin guide Tokyo 2009 features 30 hotels and 173 restaurants in Tokyo. Thirty six restaurants were given two stars, and nine restaurants were given three stars. Moreover, Shimada et al. (2006) points out the adverse imports or indirect imports activities of large multinational corporations in the agribusiness and agri-food products industry like Mitsubishi Syouji, Mitsui Bussan, Sumitomo Syouji, Itocyu Syoujyi and so on are determinant driving forces, stimulating the two-way international food trade and foreign direct investment. Particularly, agricultural or food foreign direct investment should be considered to be a cause of the rising share of VIIT with several particular trading partners and requires further examination. Several previous papers show that there are remarkable differences between the effect of abolition of import tariffs and entire elimination of all import barriers including non-tariff barriers. This suggests the effect of Preferential Trading Arrangements formation if two-way agri-food trade plays a significant role in reducing not only import tariffs but also nontariff barriers between Japan and East Asian Countries.