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DISCUSSION PAPER No. 11

East Asia's Economic Development cum Trade "Divergence" *

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Abstract
This paper addresses some salient features of how some of "successful" East Asian economies have been faring in terms of enhancing their export competitiveness. That export becomes more divergent in terms of its unit price as more technology-enhancing economic activity is undertaken within an economy, is the primary message that this study conveys. This is indeed what Schumpeter had addressed in conjunction with his "creative destruction" thesis. From this perspective, East Asia's export-led industrialization has been attained through a particular policy focus upon high "trade divergence" sectors underpinned by a generally high level of manufacturing flexibility. The experience of Malaysia's development serves as the strong case in point. As an East Asia-wide FTA is expected to facilitate "divergent" export-led industrialization through enhanced knowledge interaction, this dynamic or "divergent" impact that knowledge creation could exert should come to the fore of relevant policy arguments, together with static consideration of trade creation and diversion. A formal statistical test of the "divergence hypothesis" above is called for with a view to building upon this preliminary study.

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1. The Role of Knowledge in Industrialization

The critical role of knowledge in development through industrialization is pronounced in recent years (Nelson and Winter 1982; Dosi et al. 1988; Grossman and Helpman 1991). There may be incidences in which a country benefits from having more than one sector with competitive advantages, whereas there may also be cases in which multiple competitive advantages stand to gain by increased exports. The recent trend in "specialization followed by selection" industrialization strategy can be regarded as an attempt to reap economic rents a la Schumpeter (1942; 1961), although it remains to be seen if this move will indeed generate the expected favorable impact on the country's export performance.

Whether a country can develop economically depends on a number of factors, of which perhaps the most fundamental is the degree of its manufacturing capacity and consequent export competitiveness. This paper addresses some salient features of how some of "successful" East Asian economies have been performing in terms of their export competitiveness. This paper is structured as follows. Section 2 observes statistics pertinent to an economy's production capacity. Section 3 expounds on export competitiveness measured as "trade divergence". Section 4 attempts to empirically substantiate the implication of the previous section. Section 5 concludes this paper.

2. Importance of International Trade and Other "Upstream" Measurements

Table 1 gives the magnitude of export relative to total GDP for some selected economies. As shown, ASEAN economies have been increasing their utilization of exporting as a demand component. East Asia's industrialization can indeed be characterized as export-driven in its salient nature.

Within the whole spectrum of export commodities, what is so-called "knowledge-intensive products" have been increasing rapidly in ASEAN and China, in particular (Table 2). That the "knowledge" component of those knowledge-intensive products comprises the major source of economic rent is a well-known proposition (Schumpeter, 1942; 1961). It is then imperative for a developing economy to capture ever-progressing industrial technology through streamlining its domestic productive capacity. Since, as is often the case, developing economies lack the very capacity to do so, they oftentimes rely on attracting foreign direct investment (FDI) from developed

economies including the EU, the US and Japan. Indeed, FDI can be viewed as a transfer of money *and* the channel of acquiring knowledge.

Table 1. Ratio of export to GDP for selected economies, 1990 and 2002

Economy	1990	2002
Indonesia	0.22	0.33
Malaysia	0.67	0.98
Philippines	0.18	0.47
Singapore	1.43	1.44
Thailand	0.27	0.54
Cambodia	0.08	0.37
Laos	0.09	0.18
Vietnam	0.37	0.47
China	0.18	0.26
Korea	0.26	0.34
Japan	0.09	0.10
Hong Kong	1.09	1.25
US	0.07	0.07
France	0.18	0.23
Germany	0.25	0.31
UK	0.19	0.18
Mexico	0.15	0.25
Canada	0.22	0.35

Source: World Bank (2004), *World Development Indicators*.

As Table 3 suggests, both European and Asian economies have increasingly been dependent on inward FDI as the source of capital stock formation. It is generally observed that smaller economies in terms of GDP, most notably Hong Kong and Singapore in Asia, and Ireland, the Netherlands and Sweden in Europe, record a larger ratio of FDI to capital stock. A major difference between Asia and Europe, may lie in the casual observation (although relevant statistics is lacking) that whereas European economies have been serving as donors and recipients of FDI simultaneously, Asian developing economies have simply been hosting, as entire recipients, those FDI projects undertaken by the region's developed economies (viz., Japan and Korea) as entire donors.

Table 2. Trade matrix of knowledge-intensive goods

（US$ million）

From \ To	ASEAN Five[b]	China	Hong Kong	Korea	Japan	USA	EU12[c]	World Total[a]
ASEAN Five[b]								
1990	4,946[d]	317	1,505	851	2,107	11,373	5,276	32,598
1995	21,965	1,247	7,442	2,631	10,975	29,784	14,197	109,297
2000	35,023	4,554	10,417	5,655	16,502	40,252	27,220	161,500
China								
1990	77	—	1,094	3	55	101	152	1,734
1995	1,216	—	4,362	373	2,346	3,075	2,125	16,431
2000	3,478	—	9,251	1,520	5,294	11,529	8,610	45,370
Hong Kong								
1990	186	889	—	43	66	533	495	2,581
1995	1,066	2,036	—	112	335	1,179	604	6,200
2000	775	1,789	—	68	205	982	1,818	5,436
Korea								
1990	1,430	n.a.	892	—	2,011	5,210	2,245	15,357
1995	5,771	1,608	2,797	—	4,287	11,202	4,024	36,908
2000	7,986	3,633	3,766	—	5,591	15,268	7,966	54,513
Japan								
1990	7,589	1,563	4,047	4,283	—	25,064	15,862	74,415
1995	22,280	4,307	8,868	8,709	—	38,355	18,981	122,602
2000	22,819	7,532	10,044	9,992	—	44,485	26,992	122,566
USA								
1990	8,605	1,457	2,046	3,704	11,787	—	25,886	104,797
1995	17,451	3,268	4,722	8,083	16,324	—	29,126	151,334
2000	24,195	5,758	5,173	12,504	20,821	—	62,469	199,983
EU12[c]								
1990	2,927	254	203	1,314	3,021	10,994	n.a.	n.a.
1995	9,266	4,028	3,570	2,489	5,479	18,321	n.a.	n.a.
2000	11,782	5,402	4,532	4,315	8,188	49,853	221,631	439,972
World Total[a]								
1990	30,583	2,513	4,251	12,477	23,472	86,321	n.a.	n.a.
1995	95,682	32,468	42,744	26,752	52,240	168,171	n.a.	n.a.
2000	120,721	55,046	56,100	38,244	61,805	238,778	n.a.	1,218,827

Notes: See Annex IV-A of OECD (Organisation for Economic Co-operation and Development) [1994] "The Measurement of Scientific and Technological Activities using Patent Data as Science and Technology Indicators, Patent Manual 1994", Paris: OECD (http://www.oecd.org/dataoecd/33/62/2095942.pdf, accessed on 28 September 2004) for the trade classification codes of "knowledge-intensive products".

[a] Total of exports by economies listed in PC-TAS.

[b] ASEAN Five refers to Indonesia, Malaysia, the Philippines, Singapore and Thailand.

[c] EU12 refers to Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and the United Kingdom.

[d] The Philippines' data is not included.

Source: Author's calculation on the basis of United Nations Trade Database PC-TAS.

Table 3. Inward FDI stock as a percentage of gross domestic product, by region and economy, 1980-2002

(Percent)

Economy	1980	1985	1990	1995	2003
Japan	0.3	0.3	0.3	0.6	2.1
Asia (excl. Japan)	17.9	20.9	17.9	19.1	30.3
Indonesia	13.2	28.2	34.0	25.0	27.5
Malaysia	20.7	23.3	23.4	32.3	57.2
Philippines	3.9	8.5	7.4	8.2	14.5
Singapore	52.9	73.6	83.1	78.7	161.3
Thailand	3.0	5.1	9.6	10.4	25.8
Cambodia	2.4	2.0	3.4	12.1	46.4
Laos	0.3	-	1.5	11.6	30.1
Myanmar	..	..	..	6.1	..
Vietnam	0.2	1.1	4.0	28.5	50.6
China	3.1	3.4	7.0	19.6	35.6
Hong Kong	623.8	525.5	269.6	163.4	236.5
Taiwan	5.8	4.7	6.1	5.9	11.9
Korea	2.1	2.3	2.1	1.9	7.8
India	0.6	0.5	0.5	1.6	5.4
Bangladesh	0.4	0.5	0.5	0.5	5.0
Sri Lanka	5.7	8.6	8.5	10.0	15.6
Pakistan	2.9	3.5	4.8	9.1	10.7
Nepal	0.1	0.1	0.3	0.9	2.5
Western Europe	6.2	9.3	11.0	13.3	33.0
Austria	4.0	5.6	6.1	7.4	23.7
Belgium and Luxembourg	5.8	21.2	27.8	38.3	-
Denmark	6.1	6.0	6.9	13.2	36.1
Finland	1.0	2.5	3.8	6.5	28.6
France	3.8	6.9	7.1	12.3	24.7
Germany	3.9	5.1	7.1	7.8	22.6
Greece	9.3	20.2	6.7	9.3	9.8
Ireland	149.9	157.7	71.5	60.2	129.7
Italy	2.0	4.5	5.3	5.8	11.8
Netherlands	10.8	18.8	23.3	28.0	65.6
Portugal	12.3	18.7	14.8	17.1	36.3
Spain	2.3	5.2	12.8	18.7	27.4
Sweden	2.2	4.2	5.3	12.5	47.5
United Kingdom	11.8	14.1	20.6	17.6	37.4
Central and Eastern Europe	-	0.2	1.3	5.4	23.7
West Asia	..	0.2	1.3	5.3	9.2
Pacific	22.5	24.8	29.2	27.1	40.6
Africa	8.2	9.9	10.8	15.6	25.3
Latin America, Caribbean	6.5	11.0	10.4	11.8	36.8
North America	4.5	5.5	8.0	8.3	15.4
USA	3.0	4.4	6.9	7.3	14.1
World total	6.7	8.4	9.3	10.3	22.9

Notes: .. Negligible - Not available.

Source: UNCTAD, *World Investment Report*, various years.

There is another nexus to knowledge-intensive international trade which concerns intellectual property right figures, e.g., patent counts and royalty receipts and payments. In terms of patent counts, as shown in Table 4, most Asian economies listed (with the exception of Japan and Korea to some extent) have smaller patent "markets" than European economies, and they are dominated by non-residential application.

Table 4. Number of patent applications filed by economy, 1990, 1995, 1999 and 2001

Economy	1990	1995	1999	2001
Korea	20,595	96,557 (59,249)	133,127 (56,214)	190,022 (74,001)
Taiwan	n.a.	n.a.	31,115	-
China	28,176	41,773 (10,066)	52,348 (146)	149,294 (30,324)
Hong Kong	1,093	1,961 (23)	6,040 (42)	8,914 (74)
Indonesia	n.a.	n.a.	42,503 (0)	77,407 (0)
Malaysia	n.a.	4,052 (141)	6,451 (179)	- (-)
Philippines	1,256	97	3,361 (144)	13,598 (0)
Singapore	880	11,881 (10)	51,495 (374)	79,026 (0)
Thailand	n.a.	n.a.	5,071 (477)	5,665 (1,117)
Vietnam	29	16,982 (23)	42,212 (37)	76,542 (0)
India	2,129	6,566 (1,545)	38,362 (14)	78,522 (234)
Japan	303,960	388,957 (335,061)	442,245 (361,094)	496,621 (388,390)
USA	91,245	235,440 (127,476)	294,706 (138313)	375,657 (190,907)
United Kingdom	12,699	115,754 (25,355)	192,875 (31,326)	264,706 (34,500)
Germany	69,943	136,615 (51,948)	220,761 (74,232)	292,398 (80,222)
France	15,430	89,766 (16,140)	138,455 (20,998)	175,122 (21,790)
Italy	14,824	64,955 (1,625)	128,260 (9,613)	156,858 (3,819)

Note: Figures in parentheses denote the number of patent applications filed by residents.
- not available.

Sources: The European Patent Office database (http://ep.espacenet.com/) for 1990; World Bank (2002) for 1995 and 1999; World Bank (2004) for 2001.

Reflecting the small size of the patent "market" and relatively large demand for production technology, royalty receipts and payments, as in Table 5, register deficit (excess payments) for all the Asian economies listed (including Japan). Put simply, these Asian countries are net recipients of "knowledge". The US, France and the United Kingdom, in contrast, serve as net donors of the knowledge. This knowledge-creation aspect of economic activity can be viewed as "dynamic" as opposed to "static" within the standard trade analysis framework, yet should actually be among the foremost considerations in addressing economic integration. With this in mind, the next section addresses conceptualization of knowledge-creation, or innovation, in conjunction with international trade analysis.

Table 5. Royalty receipts and payments [a]

(US$ million)

	1991	1995	2000	2002
Korea	60.5	299	688	826
	1,581	2,384	3,221	2,979
China	n.a.	n.a.	80.4	196
	n.a.	n.a.	1,281	491
Taiwan	219.0	241	371	-
	894	937	1,834	-
Philippines	n.a.	2.0	7.0	1
	56.0	99.0	197	230
Thailand	2.1	0.6	8.7	7
	206.1	630	710	1,104
Japan	2,865	6,005	10,227	10,422
	6,051	9,417	11,007	11,021
US	17,820	30,290	38,030	44,142
	4,040	6,930	16,100	19,258
United Kingdom	3,339	6,080	7,538	7,701
	3,370	5,198	6,503	5,993
France	1,388	1,850	2,310	3,241
	1,748	2,320	2,051	1,956
Germany	1,888	3,134	2,821	3,765
	4,240	5,917	5,454	5,064
Italy	248	462	563	539
	1,472	1,166	1,198	1,273

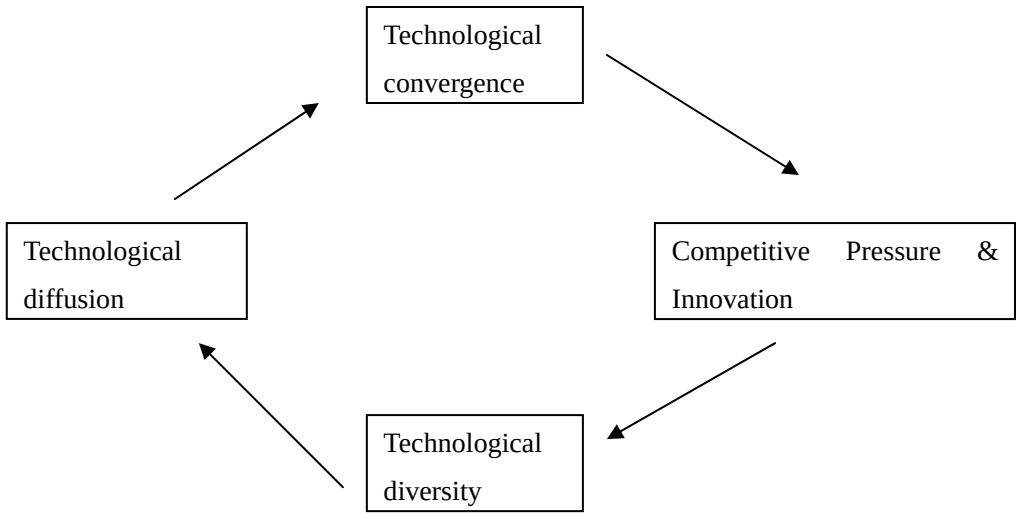
Note: [a]Upper figures denote receipts, and lower figures, payments.

Source: International Trade and Investment Center (Japan) (2002); World Bank (2004).

3. Export Competitiveness Measured as "Trade Divergence"

During the past couple of decades, with the rapid advancement of technological knowledge, unit prices of "high-tech" products have been rising steadily relative to the unit prices of "low-tech" products. Indeed, processed goods are more expensive than raw materials because the remuneration for human effort and capital used in the production is added to the value of the manufactured products (Nurnberger, 1999). Put differently, processed goods have become more expensive since technology has become more sophisticated and the remuneration for the technology has risen constantly in industrialized economies. With a view to capturing the role of technological knowledge in the economic process, this section first reviews what constitute innovation in the face of economic globalization. Then it attempts to associate the argument with international trade.

Otani (2003) propounds, within the empirical context of economic globalization and also under the theoretical purview of evolutionary theory (not necessarily confined to evolutionary economics), the concept of "globalization cycle".



Source: Adapted from Otani (2003), Figure 1.

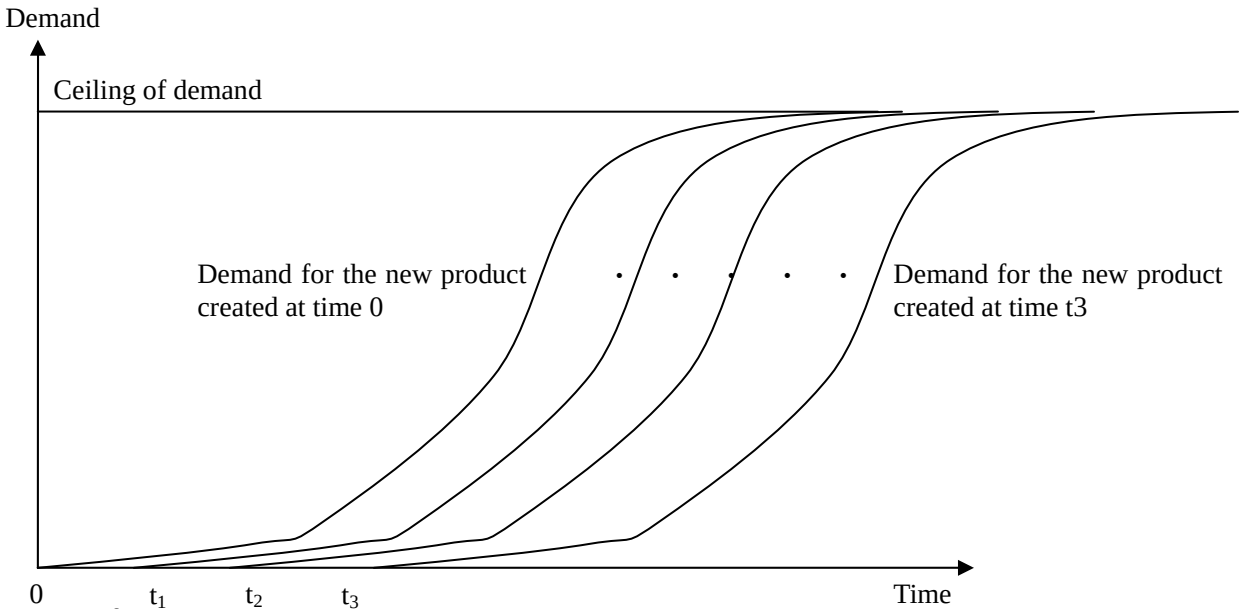
Figure 1. Globalization Cycle

According to Otani, the dynamic aspect of economic globalization can be schematically diagramed as Figure 1:

> "In a dynamic real economy, firms engage in continuous struggle to innovate newer goods and newer technologies to gain pronounced competitive advantages. Through the diffusion of

> knowledge, these innovations will stimulate other firms to catch up and the competitive advantage of the original innovator will dissipate. […] This dissipation of the older competitive advantages will push firms to further innovations to regain a newer competitive advantage. […] Therefore globalization can be divided up into the process of convergence and that of creative innovations through intensified international competition (Otani, 2003: 126).

Otani's (2003) dynamic view of globalization is not only in line with Schumpeterian creative destructions but also Aoki and Yorhikawa's (1999) "growth cum incessant innovation". An empirical illustration of Figure 2 would be: demand for "tele"-communication (to mean communication "from a distance") lead an entrepreneurial firm to create at time t_1 the innovation (or invention) of telegraph; as the demand for telegraph saturates and competitive pressure pushes down the price, the economic rent for manufacturing telegraphs dissipates; then the firm strives for creating a newer product, culminating at time t_2 in the innovation (invention) of radio; then at time t_3, by the same token, the emergence of "tele"-vision follows. The same line of argument can be made for almost all the other industrial products. The birth of semiconductors, personal computers, cellular phones and internet services are just a a few such examples.



Note: t_i refers to the time at which a new product/industry emerged
Source: Adapted from Aoki and Yoshikawa (1999).

Figure 2. Divergence and Convergence of Newer Technologies

In the context of Otani's globalization view, it seems that in Asia, the innovation has tended to be simply "one-directional", from the more technologically advanced part of the world (i.e., Europe and North America) to those Asian economies.[1] Since the globalization cycle still remains "severed" or cut off as an "open loop) in Asia at a point between "Technological convergence" and "Competitive Pressure & Innovation" of Figure 1, and since, importantly, economic process cannot be undone[2] (Georgescu-Roegen, 1971; Mayumi, 2001), the Asian region had seen the emergence of a flying geese pattern (*a la* Akamatsu, 1962) of industrial production and international trade.

Be the case as it may in the argument of technological creation/acquisition, some Asian economies had been successful at least in their export-leveraged development through utilizing those "imported" technologies. In order to consider this issue, the knowledge argument above is translated into the context of international trade below. Given that Hymer's (1976) and Penrose's (1980) resource-based view of the firm can be applicable to nation states, those nations' manufacturing capability as a whole hinges on the extent to which their domestic (to mean "within their territory") production capacity captures technology *ranging from* new to old: the more diversified or divergent their domestic technological levels are, the more profit opportunities they could capture. The divergent-ness of domestic technological capability can be reflected in the unit value of export, i.e., a higher (lower) unit value of exports should reveal a higher (lower) technological level embodied in those exported products (Fontagné, Freudenberg and Péridy, 1997; Fukao, Ishido and Ito, 2002). What is important to be borne in mind is that there is no single quality ladder as presented formally in Grossman and Helpman (1991), which nations on the whole climb up: there exist both "low-tech" and "high-tech" oriented firms within the economy.[3]

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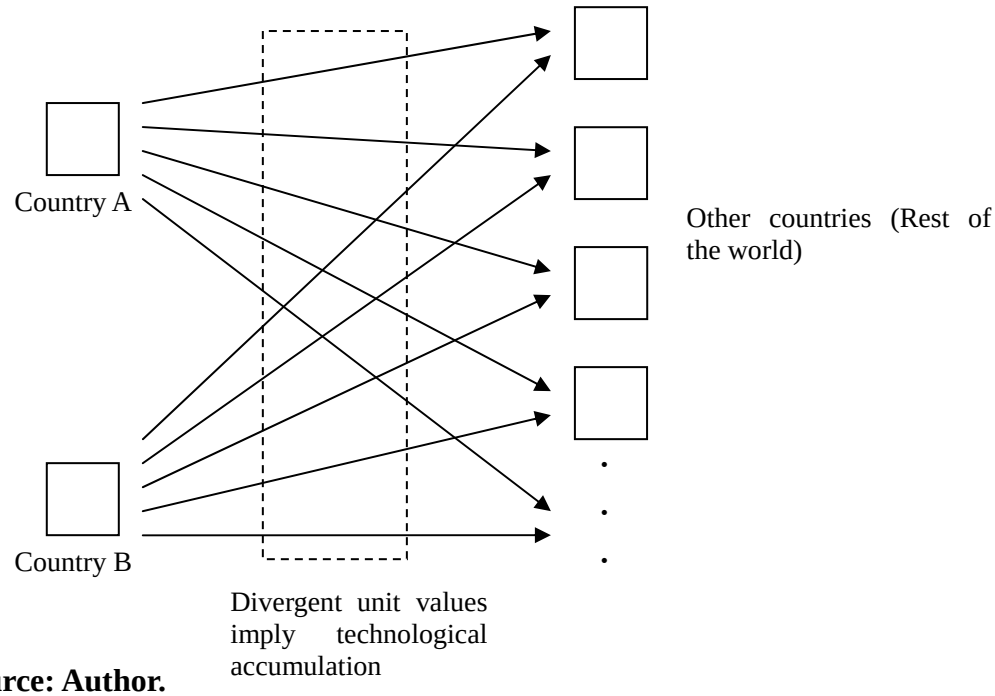
[1] While empirical substantiation is awaited, EU-type innovation is "two-directional", i.e., innovation takes place by turns in major economies including France, Germany and the United Kingdom. A free trade agreement (FTA) is hence expected for the realization of the cross-border "two-directional" exchange of knowledge through an increased level of trade, FDI and workforce.

[2] Albeit exogenously, Dixit and Pindyck (1994) observe that physical capital investment, e.g., establishment of factories embodying current (or old) technology, cannot be adjusted "smoothly" (with no energy and/or no cost) to form newer factories embodying newer technology.

[3] Kimura (2001) in this connection argues that the strategic fragmentation of firms' production facilities across economies both developed and developing, make the quality ladder further blurred. In a nutshell, "quality ladder" (pursuit of a higher export unit value) is not congruous with "sophisticated production capacity *only*".

All these considerations lead to on a trade-dimension version of measuring technological divergence as a proposal: an economy's technological "diversity" or "divergence" in an industry can be reflected in the cross-sectional "variance" of its export unit value (as shown in Figure 3). Put another way, the more divergent the economy's production possibility is, the "fitter" it is for meeting demand from outside, as illustrated in Figure 4.[4]



Source: Author.

Figure 3. Concept of Trade Diversification (or "divergence")

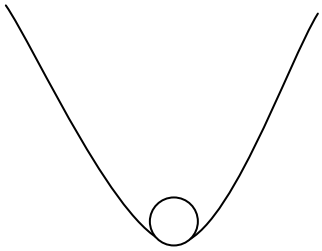
A further extension of this line of reasoning would be stated in terms of "Fisher's Fundamental Theorem of Natural Selection" in evolutionary science[5]: "the rate of increase in fitness of any organism at any time is equal to its genetic variance in fitness at that time (Fisher, 1958). Then an economic interpretation of Fisher's Theorem would be: "the rate of reduction in industry average unit cost is equal to the share-weighted cross-sectional variance of unit cost" (Nelson and Winter, 1982: 243), or in a modified form for This paper focusing on exports, "the rate of increase in the industry's exports has a positive correlation with the cross-sectional variance of unit

[4] In other words, manufacturing flexibility is revealed by the extent of diversity of products (Carlsson, 1989).

[5] See Dosi et al. (1988) for an extensive argument of evolutionary technological change.

value of exports". Drawing on this line of argument, the next section attempts a preliminary effort to measure Asian and other economies' domestic productive capacity.

Flexible technological capability accommodates a wide range of external "shocks", or new demands for product specifications



Inflexible technological capability accommodates only a narrow range of external "shocks", or new demands for product specifications

Source: Author.
Figure 4. An Image of Technological Capability as Flexibility

4. Descriptive Statistics: Coefficient of Variation and Export Volume

As discussed in the previous section, an economy's domestic productive capacity, or "fitness" to demand ("external environment" in evolutionary science), might be measured by the "variance" (reflecting domestic technological divergence) of the unit value of the economy's exports.[6] The present section makes a preliminary analysis of Asian and other economies' export performance, from the viewpoint introduced above.

A proxy measurement of manufacturing capability cum technological divergence is introduced: coefficient of variation (CV, defined as "standard deviation divided by mean" in statistics).[7] Then a hypothesis can be submitted which states that a high CV of an economy's cross-sectional exports (to its trade partner economies in the

[6] In methodological terms, firm-level data sets might be desirable, yet those statistics lack unit prices of those manufactured products. As a second-best proxy, therefore, trade statistics is used in this study.
[7] As is known, the normalized nature of CVs enables cross-sectional (including cross-industry) comparison. See, e.g., Woodridge (2002) for statistical arguments on this point.

rest of the world) suggests high manufacturing (technological) capability of the economy's industry under consideration. As regards trade data, this study uses the United Nations' online trade statistics "TradeMap" and "COMTRADE".[8]

Based on the United Nations' said trade statistics ("TradeMap" and "COMTRADE"), Coefficient of Variations (CVs) defined above have been calculated by taking the simple average of a cross-sectional set for each year of unit values for the exports (f.o.b. basis) to partner countries at the 6-digit (most detailed) level and aggregating them up to 2 digit (HS85 for "Electrical/electronics products", HS50-63 for "Textiles"). Export volumes have also been computed in time series.

Results of the calculation are shown in Figures 5 through 23 (unit for the vertical axis: no unit for CVs on the left and US$ thousand for export volumes on the right). A general observation of the results is that the export sector with a higher CV tends to grow faster than the one with a lower CV, which is in line with the Fisher's Theorem introduced above. For instance, the disparity between trade in textiles and trade in Electronics is wider for Malaysia than for the Philippines. Relatedly, increasing CVs characterize Malaysia's and China's electronics exports, in contrast with declining CVs for Cyprus' electronics and textile exports. Also, there seems to be a robust observation within each economy that electrical/electronics products have a higher CV than textiles. One explanation for this might be the standardized nature (in the sense argued by Vernon, 1966) of textile-related products. Another way of making this point is that technology embodied in the manufacture of textile-related products has already been converged, whereas in the case of electrical/electronics products, relevant technologies are still in the rapid cycle of divergence and convergence.

Further, and most importantly, the disparity in trade volume between electrical/electronics and textiles is larger in some Asian economies such as Singapore and Malaysia than in most European economies. This particular point appears to explain those Asian economies' rapid or even "miraculous" economic development through recourse to the concept of "technological divergence" at issue in this study. Those Asian economies with a high share in total export of high-CV products (exemplified by electrical and electronic products) have overall raised the unit-price variety of their

[8] Both TradeMap and COMTRADE cover essentially the same international trade statistics but different in their coverage of years and data presentation. See

export commodities, thus reaping relatively higher value-added alias Schumpeterian rents.

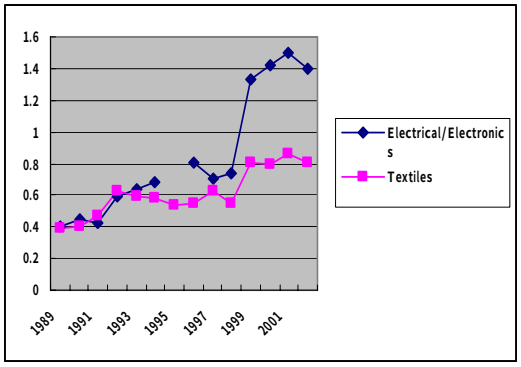


Figure 5-1. CVs for Indonesia

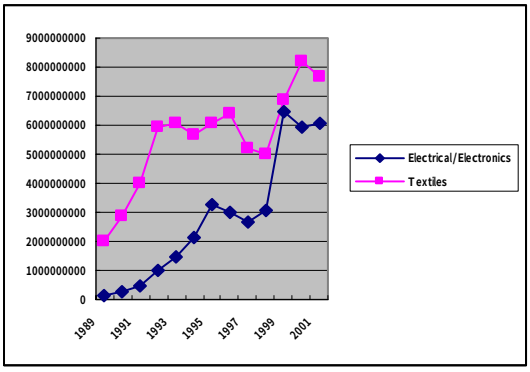


Figure 5-2. Export volume for Indonesia

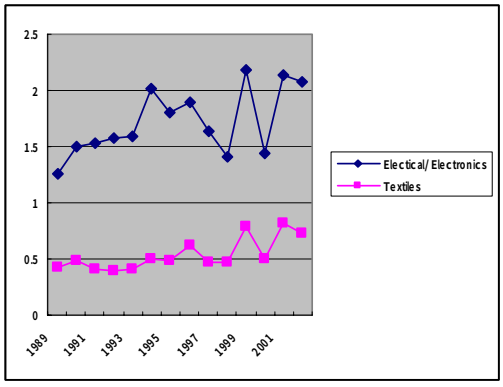


Figure 6-1. CVs for Malaysia

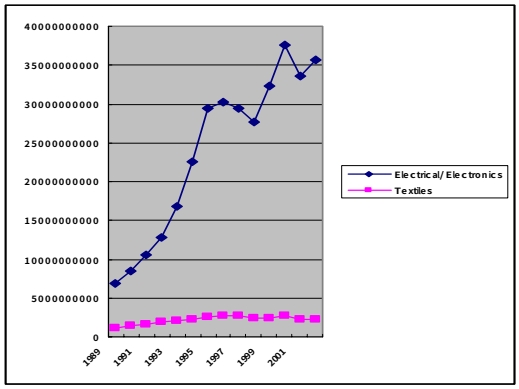
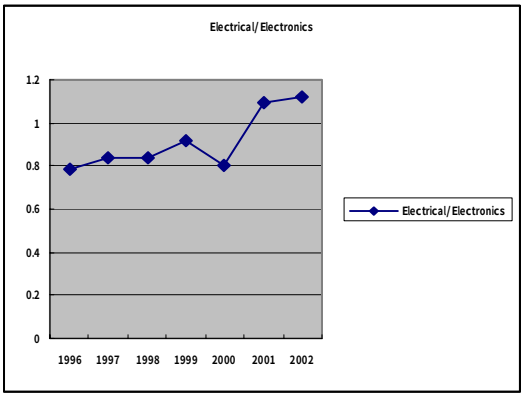


Figure 6-2. Export volume for Malaysia



Note: Export data for textiles are missing.

Figure 7-1. CVs for the Philippines

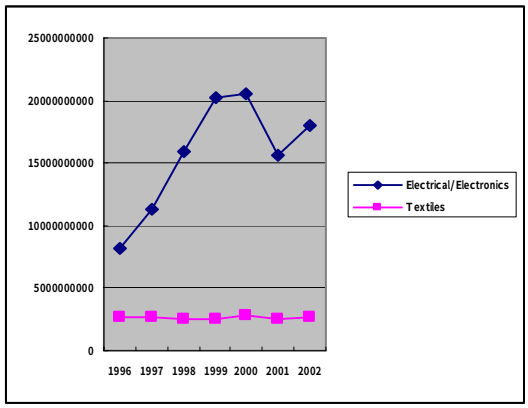


Figure 7-2. Export volume for the Philippines

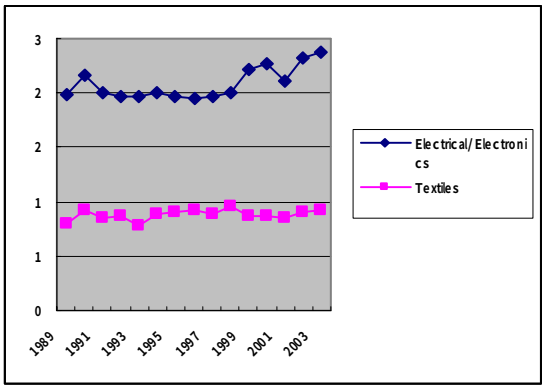


Figure 8-1. CVs for Singapore

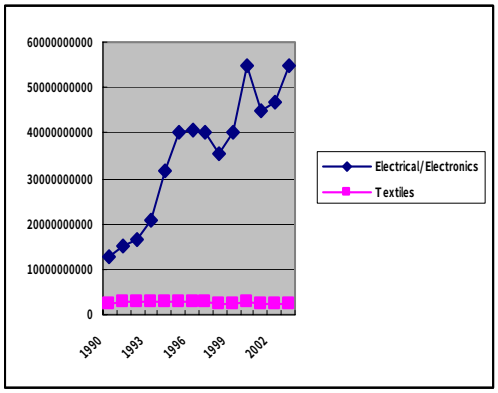


Figure 8-2. Export volume for Singapore

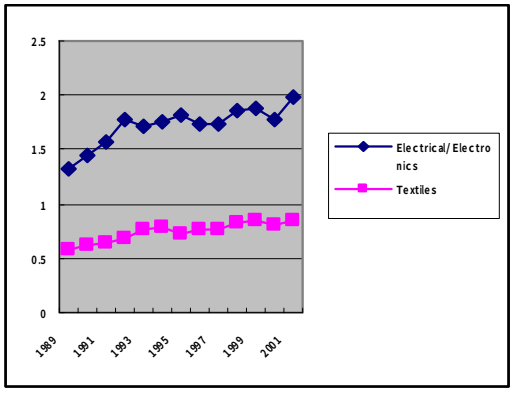


Figure 9-1. CVs for Thailand

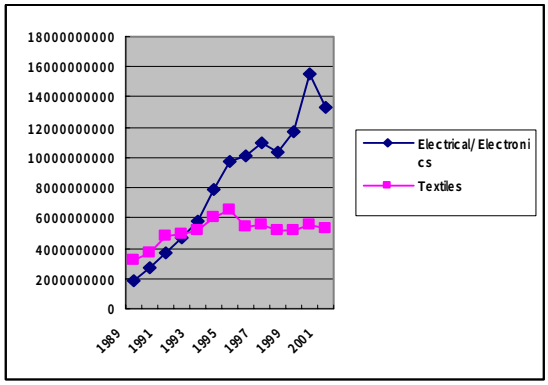


Figure 9-2. Export volume for Thailand

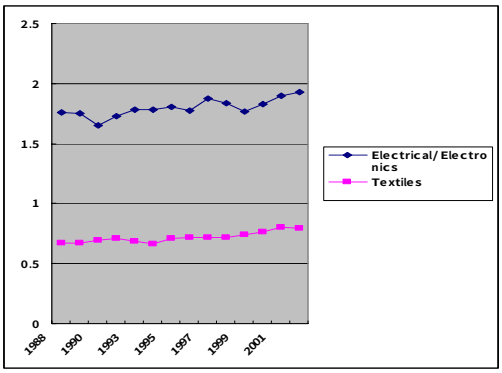


Figure 10-1. CVs for Japan

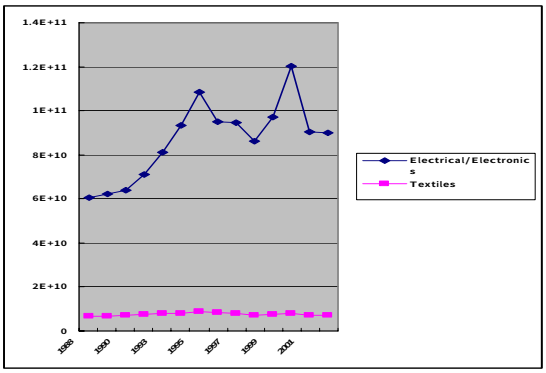


Figure 10-2. Export volume for Japan

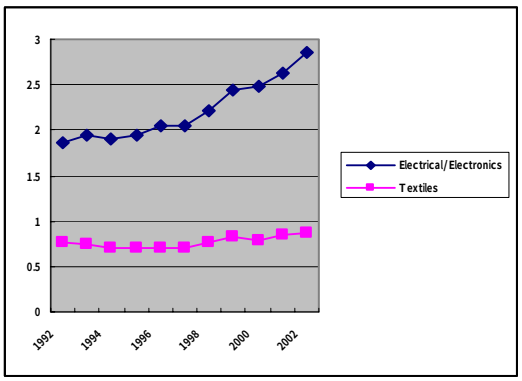


Figure 11-1. CVs for China

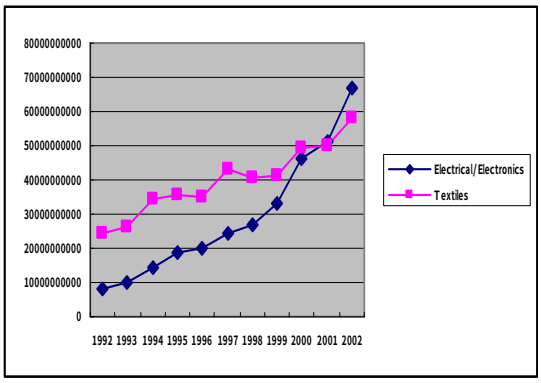


Figure 11-2. Export volume for China

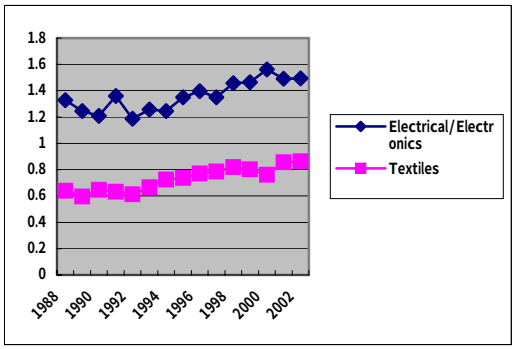


Figure 12-1. CVs for Korea

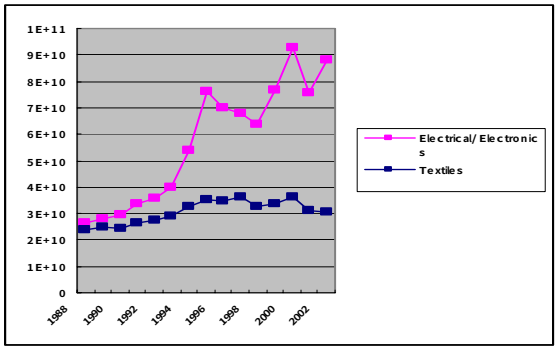


Figure 12-2. Export volume for Korea

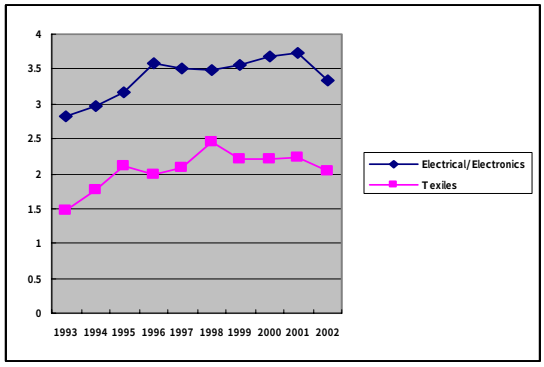


Figure 13-1. CVs for the UK

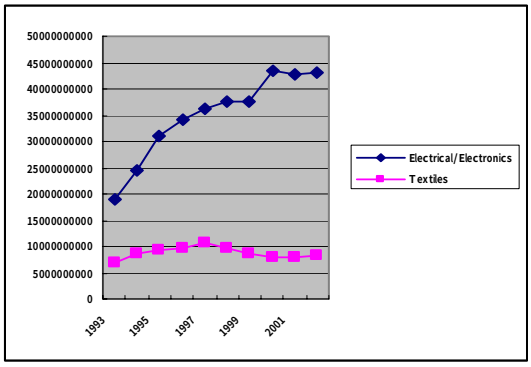


Figure 13-2. Export volume for the UK

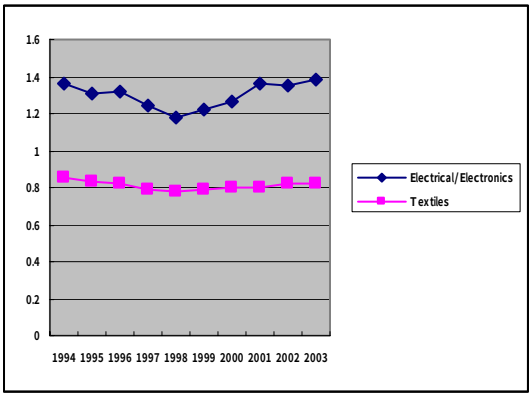


Figure 14-1. CVs for France

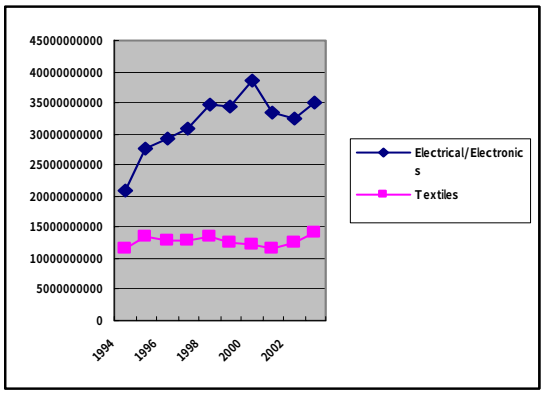


Figure 14-2. Export volume for France

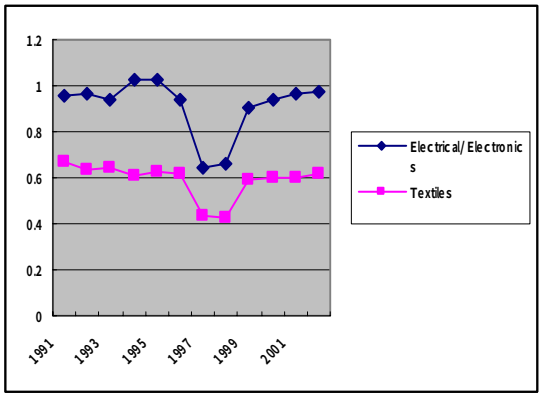


Figure 15-1. CVs for Germany

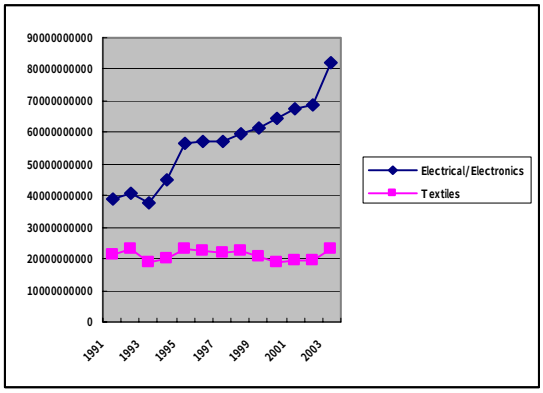


Figure 15-2. Export volume for Germany

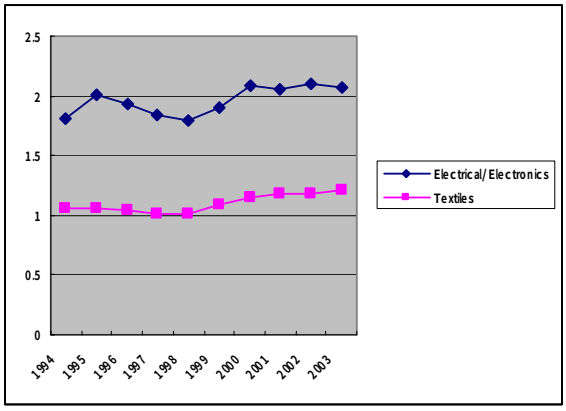


Figure 16-1. CVs for Italy

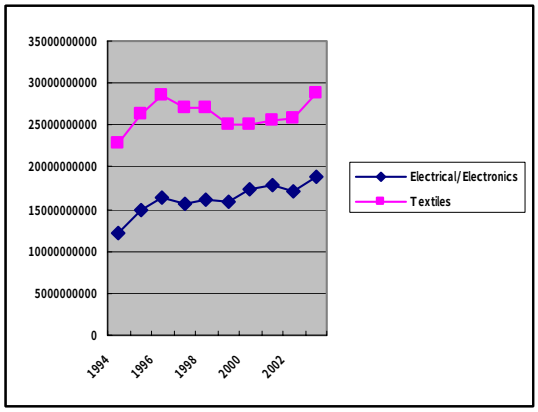


Figure 16-2. Export volume for Italy

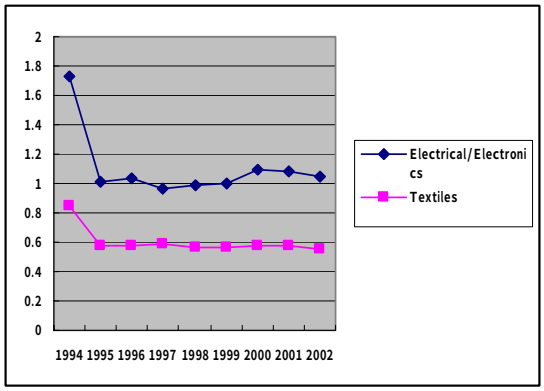


Figure 17-1. CVs for Austria

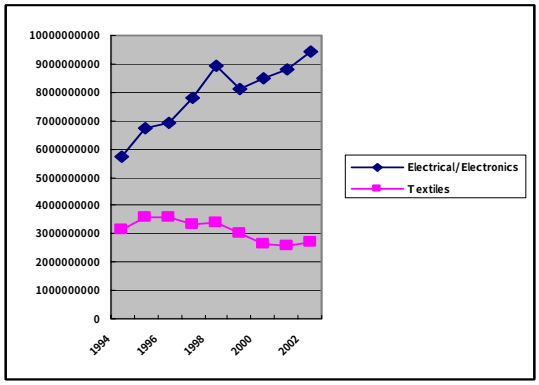


Figure 17-2. Export volume for Austria

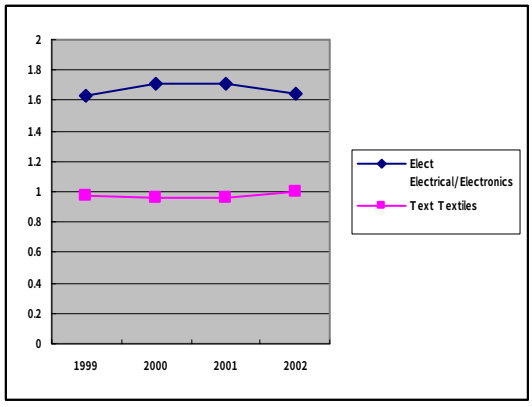


Figure 18-1. CVs for Belgium

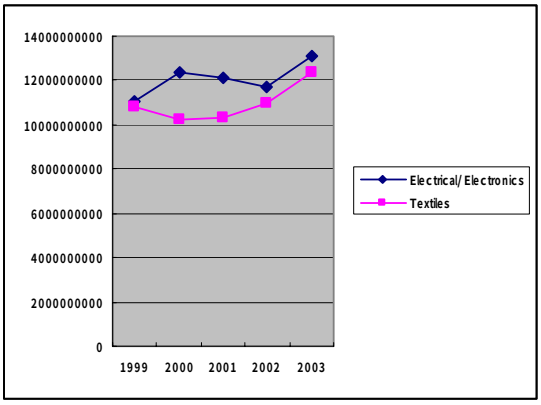


Figure 18-2. Export volume for Belgium

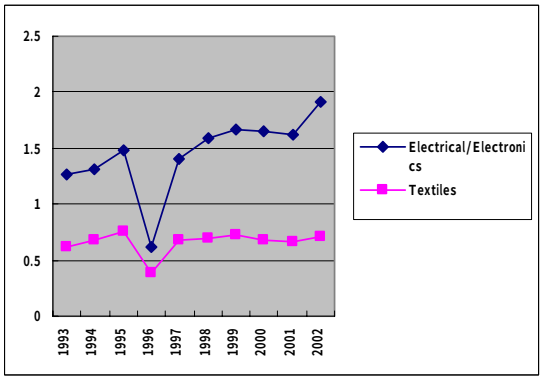


Figure 19-1. CVs for Czech

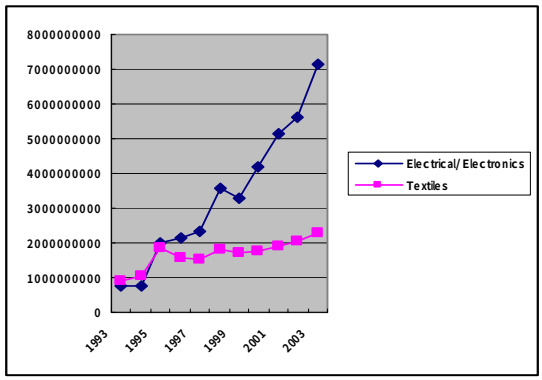


Figure 19-2. Export volume for Czech

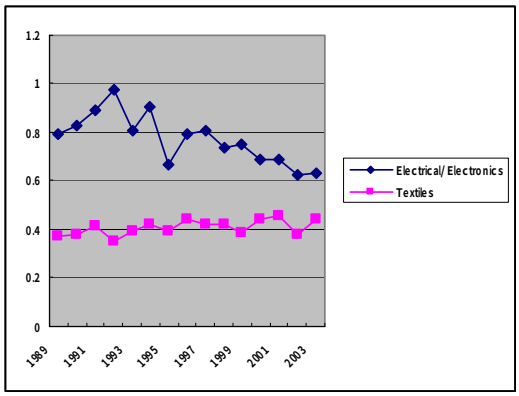


Figure 20-1. CVs for Cyprus

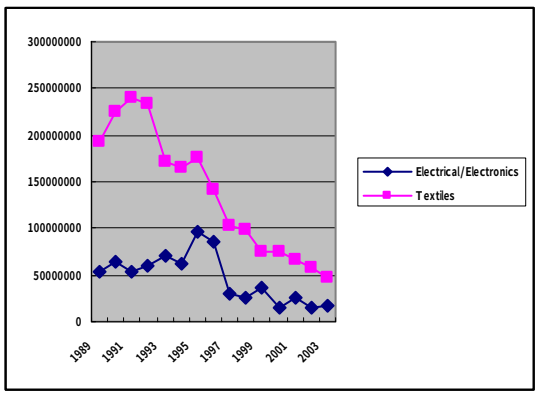


Figure 20-2. Export volume for Cyprus

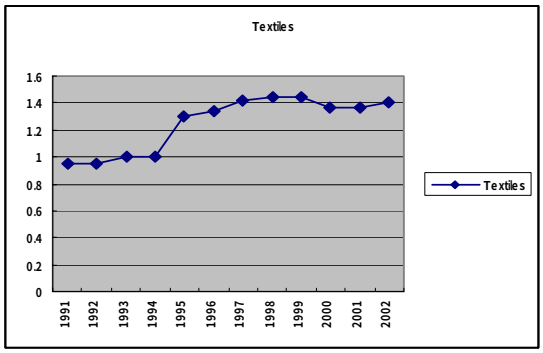
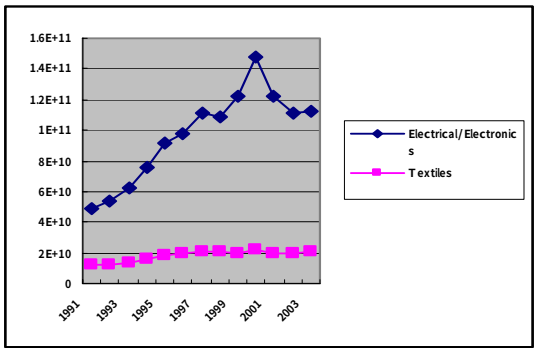


Figure 21-1. CVs for the US



Note: Export data for Electrical/Electronics are missing.

Figure 21-2. Export volume for the US

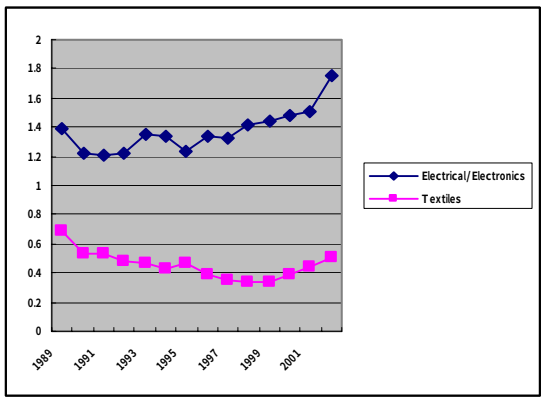


Figure 22-1. CVs for Canada

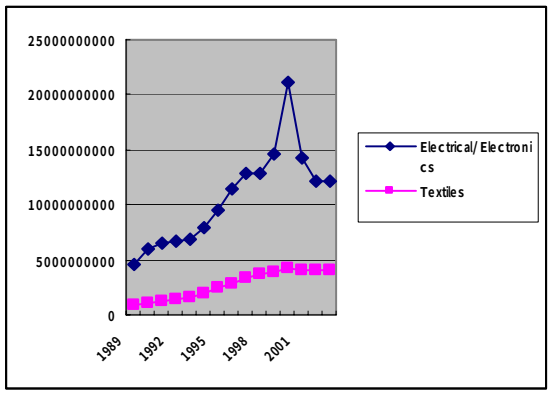


Figure 22-2. Export volume for Canada

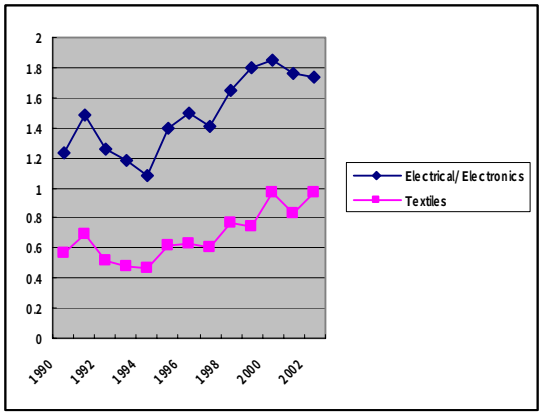


Figure 23-1. CVs for Mexico

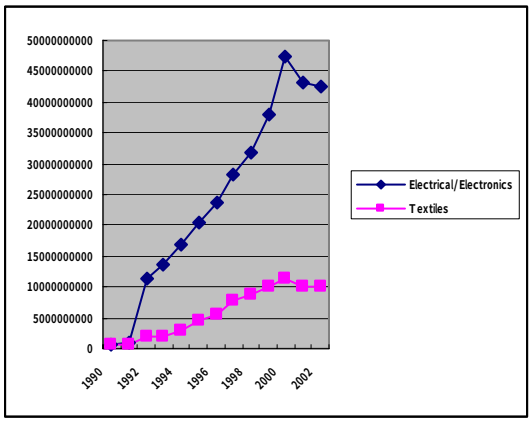


Figure 23-2. Export volume for Mexico

Conventional "trade diversification" arguments have tended to focus on the kinds of products (mostly in the primary sector in Asia's and Africa's least developed economies), yet this study's complementary focus is placed on the "unit-value diversification". Just as a reference, a measurement of export diversification in its conventional sense, "export diversification index" (EDI), can be defined as: "the number of most detailed trade classification codes in an industry (6 digit HS codes for this study) divided by the total export amount of the industry.

Figures 24-1 and 24-2 denote the EDIs of electrical/electronics and textiles for selected Asian economies, respectively (unit of the vertical axis: number of the 6 digit HS codes per US$ thousand). Figures 25 and 26 depict the same thing with the cases of European and NAFTA economies, respectively (unit of the vertical axis: number of the 6 digit HS codes per US$ thousand). As shown, EDIs for both categories of products have been on a declining trend over time in Asia, as in other economies. What is also noticeable is that the products of these economies with a larger trade share exhibit lower EDIs. Put differently, a more comparatively advantageous products exhibits lower EDIs. Thus, the "export diversification" scenario has not been the governing norm in Asian economies' rapid industrialization. Instead, extensive, or almost exclusive, utilization of "trade divergence", or technological deepening through unit price diversification, has been in place in those Asian economies.

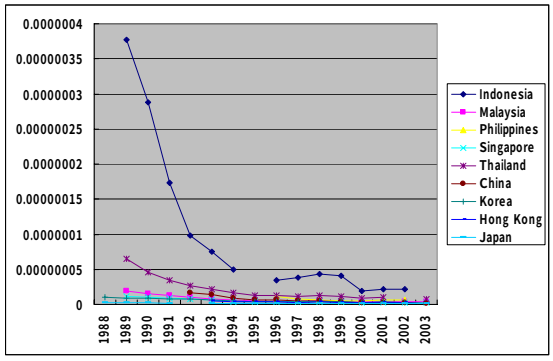


Figure 24-1. EDIs of electrical/electronics for selected Asian economies

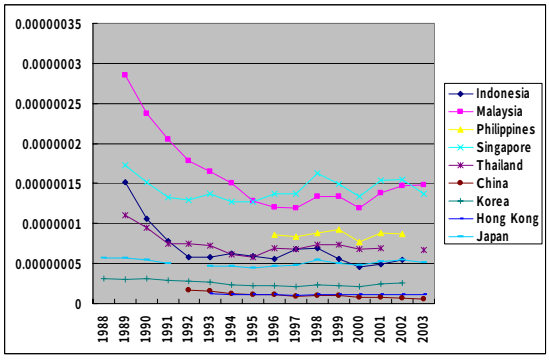


Figure 24-2. EDIs of textiles for selected Asian econoimes

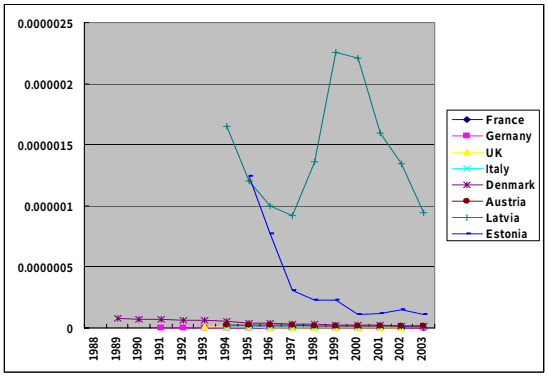


Figure 25-1. EDIs of electrical/electronics for selected European economies

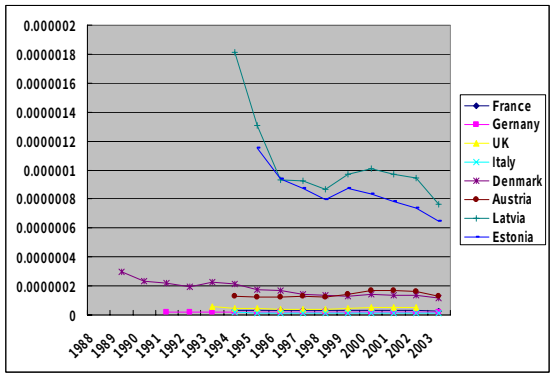


Figure 25-2. EDIs of textiles for selected European economies

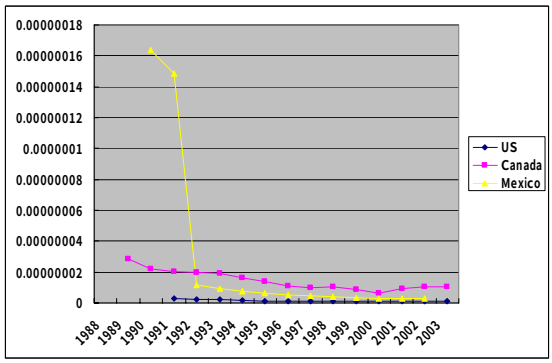


Figure 26-1. EDIs of electrical/electronics for NAFTA economies

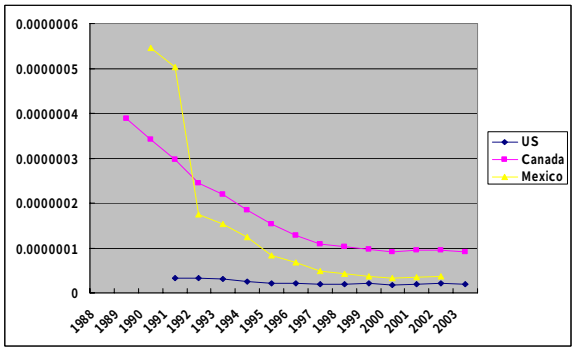


Figure 26-2. EDIs of textiles for NAFTA economies

It might be meritorious to consider an illustrative case example. Malaysia, in its three decades of export-oriented industrialization, has been successfully attracting FDI from developed economies including Japan. Multinational firms have undertaken FDI in Malaysia in the form of investing in automation and flexible production systems (Siew-Yean, 2004: 225). Hence, although "made in Malaysia" is different from "made

by Malaysians", the country's GDP has surely been underpinned by foreign firms.

Among industrial sectors, Malaysia has been placing an increasing emphasis upon attracting FDI in the electrical and electronic industry (Table 6). As is known, semiconductor chips exhibit unit price diversity ranging from less than 1 dollar to over 100 dollar per chip.[9] Unlike this highly divergent property of the semiconductor industry, textiles, in contrast, have little scope for unit price divergence.[10]

Table 6. Share of FDI (production basis) in Malaysia by industry, 1986-1998

(Percent)

Industry	1986	1990	1995	1996	1997	1998
Food manufacturing	14.3	11.3	7.5	6.5	5.7	5.1
Beverages & tobacco	8.9	4.2	2.6	2.6	2.8	2.6
Textiles & textile products	10.4	8.7	10.4	9.4	9.3	8.1
Leather & leather products	0.4	0.2	0.2	0.2	0.1	0.2
Wood & wood products	1.7	2.3	3.5	3.5	3.4	3.3
Furniture & fixtures	0.3	0.4	0.6	0.6	0.5	0.5
Paper, printing & publishing	1.4	2.3	0.9	0.9	1.0	1.0
Chemicals & chemical products	11.1	6.8	8.1	9.8	5.8	6.1
Petroleum & coal	8.4	11.2	4.8	4.9	9.1	8.9
Rubber products	3.6	3.8	2.8	2.8	2.7	2.6
Plastic products	0.7	1.4	3.2	2.9	2.7	2.4
Non-metallic mineral products	8.9	8.3	5.7	4.9	4.7	4.8
Basic metal products	6.9	3.8	5.0	4.8	5.8	5.4
Fabricated metal products	4.5	3.8	4.0	3.9	3.8	3.8
Machinery manufacturing	1.9	2.2	4.0	4.3	4.3	5.0
Electrical & electronic products	10.8	23.2	30.4	31.9	32.4	33.7
Transport equipment	4.2	4.0	3.8	3.5	3.3	3.0
Scientific & measuring equipment	0.9	1.0	1.7	1.5	1.7	3.0
Miscellaneous	0.8	1.0	0.9	0.9	0.8	0.6
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: Data are available only until 1998.
Original source: Malaysian Industrial Development Authority, *Statistics on the Manufacturing Sector*, various years.
Source: Siew-Yean (2004: 193)

There can be no large price disparity in the case of, say, T-shirts as among textile products. As a matter of fact, expenditure on research and development (R&D)

[9] An interview by the author at a Japanese semiconductor firm's headquarters in Tokyo (6 August, 2004) also corroborate this point. This firm's Japanese factory produces semiconductor chips whose unit price exceeds 15,000 yen (around 120 dollars), while on the other hand some semiconductor chips manufactured by its factory in China are priced less than 10 yen (around 8 cents).

[10] Interviews by the author at Malaysia's Ministry of International Trade and Industry (25 August, 2004), Thailand's Department of Foreign Trade (31 August 2004) and Thai Garment Manufacturers Association (31 August 2004) have found that the local textile firms' current operation in both countries stays manufacturing of low-end products. This exemplifies the fact that within the relatively standardized textile industry, the scope for product differentiation and price elevation in developing economies is even more limited.

for textiles is much smaller than for electrical/electronics in Malaysia (Table 7). That the R&D expenditure on electrical/electronics products have been dominated by foreign investors with a high-level technology, and that in the case of textiles Malaysian firm's much smaller amount of R&D still "dominates", can be viewed as both a cause and a consequence of the latter textile industry's little scope for Schumpeterian innovation. In sum, its strategic policy efforts in favor of capturing a larger share of "high CV" industry's products in its export has enabled Malaysia to attain the export-driven development cum trade divergence. A formal statistical test of this "divergence hypothesis" is called for with a view to building upon this preliminary and descriptive study.

Table 7. Firms' R&D Expenditure by Industry and ownership in Malaysia, 2000

(RM million)

Industry	Foreign- owned or controlled firms	Malaysian- owned or controlled firms	Total R&D expenditure
Food & beverages	262	5.4	267.3
Textiles	0.3	4.2	4.5
Wearing apparel, dressing & dyeing of fur	-	1.1	1.1
Wood, wood & cork products except furniture, articles of straw, & plaited materials	1.1	0.8	2.0
Paper & paper products	0.1	0	0.1
Publishing, printing, & reproduction of recorded media	-	0.4	0.4
Coke, refined petroleum products, & nuclear fuel	-	0.3	0.3
Chemicals & chemical products	2.5	11.5	13.9
Rubber & plastic products	8.5	5.2	13.7
Non-metallic & mineral products	-	9.2	9.2
Basic metals	-	0.5	0.5
Fabricated metal products except machinery & equipment	0.4	1.7	2.1
Machinery & equipment	106.4	0.7	107.1
Office, accounting, & computing machinery	7.2	2.8	10.0
Electrical machinery & apparatus	223.4	10.8	234.2
Radio, television, & communication equipment & apparatus	23.1	8.3	31.4
Medical & precision optical instruments, watches & clocks	0.9	0.8	1.7
Motor vehicles, trailers, & semi-trailers	-	258.2	258.2
Other transport equipment	-	5.3	5.3
Furniture, manufacturing not elsewhere classified	-	2.3	2.3
Total (% of total)	635.9 (64.0)	329.4 (36.0)	991.7 (100.0)

Notes: Figures may not add up to total due to rounding.
- Value of zero or close to zero.
Source: Adapted from MASTIC (2002: 135).

5. Conclusion

That export becomes more divergent in terms of its unit price the more technology-enhancing economic activity is undertaken within an economy is the primary message this study has to convey. This is indeed what Schumpeter had addressed in conjunction with his “creative destruction” thesis. From this perspective, East Asia’s export-led industrialization has been attained through “trade divergence” underpinned by a generally high level of manufacturing flexibility. This study though obviously remain preliminary in both stage and orientation. A formal statistical test of the claimed hypothesis would be required to this effect.

By way of concluding this paper, it must be stressed that just as an isolated individual could hardly stay alive in the society, isolated nation states, cannot attain higher degrees of prosperity. Cooperation therefore must come in, which depends on two things: First, individuals must be free to develop their particular gifts. This is called specialization. Second, these specialized functions must be integrated optimally in an institutionalized process. As an East Asia-wide FTA is expected to facilitate “divergent” export-led industrialization through enhanced knowledge interaction, this dynamic or “divergent” impact that knowledge creation could exert should come to the fore of relevant policy arguments, together with static consideration of trade creation and diversion. Last but not the least, FTAs in East Asia and elsewhere should not imprison member states’ potentials in predefined roles and statuses, but should instead incubate “community spirit”, with which the humans, not the states, can achieve higher satisfaction levels.

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