The ECFA and Its Effect on Cross-Strait Trade and Investment: A Taiwanese Perspective

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Abstract

To come to terms with the realization of ASEAN+1, Taiwan had concluded with China a special free trade agreement (FTA), the Economic Cooperation Framework Agreement (ECFA) in June 2010. This framework agreement provides an early harvest agreement of near-term tariff elimination, including detailed product schedules for goods and services from each side, with the final shape of fuller trade liberalization in goods and services taking years to negotiate and realize. The conclusion of the ECFA has been considered as a major breakthrough in cross-strait talks and economic relationships, even though it is by no means free from controversies inside Taiwan. The authors are therefore motivated by hot debates in Taiwan to reflect on the trade effect of the ECFA by taking into account the factor of cross-strait global production networks (GPNs). In particular, we examine with a proposed model and statistical robustness, the trend of Taiwan-based firms' localization in China, driven in part by constant movements in GPNs, which generates complicated and dynamic relationships between Taiwan's investment-induced trade and structural shift in Taiwan's exports to China. Based on our empirical findings, we reflect on the conventional views on the trade effect of the FTA. The results of our analyses tend to support a cautious view about the trade effect of the ECFA. Without denying the significance of the ECFA and deepening cross-strait economic relationships, we argue that the impact of the FCFA should be interpreted in a wider context than just the trade perspective, as the conventional wisdom and the existing evaluations suggested.

Keywords: Economic Cooperation Framework Agreement (ECFA), free trade agreement (FTA), trade creation, global production network (GPN), localization of offshore subsidiaries

1. Introduction

The global financial crisis bursting out in September 2008 was overwhelming. Because of its substantial integration with the global economy, Taiwan was severely hit. Since the third quarter of 2008, Taiwan had experienced economic slump for five quarters in a row, leading to an unprecedented -1.91% growth rate for the whole year of 2009. Compared to South Korea, Taiwan had suffered more from the economic downturn, with a negative economic growth rate twice that of Korea on a quarterly basis. This might have something to do with a swift and deep depreciation of Korean Won at the very beginning of the financial storm, but more importantly with their differences in economic structure[1]. In addition, since a high portion of Taiwan's exports to China is bound for other markets, global demand for China's finished products plummeted during the financial crisis, hence substantially reduced Taiwanese exports by more than 40 percent year on year in that gloomy period of time. However, the fourth quarter of 2009 witnessed a strong bounce-back with a growth rate of 9.24%. Afterwards, Taiwan has been on the track of escalating economic recovery, registering an impressive growth rate as high as more than 10% in 2010 (see Figure 1 for details).

Soon after the eruption of the global financial crisis, the Taiwanese government introduced various stimulus and financial stabilization policies, covering a few aspects. For example, besides fiscal policy to expand public infrastructure, a 3,600 NTD per person consumption voucher[2] was introduced prior to the Chinese New Year of 2009, with an aim to stimulate domestic demand. Employment policy was geared to short term employment programs and vocational training to help the unemployed upgrade their job skills.

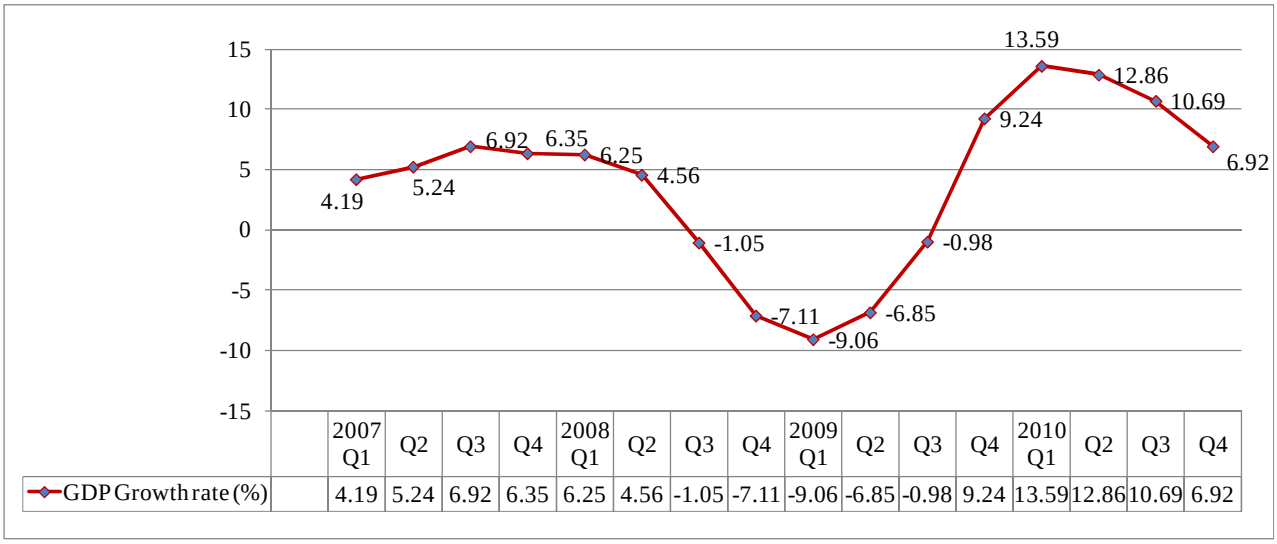
In addition, as part of the effort to weather the financial storm, the Taiwanese government took initiative to overhaul its economic policies towards China. As a result, such new initiatives as cross-strait cooperation in industrial standards, the Building Bridges Project for industrial cooperation, the ECFA (Economic Cooperation Framework Agreement) and the deregulation of Chinese investment in Taiwan have been launched mainly from the Taiwan side and met with some positive responses from

[1] In our opinion, an important reason why Korea had suffered less during the financial crisis is related to Korea' s more diversified structure of manufacturing GDP and exports (Chen, Wen and Liu, 2011).

[2] According to Council for Economic Planning and Development (CEDP), the implementation of consumption voucher had helped stimulate GDP by 0.28-0.43% in 2009.

China.

Of particular note is the ECFA, which is a special free trade agreement (FTA) between Taiwan and China, concluded in June 2010 and came into effect in January 2011. This framework agreement provides an early harvest agreement of near-term tariff elimination, including detailed product schedules for goods and services from each side, with the final shape of fuller trade liberalization in goods and services taking years to negotiate and realize. The conclusion of the ECFA has been considered as a major breakthrough in cross-strait talks and economic relationships, even though it is by no means free from controversies inside Taiwan. For domestic dialogue, the ECFA is considered as a means to offset the negative impact of ASEAN+1 on Taiwan's economy. It is also meant for Taiwan to come to terms with China's growing economic strengths. Nonetheless, how the ECFA will incur benefits and impacts to Taiwan is still an issue drawing both domestic and international attention.



	2007 Q1	Q2	Q3	Q4	2008 Q1	Q2	Q3	Q4	2009 Q1	Q2	Q3	Q4	2010 Q1	Q2	Q3	Q4
GDP Growth rate (%)	4.19	5.24	6.92	6.35	6.25	4.56	-1.05	-7.11	-9.06	-6.85	-0.98	9.24	13.59	12.86	10.69	6.92

Source: CEPD.

Figure 1 Taiwan's GDP Growth Rates: 2007-2010 (by Quarter)

It is well-documented that FTAs can generate positive trade creation effect for the parties directly involved due to a mutually preferential reduction in tariff rates and trade barriers. There is also trade diversion effect, often assumed negative in welfare terms because a free trade area diverts trade, away from a more efficient supplier outside the FTA, towards a less efficient supplier within the FTA. Underlying such conventional wisdom is an implicit assumption that an FTA enables firms in one party not to get

engaged in tariff-jumping (or trade barrier-jumping) outward investment to the FTA partner. Such arguments have been used to promote the ECFA and evaluate its effects.

So far it is too early to systematically examine the real effect of the ECFA, but the authors are motivated by hot debates in Taiwan to reflect on the trade effect of the ECFA by taking into account the factor of cross-strait global production networks (GPNs; Chen, 2004; Ernst, 2006; UNCTAD, 2005). In particular, we examine the trend of Taiwan-based firms' localization in China, driven in part by constant movements in GPNs, which generates complicated and dynamic relationships between Taiwan's investment-induced trade and structural shift in Taiwan's exports to China.

The results of our analyses tend to support a cautious view about the trade effect of the ECFA. However, it is by no means our intention to play down the significance of the ECFA as well as deepening cross-strait economic relationships. Instead, we tend to take the position that it should be interpreted in a wider context than just the trade perspective, as the conventional wisdom and the existing evaluations suggested.

The paper is structured as follows. Section 2 discusses changing cross-strait economic relationships and the ECFA to set the context for further analyses. In Section 3, the existing and available evaluations of the impact of the ECFA are examined to highlight the dominant views on the trade effect of the ECFA. Section 4 and Section 5 form the core of our empirical inquiries into the complex relationships between cross-strait trade and the localization of Taiwan-based firms in China, which have been subject to benign neglect in the existing evaluation of the ECFA. In particular, we propose and examine a model with statistical robustness to highlight factors underlying the localization of Taiwan-based firms in China. In Section, based on our empirical findings, we reflect on the dominant views on the trade effect of the ECFA, with further implication on the conventional wisdom about the trade effect of FTAs. Section 7 concludes the paper.

2. Changing Cross-Strait Economic Relationships and the ECFA

Despite long-standing political tensions, economic interactions between Taiwan and China have been intensified over last few decades. This has been driven to a great extent by Taiwanese outward investment to China, which has further stimulated Taiwan's exports to China. Both economies have been members of the World Trade Organization (WTO) since early 2000s, which has helped intensify cross-strait investments and trade, despite not in a WTO-compliance way.

Year 2008 marked a turning point of cross-strait relationships in both economic and political terms. The Taiwanese government took initiative to ease the political tensions and strengthen cross-strait economic links. Through a series of talks on a semiofficial platform, direct transport links, Chinese tourists' visits to Taiwan, inbound investment from China etc. have been realized.

In addition, such new initiatives as cross-strait cooperation in industrial standards, the Building Bridges Project for industrial collaboration have been launched mainly from the Taiwan side and met with some positive responses from China. The Building Bridges Project has gained momentum through platforms established for a few industrial sectors, on which constructive dialogues between the two sides of the Taiwan Strait have taken place. In addition, the initiative to promote cross-strait cooperation in industrial standards has continued for several years. This effort coincides with China's widely-publicized strategies to promote indigenous innovation and industrial standards. A few areas have been identified as the priority themes for cross-strait cooperation in industrial standards, with mutual consensus of going beyond dialogues and standard harmonization.

The cross-strait talks on the signing of the ECFA began to gather momentum when ASEAN+1 was about to take complete shape and Taiwan's economy was overwhelmed by the storm of the global financial crisis. In the end, both sides successfully concluded the framework agreement in June 2010 in Chongqing, bringing about an institutionalized mechanism of cross-strait economic liberalization. On a different track, ad hoc meetings that often conclude with MOUs (Memorandum of Understandings) also have made progress on cross-strait economic relationships in a piece-by-piece manner.

The ECFA, as a framework agreement, is a preface to a full-fledged FTA arrangement, with an Early Harvest Program for both Trade in Goods and Trade in Services[3] as the main down payment for both sides. Like most of the FTAs in the world, the scope of the ECFA includes tariff reduction, elimination of non-tariff trade barriers, investment liberalization and facilitation, and economic cooperation in such areas as IPR (intellectual property right) protection, finance, industrial development,

[3] The Early Harvest List for Taiwan's exports to China includes 539 items of products, eight services, and three financial sectors. The China's list for its exports to Taiwan covers 268 items of products, eight service industries, and one financial sector.

e-commerce and so on.

3. The Existing Evaluations of the Impact of the ECFA

So far, there are only a limited number of analyses on the impact of the ECFA on cross-strait economic relationships[4] (CIER, 2009; Rosen and Wang, 2011), which can at most capture the economic welfare incurred from a trade perspective.

In 2009, Chung-Hua Institution for Economic Research (CIER, 2009), a think tank in Taipei, produced the first ever report on the impact of the ECFA on Taiwan's economy. The CIER team employed Global Trade Analysis Project (GTAP) Model, which has been commonly used to analyze the impact of FTAs. Table 1 presents the simulation result of the CIER report. On balance, taking into the dynamic effect of new capital accumulation, cross-strait trade liberalization was estimated to eventually increase Taiwan's GDP by 1.65% to 1.72%. GDP will increase approximately by US$6.9 billion to US$7.1 billion, bringing about a positive effect on almost all of the major trade and welfare indicators.

More recently, Rosen and Wang (2011) have produced another analysis on the impact of the ECFA, based on a global recursive dynamic computable general equilibrium (CGE) model. They considered ASEAN+1 as the baseline for their simulations due to its negative impacts to Taiwan (Kawai and Wignaraja, 2008), and then took into account different scenarios, as shown in column headings of Table 2. Above all, Rosen and Wang's (2011) estimation suggested that for the trade liberalization effect of the ECFA to sink in by 2020, Taiwan's GDP would be on the order of 4.4% higher than the scenario of baseline, enabling Taiwan to offset the negative impact of ASEAN+1, and bringing about an increase of GDP by US$21 billion in the price of 2004.

However, a bizarre and counter-intuitive result from both of the studies is about the substantial negative impact on the electronic industry. Both economies are actually party to the WTO Information Technology Agreement (ITA), stipulating free trade (zero tariffs) in components and products related to electronics, computing, and other industries, which have formed a substantial part of the cross-strait economic relationship. Even those items in this broadly-defined sector outside the ITA product list are generally subject to low tariff rates. It therefore makes little sense for the electronic

[4] Some of which may be kept confidential.

industry to be seriously adversely affected by the ECFA. In response, the CIER team admits that this has much to do with the intrinsic nature of their model[5,] while Rosen and Wang (2011: 89) owe their explanations to the hastening migration of Taiwan-based electronic sector to China, even though their model does not allow them to capture such effects.

On balance, the studies mentioned above are both based on a general equilibrium approach to evaluate the impact of the ECFA from a trade perspective. Their results tend to reflect the economic welfares affected by the changes in trade regime on both sides via trade creation and trade diversion effects. How well can their results stand up to empirical scrutiny? This can be examined with reference to some distinct factors in the context of the current cross-strait industrial interactions, continuously shaped by intertwined cross-strait trade and investment relationships and industrial policy; an issue to be discussed below.

[5] Technically speaking, the CIER model makes the assumption of full employment and fixed endowment, hence other sectors would benefit from the ECFA at the expense of the current dominant electronic industry.

Table 1 CIER: The Impact of Cross-Strait Trade Liberalization

Item \ Scenario	Scenario 1	Scenario 2
GDP (%)	1.65	1.72
Exports (%)	4.87	4.99
Imports (%)	6.95	7.07
Trade condition (%)	1.42	1.41
Social welfare (US$ million)	7,710.90	7,771.00
Trade balance (US$ million)	1,757.90	1,779.40
Total production (US$ million)	28,004.73	28,884.20

Source: Adapted from CIER (2009).

Scenario 1: Maintain current restrictions on agriculture and industry sectors, liberalize items now open to import, and have zero tariff for all Chinese goods.

Scenario 2: Maintain import restrictions and do not reduce tariffs in the agricultures sector; eliminate tariffs and fully liberalize import of industrial items.

Table 2 Rosen and Wang: The Impact of the ECFA

(Billions of 2004 US dollars and percent)

	ECFA				No ECFA, ASEAN+3				ECFA, ASEAN+3			
	Taiwan		China		Taiwan		China		Taiwan		China	
Trade balance	-9.5		6.4		0		20.8		-9.30		26.50	
Exports	26.3	(6.3)	38.8	(1.7)	-4.5	(-1.1)	71.5	(3.1)	21.00	(5.1)	109.10	(4.7)
Imports	35.8	(11.0)	32.4	(1.9)	-4.5	(-1.4)	50.7	(3.0)	30.30	(9.3)	82.60	(4.8)
Terms of trade (percent)	3.83		0.16		-0.42		0.15		3.33		0.34	
Absorption	15.30	(3.9)	4.20	(0.1)	-2.70	(-0.7)	17.90	(0.3)	12.10	(3.1)	23.90	(0.5)

Note: Numbers may not tally due to rounding. Numbers in parentheses represent percent change.

Source: Adapted from Rosen and Wang (2011).

4. Cross-Strait Trade and the Localization of Taiwan-Based Firms in China

Taiwan has been among major inward investors in China, and China as a destination has nowadays accounted for a lion's share of Taiwan's outward investment. In particular, referring to Figure 2, both Electronic Parts and Components Manufacturing and Computers, Electronic and Optical Products Manufacturing, which are mainly ICT-related have recently accounted for more than 40 percent of Taiwan's annual outward manufacturing investment to China. As a result, China has become an important offshore production site for Taiwan-based PC and notebook computer firms, having significantly outweighed the latter's domestic production since 2002. Of note is the fact that despite a growing strength of China's domestic demand, the Taiwanese subsidiaries' operations there used to mostly serve the international end market (Chen and Chen, 1998; Makino, Lau and Yeh, 2002), only recently have become local market-oriented.

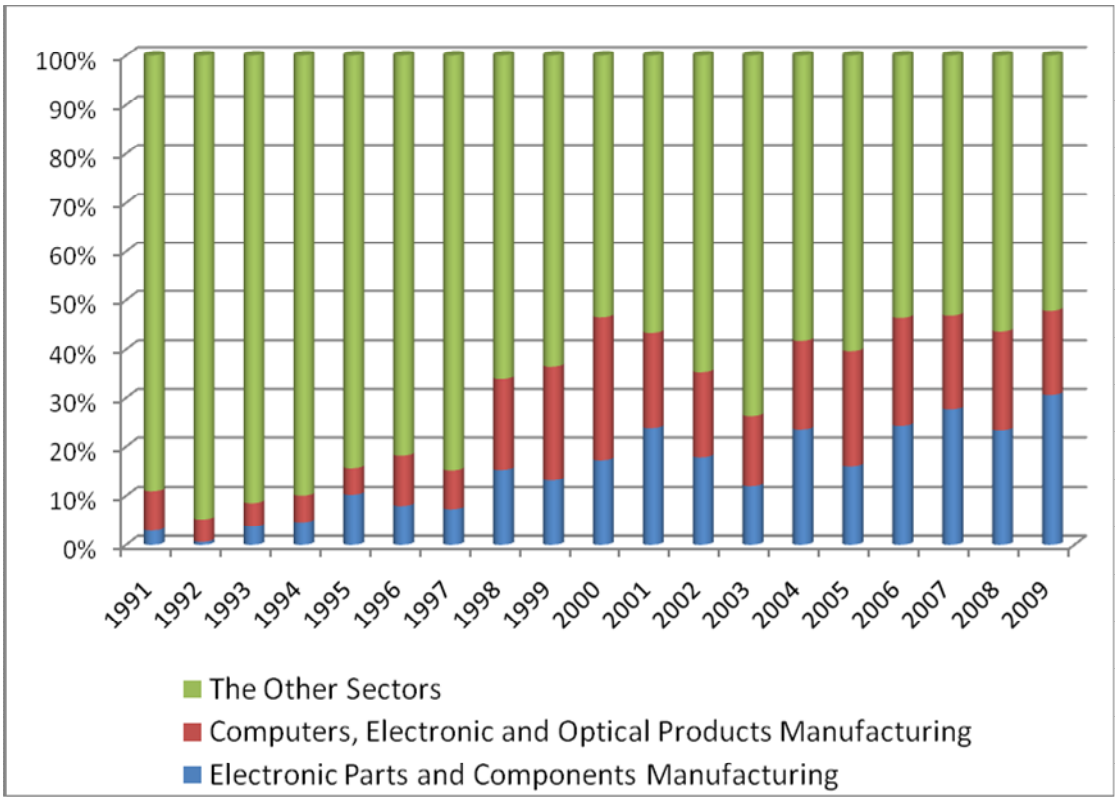
Against this backdrop, a characteristic feature of cross-strait economic relationship is investment-induced trade, from Taiwanese perspective (Liu, 2004), continuously shaping the structure of Taiwan's exports to China over time. As a typical example, in their outreach to China, Taiwan-based ICT manufacturers have widely adopted the approach of "receiving orders in Taiwan, shipping manufactured goods from China". Some of them have even developed a new cross-strait division of labor along the line of pilot run vs. mass production. To the extreme, this can lead to the delinking of R&D and manufacturing/commercialization in terms of location. What's more, there has been an increasing divergence between the value of purchase orders received and that of actual exports in the ICT sector, measured by the Deviation Ratio of Exports to Export Orders[6] (Chen and Liu, 2004), indicating a significant ratio of offshore production by the Taiwan-based OEM/ODM firms. As a result, the main item among Taiwan's ICT exports to China was initially final goods, which began to give way to general producer goods in early 1990s. Ever since the late 1990s, high-end producer goods have replaced general producer goods, currently becoming the major item of Taiwan's ICT exports to China (Liu, 2004)[7]. In other words, Taiwan's ICT exports nowadays is highly

[6] The Deviation Ratio of Exports to Export Orders is defined as (value of purchase order-value of exports)/value of purchase order.

[7] This classification (namely high-end producer goods, general producer goods and final goods) was

concentrated in the high-end intermediate goods (mainly semiconductors and LCD panels), rather than the ICT end products, which coincides with the fact that around 70% of Taiwan's overall exports is related to intermediate goods[8].

Figure 3 presents the Deviation Ratio of Exports to Export Orders for Taiwan's overall exports over 2007-2010 period. In general, the Deviation Ratio is on a steadily increasing trend, reaching above 32% for year 2010 as a whole. A closer look at a few selected sectors (see Figure 4) indicates a higher Deviation Ratio and for such sectors as information and communication products (86.0% in 2010), electrical machinery products (45.8%) and precision instruments (35.6%).



Source: Investment Commission (http://www.moeaic.gov.tw/); compiled by the authors.

Figure 2 Share of Taiwan's Approved Manufacturing Outward Investment to China, by Sector

On the one hand, the above-mentioned structural shift in Taiwan's exports to China may signify increasing "localization" of Taiwan's ICT industry as well as some other

reported in Hatzichronoglou (1997) and used by Liu (2004) to examine the structure of Taiwan's exports to China

[8] As a matter of fact, even such brand new products as Wii, Xbox, iPhone, iPad nowadays are mostly made/assembled in China and/or Southeast Asia, because mainly of manufacturing offshoring by the Taiwan-based ICT OEM/ODM firms.

sectors in China over time, in line with the formation of GPN (Ernst, 2006), a production scheme where various stages of a manufacturing process are undertaken at different geographic locations where they can be carried out most efficiently (UNCTAD, 2005). On the other hand, the outreach of Taiwanese-based firms to China, those in the ICT sector in particular, tends to have been characterized by "defensive-type outward investment" that has mainly involved relocating the domestic supply chain to the host economy. A downside of this approach is that domestic production will be steadily replaced by offshore production.

In addition, a problem with Taiwan's overconcentration on intermediate goods in terms of exports and domestic production is related to the Bullwhip effect (Lee, Padmanabhan and Whang, 1997). This effect refers to the amplified variations between demand and inventory as one moves upstream in the supply chain, further from the customer. Due to this overconcentration on the ICT sector, Taiwan may become particularly vulnerable to the downturn of the global economy. This has proven to be the case during the recent global financial crisis.

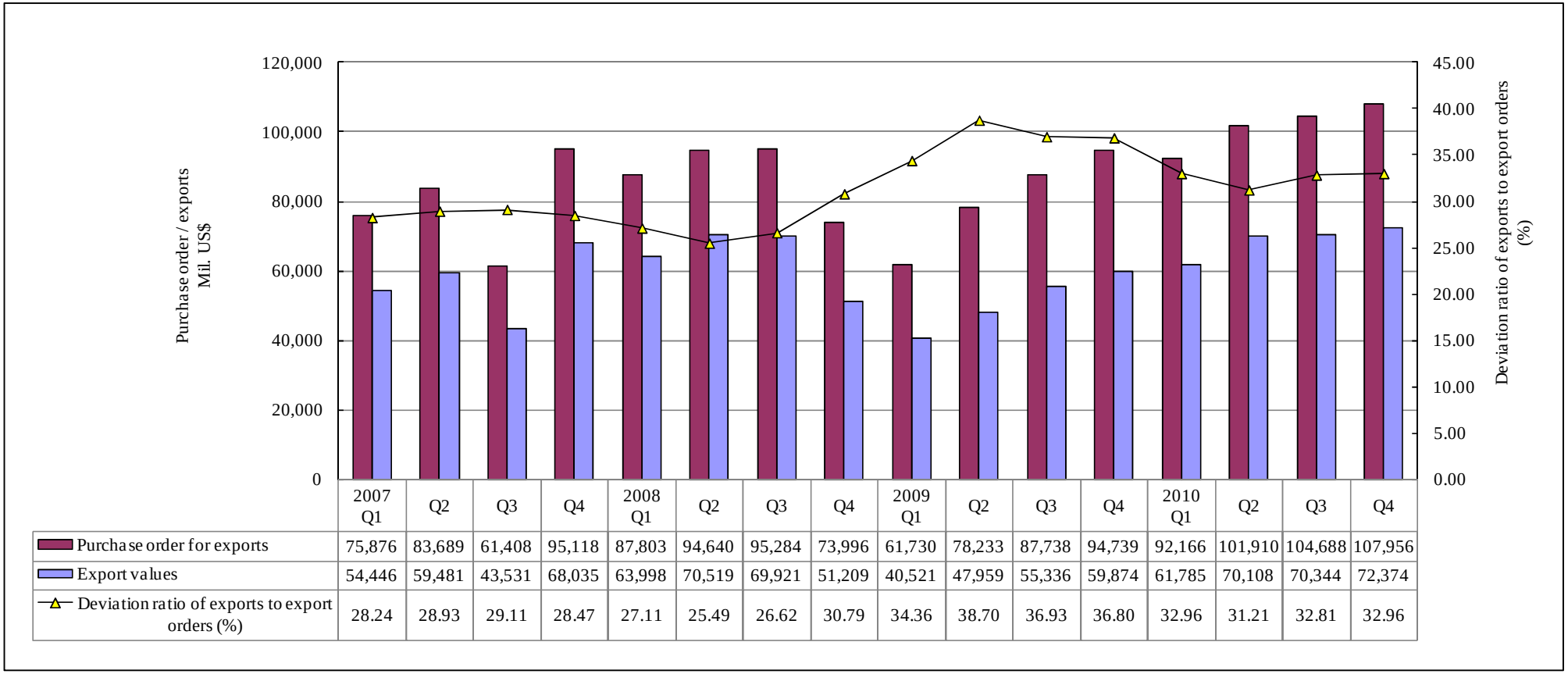
Another aspect of increasing localization of Taiwanese industry in China is related to the operation of their Chinese subsidiaries. Taking data from the Investment Commission at the Ministry of Economic Affairs (MOEA), we can examine this issue from different facets. Table 3 reports the extent of local sourcing of Taiwan-based firms in China, in terms of the procurement and/or supply of machinery, raw materials, components & parts, and semi-finished goods. On a rising trend up to 2009, local sourcing has become primarily important for the Chinese subsidiaries of Taiwan-based firms to meet their needs for machinery (60.46%) and raw materials, components & parts, and semi-finished goods (57.99%). This trend indeed echoes the above-mentioned structural shift in Taiwan's exports to China.

In addition, it is evident that Taiwan-based firms' Chinese subsidiaries have gone beyond the manufacturing value chain, increasingly involving in R&D function. As shown in Table 4, even though the parent company remains the major source of technologies and know-how needed, local R&D teams as a source in China have gained growing significance for their Chinese subsidiaries. In particular, with some of the Taiwan's ICT firms having scaled down, or even hollowed out their manufacturing operations in Taiwan, shifting them towards China and elsewhere, it may in fact become necessary for them to increasingly rely on their Chinese subsidiaries to engage in

manufacturing-related R&D (Chen, 2004).

There are even signs suggesting that Taiwan-based firms' Chinese subsidiaries may be on the trend of becoming more autonomous in terms of the scope of their functions (see Table 5; Jarillo and Martinez, 1990). As suggested by Table 5, apart from manufacturing facilities, many Taiwan-based firms have equipped their Chinese subsidiaries with such functional units as sale force units, procurement units, after sale units, R&D and design units. Some of which may even be able to pursue "autonomous" strategy in a relatively independent manner. This phenomenon can have profound implications for the operational and hierarchical relationships within Taiwan-based firms' cross-strait corporate networks. To the extreme, fertile ground provided by China's massive market may furnish the Chinese subsidiaries with strengths to challenge the traditional hierarchical notion of "superior and central home" versus "inferior and periphery overseas" in terms of capability and organizational control. Such developments cannot be neglected when one takes a closer look at the impact of the ECFA; a point to be discussed later.

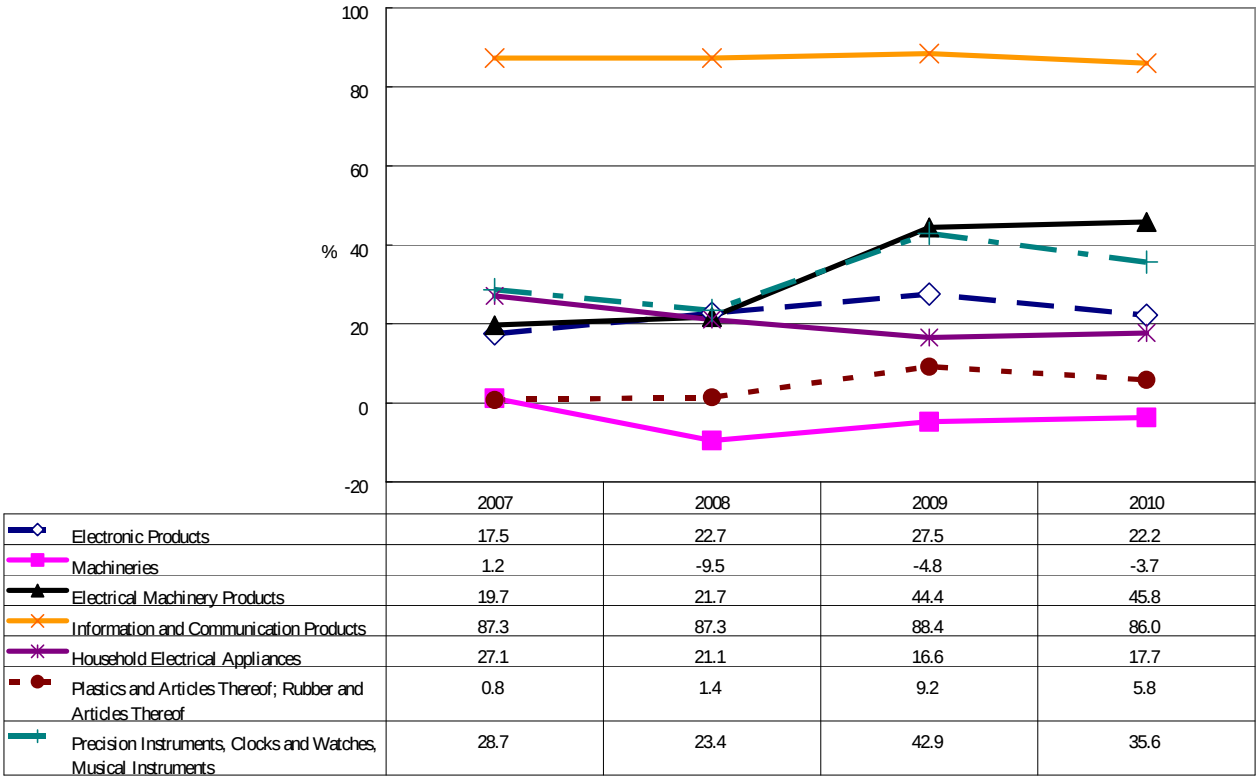
China has gone beyond a manufacturing powerhouse, and is intentionally marching towards becoming a regional technological superpower (Sigurdson, 2005). This quest for technological leadership is often associated with championing the value of indigenous innovations and industrial standards (Suttmeier and Yao, 2004). In fact, the recently released 12th Five-Year Plan may mark a significant turning point of China's strategy for economic development. Such new strategies as structural transformation, indigenous innovations and industrial standards, inclusive growth, urbanization have been put top on policy agenda.



	2007 Q1	Q2	Q3	Q4	2008 Q1	Q2	Q3	Q4	2009 Q1	Q2	Q3	Q4	2010 Q1	Q2	Q3	Q4
Purchase order for exports	75,876	83,689	61,408	95,118	87,803	94,640	95,284	73,996	61,730	78,233	87,738	94,739	92,166	101,910	104,688	107,956
Export values	54,446	59,481	43,531	68,035	63,998	70,519	69,921	51,209	40,521	47,959	55,336	59,874	61,785	70,108	70,344	72,374
Deviation ratio of exports to export orders (%)	28.24	28.93	29.11	28.47	27.11	25.49	26.62	30.79	34.36	38.70	36.93	36.80	32.96	31.21	32.81	32.96

Source: The authors' calculation based on official statistics of the MOEA.

Figure 3 The Trend of Taiwan's Export and Purchase Orders Values and the Deviation Ratio



	2007	2008	2009	2010
Electronic Products	17.5	22.7	27.5	22.2
Machineries	1.2	-9.5	-4.8	-3.7
Electrical Machinery Products	19.7	21.7	44.4	45.8
Information and Communication Products	87.3	87.3	88.4	86.0
Household Electrical Appliances	27.1	21.1	16.6	17.7
Plastics and Articles Thereof; Rubber and Articles Thereof	0.8	1.4	9.2	5.8
Precision Instruments, Clocks and Watches, Musical Instruments	28.7	23.4	42.9	35.6

Source: The authors' calculation based on official statistics of the MOEA.

Figure 4 The Deviation Ratio of Exports to Export Orders for Selected Sectors in Taiwan

Table 3 The Extent of Local Sourcing of Taiwan-Based Firms in China

Unit: %

Source of Procurement of Their Chinese Subsidiaries		2007 (#299)	2008 (#426)	2009 (#694)
Machinery, raw materials, components & parts, semi-finished goods	From Taiwan	32.69	-	-
	Local sourcing	51.22	-	-
	From others	16.08	-	-
Machinery	From Taiwan	-	29.88	25.35
	Local sourcing	-	54.96	60.46
	From others	-	15.17	14.19
Raw materials, components & parts, semi-finished goods	From Taiwan	-	31.03	30.15

Source of Procurement of Their Chinese Subsidiaries		2007 (#299)	2008 (#426)	2009 (#694)
	Local sourcing	-	57.65	57.99
	From others	-	11.32	11.86

Note: Numbers in parentheses refer to the number of the respondents.
Source: Investment Commission, "Survey on Overseas Investment by Taiwan-based MNCs", 2008-2010.

Table 4 The Extent of R&D Localization of Taiwan-Based Firms in China

Unit: %

Source of Technologies & Know-How of Their Chinese Subsidiaries	2007 (#374)	2008 (#602)	2009 (#690)
The parent company	86.38	85.55	86.52
Local R&D teams in China	28.61	32.06	30.73
R&D institutes in Taiwan	9.81	11.30	8.70
Technology transfer from Taiwan-based OEM/ODM vendors	7.08	6.31	5.51
Local R&D institutes in China	2.18	2.99	3.91
Technology licensing from third party of firm	3.54	3.32	3.77
Local partners in China	2.45	3.32	2.75
Technology transfer from local OEM/ODM vendors in China	1.91	2.33	2.46
Local procurement of technology in China	1.63	1.50	1.30

Note: Number in parentheses refer to the number of the respondents.
Source: Investment Commission, "Survey on Overseas Investment by Taiwan-based MNCs", 2008-2010.

Table 5 Functional Diversification of Taiwan-Based Firms' Chinese Subsidiaries

Unit: %

Functional Units Equipped in Their Chinese Subsidiaries	2007 (#336)	2008 (#571)	2009 (#688)
Manufacturing facilities	77.98	76.01	72.67
Sale force units	54.46	51.49	50.58
Quality control units	50.89	52.19	39.39
Procurement units	44.94	46.23	37.65
After sale units	48.21	50.79	35.90
R&D, design units	24.40	26.62	26.89
Financial management units	24.11	28.20	26.74
Headquarters	8.04	9.11	12.21

Note: Number in parentheses refer to the number of the respondents.
Source: Investment Commission, "Survey on Overseas Investment by Taiwan-based MNCs", 2008-2010.

Within the framework of the 12th Five-Year Plan, China has also unveiled its plan to promote designated emerging industries, including green technologies, next-generation ICTs, biotechnology, new energy, new materials, new energy vehicles, and advanced manufacturing. In our opinion, innovation in China is a fast moving target, with changing faces and variety. Even at the onset of economic reform, China's economic take-off did not start from the scratch, hence with a great potential of leapfrogging (Brezis, Krugman and Tsiddon, 1993). In particular, the Chinese science and technology system formerly placed relatively great emphasis on basic research and the development of sophisticated technologies, partly because of the defense race and China's self-dependence strategy in the Cold War period. This together with speedy economic development and such a strategy as that of "market for technology" over the last three decades may facilitate China becoming a fertile ground for innovation. The fruit of China's economic development so far also has enabled some proportion of the Chinese population to consume state-of-the-art products and services. This may help to

explain China's fast surge in high-speed railway in deployment and challenging technological frontiers, even with an intention to export. In addition, unlike its Asian preceding economies, for example South Korea, Singapore and Taiwan, China is definitely not dwarfed by the size of market, at least in terms of market potentials. Even China's severe uneven development in both spatial and social terms can be leveraged to generate Bottom of the Pyramid (BOP) Innovation (Prahalad, 2005) and "good enough" innovation" (Christensen, Craig and Hart, 2001; Gadiesh, Leung and Vestring, 2007; Chen, Wen and Tai, 2011).

In cultivating the emerging industries, the Chinese government intends to promote a few national champions with various measures to enter into the new frontiers, with only few steps behind those in the advanced economies. Apart from technology development programs, the Chinese government also orchestrates demonstration projects in selected areas and in designated locations, providing with initial market opportunity, in order to facilitate the formation of indigenous innovation solutions and industrial standards.

Since Taiwan also looks to the similar fields for emerging industries, for example, electric vehicles, cloud computing, biotechnology, and green energy, both economies are somehow at similar starting points in pursuing industrial upgrading. This situation is quite different from the current mode of cross-strait economic interactions, under which Taiwan enjoys head-start and even technological lead. As a result, it will become less likely for Taiwan to take advantage of the investment-induced trade to engage with China in the course of developing the emerging industries.

5. The Determinants of Taiwan-based Firms' Localization in China

Following the discussions in the previous section, the authors would like to go further to examine the factor underlying the localization of Taiwan-based firms in China.

The Model

There are grounds for suggesting that foreign-owned subsidiaries with a greater extent of local market orientation tend to be characterized by a greater degree of localization in terms of their sourcing of both production materials and capital goods

(machinery) (Jarillo and Martinez, 1990; Liu and Chen, 2005; Pagestu et al., 1992; Supapol, 1995). Even nowadays quite a number of Taiwan-based firms have given R&D mandates to their subsidiaries in China (Chen, 2004). Within the process, the operations of Taiwan-based firms in China have shown a growing trend towards localization, and more recently moving from export orientation towards local market orientation.

The study focuses on the local dependency of Taiwan-based firms' affiliates, in terms of their supply chains connecting with the industrial capabilities in China. LMPR is the local material procurement ratio, measured by the portion of locally purchased materials to all purchased materials. ***LMPR*** is meant to measure the Chinese subsidiaries' supply chain localization. The variable LCMR refer to a Chinese affiliate's localization in production technology and access to the industrial capability. A host economy's sound and comprehensive industrial infrastructure, in terms of vertical industrial linkage, may attract foreign affiliates to adopt local production technologies in order to effectively interact with the local suppliers of capital goods for innovation.

As suggested, foreign affiliates with greater local sales orientation tend to have higher reliance on local inputs. This is because foreign affiliates with high local sales orientation are likely to have a strong linkage with local firms in terms of not only sales but also procurement of inputs. In this paper, the share of local sales in total sales of foreign affiliates, ***LMR***, is included to capture the importance of local market orientation for the determination of input sourcing. We hypothesize that the share of local sales is positively related to the degree of local supply linkages, in terms of both ***LMPR*** and ***LCMR***.

A subsidiary's mandates have something to with its functional role within the MNC's global business network. The scope of a subsidiary's operations and organizational functions is related substantially to its tasks assigned, purely local or for certain activities beyond its local undertakings. Some subsidiaries may be equipped a global product mandate for certain activities (Birkinshaw, 1996) or become centers of excellence for the entire MNC (Holm and Pedersen, 2000), thereby obtaining responsibilities well beyond their local activities.

However, the role and organizational structure of a foreign subsidiary arguably has much to do with such factors as markets served, products manufactured, technologies owned, functional areas covered or their combination (Birkinshaw, 2000). Liu and Chen's (2005) have presented empirical evidence in line with the evolutionary process

of foreign affiliates in upgrading their strategic roles within their parents' global production networks. Also, according to Ferdows (1997), foreign affiliates can enjoy greater authority over procurement, production planning, process change, outbound logistics, product customization, and redesign decisions, as their mandates are upgraded from an offshore factory, or a server factory, to a source or contributor factory. It is therefore reasonable to argue that foreign affiliates with a more comprehensive coverage of the value chain scope may reflect the upgrading of their mandates in the business groups in terms of their localization and integration strategies.

Birkinshaw, Hood and Young (2005) pioneered an approach to depict a subsidiary's upgrading and mandate by measuring its value-added scope in terms of the number of different functional activities they were engaged in. The extent of the value-added scope ranges from manufacturing only, through to entire value chain (R&D, purchasing, manufacturing, sales, service). Following Birkinshaw et al. (2005), we define *SCPE* to reflect the degree of the Chinese subsidiaries' autonomy. In doing so, we refer to seven value-added functions: production manufacturing, marketing, quality management, after-sale service, purchasing office, R&D, and financing. As *SCPE* is 1, the subsidiary has only one value-added function. As *SCPE* is seven, the subsidiary has a comprehensive mandate with the seven kinds of value-added functions.

Moreover, we examine the effect of the Chinese affiliates with regional headquarters status (***DHQ***) on their local procurements. Headquarters are usually located in areas with business services and proximity to other headquarters because of economies of scale in the provision of business services. In addition, the location of headquarters is related to externalities among headquarters due to face-to-face interactions. Headquarters can enjoy the benefits from diversified business service inputs and from the informal information exchange due to close geographical proximity (Strauss-Kahn and Vives, 2009). The regional headquarters of global suppliers, typically the site of regional sales, program management, design, and engineering, have gravitated together in industrial clusters. The headquarters location of the important suppliers in the region usually includes regional headquarters for some MNCs (Sturgeon, Van Biesebroeck and Gereffi, 2008). Accordingly, we presume Taiwan-based affiliates' regional headquarters (***DHQ***) in China to generate the positive effects on local procurements on intermediate and capital goods.

The purpose of our empirical analysis is to examine the effect of local

market-orientation on the localization of supply chain by Taiwan-based firms' Chinese subsidiaries, in terms of both machinery, and material and parts purchased. In the equations (1), the left hand side variables, ***LMPR*** and ***LCMR***, are the portions of local raw material and components to total intermediate inputs, and the ratio of locally purchased machinery to total purchased machinery. On the right hand side of equations (1), variables ***LMR***, ***SCPE***, ***DHQ***, and ***DYR*** are considered. Based on the preceding discussions, the study derives a set of regressions for the Chinese subsidiaries with the equation defined as follows:

$$LCMR = \alpha_0 + \alpha_1 LMR + \alpha_2 SCPE + \alpha_3 DHQ + \alpha_4 DYR, \quad (1a)$$

$$LMPR = \beta_0 + \beta_1 LMR + \beta_2 SCPE + \beta_3 DHQ + \beta_4 DYR, \quad (1b)$$

LMR is the ratio of local sales to total sales in percentage terms; *SCPE* refers to the scope of the Chinese subsidiaries' functions; *DHQ* denotes the Chinese subsidiaries' mandates as regional headquarters; *DYR,* a dummy variable, denotes the year of surveyed data.

Data Source and Estimation Approach

The data were collected from the Investment Commission, MOEA, Taiwan, over the period of 2009-2010. After missing values were deleted, the available data was pooled together to form our sample. Appendix presents a summary of the descriptive statistics of these variables.

We apply the Bivariate Tobit model for estimation. We estimate the local procurement functions for intermediate inputs and capital goods by using a Bivariate Tobit model. The Bivariate specification takes into account the fact that local procurement of intermediate inputs and capital goods can be jointly determined. The Bivariate Tobit model uses the Geweke-Hajivassiliou-Keane (GHK) simulator implemented to draw random numbers for evaluation of the multi-dimensional Normal integrals in the likelihood function. For each observation, a likelihood contribution is calculated for each replication, and the simulated likelihood contribution is the average of the values derived from all the replications. The simulated likelihood function for the sample as a whole is then maximized using standard methods.

Empirical Results and Discussions

Table 6 summarizes our empirical results. The coefficients of *LMR* in both equations are positive and statistically significant at 5%. This implies that the extent of local sourcing for both materials & parts and capital goods tends to be high for the affiliates with strong local market orientation.

More importantly, as shown in Table 6, the coefficient of *SCPE* is not statistically significant in equation (1a), but positive and statistically significant in equation (1b). This implies that as the Chinese subsidiaries become more localized in terms of the coverage of their value-added functions, they tend to engage in more local sourcing in materials & components, if not capital goods. To some extents, the empirical evidence is in line with Jarillo and Martinez's (1990) findings in their analyses on different roles played by MNCs' subsidiaries in Spain. They argued that subsidiaries tended to receive stronger mandates from their headquarters if they engaged in geographical localization in terms of R&D, purchasing, manufacturing, and marketing in the host countries.

Table 6 Results of Bivariate Tobit Regression

Ratio of local materials, parts and machinery purchased by Taiwan-based subsidiaries for 2009-2010

	LCMR (%)	***LMPR*** (%)
LMR	0.18	0.15
Local sale ratio (%)	(4.51)*	(4.50)*
SCPE	-0.60	2.75
Scope of the subsidiaries' functions	(-0.78)	(4.37)*
DHQ	11.32	10.86
Regional headquarters (dummy)	(2.14)*	(2.51)*
DYR	4.93	1.54
(=1 as survey in 2010, 0 if others)	(1.54)	(0.59)
Intercept	42.53	36.13
	(10.04)*	(10.44)*
σ_1	45.37	
	(37.03)*	
σ_2	37.30	
	(38.64)*	
ρ_{12}	0.30	
	(9.32)*	
# of obs	850	
Waldχ^2 (8)	78.40*	

Note: * refers to 5% of statistical significance. Figures within parentheses denote *t*-values.

Moreover, in Table 6, the coefficients of the Chinese subsidiaries with a regional headquarters mandate (***DHQ***) has a positive and statically significant effect on the local procurements of both raw materials and capital goods. To some extent, Taiwan-based MNCs set up their regional headquarters in China, indicating that they upgrade their subsidiaries' mandates with higher autonomy. Through accessing local business services, they explore local production and technology resources. However, the coefficients of ***DYR*** don't reach 5% of statistical significance level. That indicates that the Chinese subsidiaries' localization in supply chains and capital purchased has no significant difference between two survey years.

6. A Revisit of the Trade Effect of FTA

Conventional wisdom proposes that an FTA will unleash the force of market for the FTA area as a whole, eventually bringing about positive gains for all of the economies involved. From a trade perspective, trade creation effect is the key to the welfare gain of an FTA, while trade diversion effect can bring about economic inefficiency hence welfare loss. Quite often, trade creation effect is associated with horizontal division of labor and specialization which enable the members of the FTA each to exploit economy of scale in the sector to their favor. In addition, underlying such conventional wisdom is an implicit assumption that an FTA enables firms in one party not to get engaged in tariff-jumping (or trade barrier-jumping) outward investment to the FTA partner.

However, the current economic relationships cross the Taiwan Strait do not seem to be in line with the context set by the conventional wisdom. In short, Taiwan's exports to China have been driven to quite an extent by its outward investment to China. Over time, escalating outbound investment to China has steadily changed the structure of Taiwan's exports.

In particular, due to the formation of the global production network (GPN), cross-strait trade from the Taiwanese side has been featured by investment-induced trade, leading to a decreasing share of Taiwan's exports to the advanced countries as the end market. As a result, Taiwan's exports have increasingly focused on intermediate goods, nowadays accounting for more than 70 percent of Taiwanese exports. Along with this trend, a great share of Taiwan's exports to China is not for final consumption in China but for re-export, suggesting the dominant form of cross-strait vertical division of

labor. More importantly, as the GPN functions in a way of consistently farming out to layers of specialized suppliers and to different locations, Taiwan's exports to China has over time shifted from low-end intermediate goods to high-end intermediate goods. As a result, domestic production in Taiwan will be steadily replaced by offshore production in an upstream way, with or without tariff barriers set by China.

A closer look at changes in the export structure of Taiwan's ICT sector against the backdrop of WTO's ITA can help to illustrate this point. ITA, entering into force in July 1997 stipulates free trade (zero tariffs) in major ICT products and components, which have been important to cross-strait trading and investment relationships. In 1997, the computer and related equipment (end-product) sector accounted for 48.70% of Taiwan's ICT goods exports, and reaching its all-time peak of 51.60% in 1998, while the electronic components sector (intermediate goods) accounted only for 37.12%. Since then, the computer and related equipment sector's export share had declined over time, down to the level of 15.46% in 2006. On the other hand, the electronic components sector has gained substantially its export share, reaching 61.97% in 2006, which has much to do with the burgeoning development of the IC and LCD (high-end intermediate goods) industries in Taiwan. Even with a comprehensive free trade arrangement of ITA[9], in terms of domestic production, the role played by Taiwan's ICT industry in the GPN has shifted from a key producer of end products to that of important components and parts. Following this trend, as Taiwan's domestic production and exports moves further upstream, the room for investment-induced trade may become narrower.

The reconfiguration of the cross-strait production network is also shaped in part by the government policy in China. Specifically speaking, in response to the global economic downturn, China has not only implemented a demand-stimulus package by providing subsidies to the consumption of such goods as TVs and computers, but also made deliberate procurements from the Taiwanese suppliers of LCD panels. As a result, the LCD makers in Taiwan have got out of the industrial slump. Nonetheless, having demonstrated the strength of its domestic consumption, China unveiled its plan to establish indigenous LCD production capacities, going beyond that of LCM (LCD modules). Therefore, the major players from Taiwan (ChiMei and AUO), Korea (Samsung and LGD) and Japan (Toshiba and Sony) have jumped on the bandwagon by

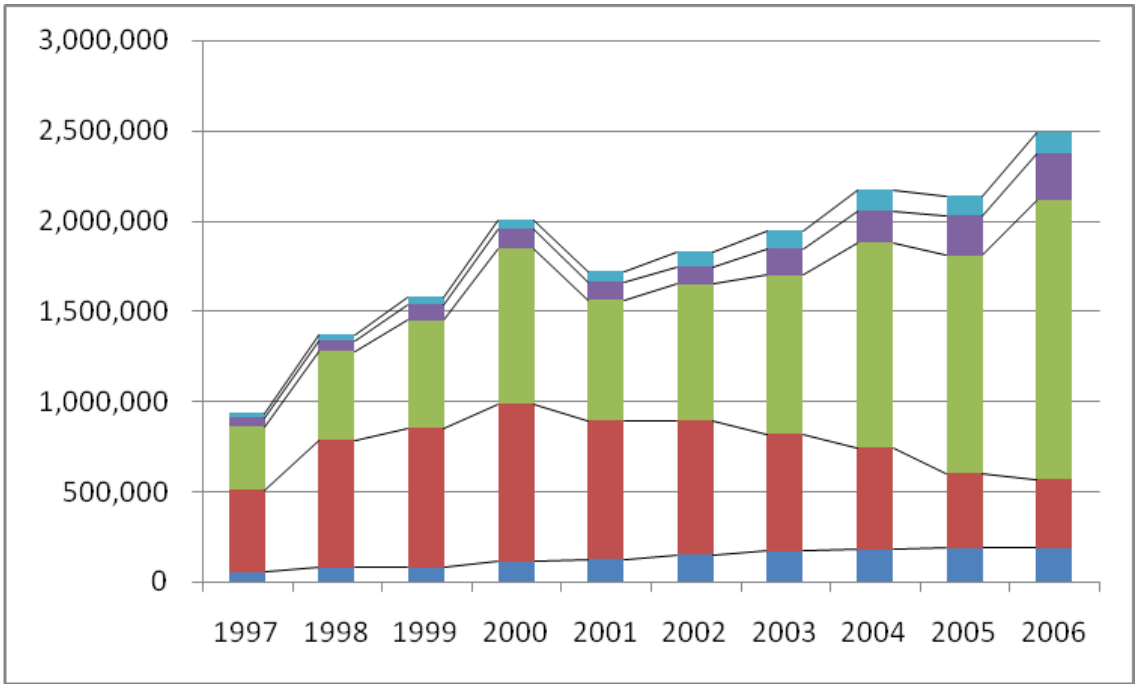
[9] ITA entered into force at that time when the participants represented approximately 90 percent of world trade in the related ICT products.

forming partnerships with Chinese TV makers. As a result, China is about to join the league of LCD producers.

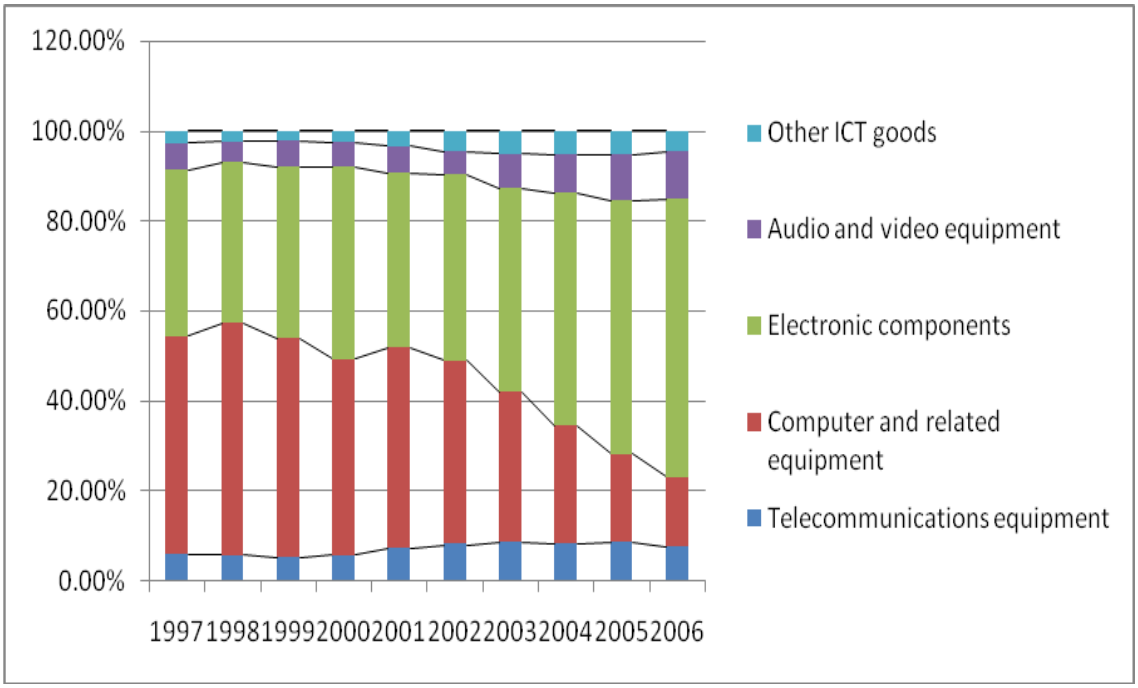
Even for the intermediate goods outside the ICT sector which form the core of Taiwan's exports to China, such as steels, petrochemicals, the Taiwanese players are increasingly facing competition from their Chinese counterparts, due in to part to China's import substitution strategy. On the other hand, Chinese exports to Taiwan are on a rising trend, which may be further fuelled by closer relationships between the two sides.

In addition, there has been a trend for Taiwan-based firms' subsidiaries in China to become localized in terms of the sourcing of components and parts, and even R&D inputs. In section 5, we have shown with statistical robustness that the extent of local sourcing for both materials & parts and capital goods tends to be high for the affiliates with strong local market orientation. In addition, as the Chinese subsidiaries of Taiwan-based firms become more localized in terms of the coverage of their value-added functions, they tend to engage in more local sourcing in materials & components, if not capital goods.

There are even signs suggesting that Taiwan-based firms' Chinese subsidiaries may be on the trend of becoming more autonomous in terms of the scope of their functions (see Section 4). This phenomenon can have profound implications for the operational and hierarchical relationships within Taiwan-based firms' cross-strait corporate networks. To the extreme, fertile ground provided by China's massive market may furnish the Chinese subsidiaries with strengths to challenge the traditional hierarchical notion of "superior and central home" versus "inferior and periphery overseas" in terms of capability and organizational control, rendering them becoming more localized in terms of local sourcing.



(A) In Terms of ICT Export Values



(B) In Terms of Ratio to ICT Exports

Source: Adapted from Chen, Wen and Liu (2011).

Figure 5 Export Structure of Taiwan's ICT Sector

In other words, when the ECFA comes in effect, there will be two forces at work that may shape cross-strait trade. On the one hand, as suggested by the conventional wisdom, trade creation effect, and even trade diversion effect, tends to function to Taiwan's favor from the trade perspective. Such effects tend to take the form of specialization along the line of horizontal division of labor. On the other hand, against the backdrop of GPNs, it is possible that Taiwan-based firms' operations and manufacturing capacities are on a constant trend of relocating to China, eventually generating a diminishing effect of investment-induced trade, as they move further upstream in Taiwan. Due to path dependence, even when the Taiwan-based firms turn to local market in China, their Chinese subsidiaries may become more localized because of accumulated strengths in local supply chain and market potential. On balance, from the Taiwanese perspective, the trade creation effect anticipated by the conventional wisdom and projected by the existing evaluations may be offset in part by the complicated and dynamic relationships between Taiwan's investment-induced trade and structural shift in Taiwan's exports to China.

In addition, referring to the emerging industries which both economies share common interest, the trade creation effect cannot be taken it for granted because both economies are on similar starting point in promoting those industries. This situation is quite different from the current mode of cross-strait economic interactions, under which Taiwan enjoys head-start and even technological lead. As a result, it will become less likely for Taiwan to take advantage of the investment-induced trade to engage with China in the course of developing the emerging industries.

By implication, the trade creation effect of an FTA is based on a premise that exports from one partner to the other are for the latter's final consumption. This premise is not in line with a major part of the current cross-strait trading relationships, which are featured by processing trade in China for re-export and cross-strait vertical division of labor in the framework of GPNs.

The authors have to mention that it is by no means our intention to play down the significance of the ECFA as well as deepening cross-strait economic relationships. Instead, we tend to take the position that it should be interpreted in a wider context than just the trade perspective, as the conventional wisdom and the existing evaluations suggested. In our opinion, the existing evaluations are flawed with a narrow focus on the trade perspective. By contrast, some progresses made on other tracks, such as

tourism (Wang and Wen, 2010), the Building Bridges Project for industrial cooperation may mean more to the prospect of Taiwan's local economy.

For example, thanks to cross-strait cooperation in industrial standards, both sides have reached agreements to work together on the fields of TD-SCDMA, LCD, LED and solar cells. As far as Taiwan is concerned, cross-strait cooperation in industrial standards is meant to come to terms with the rise of China and promote cross-strait economic relationships beyond the current typical form of Taiwan-based firms' relocation of industrial value chain to China. As a result, some of the Taiwanese firms may be able to get involved in the formation of the Chinese industrial standards and/or dominant architecture design at the early stage.

What's more, in light of new economic situation across the Taiwan Strait, some Korean has coined the term "Chaiwan", considering the new partnership between China and Taiwan as a potential threat to some Korean firms. However, as far as Taiwan is concerned, such new initiatives as the ECFA and the Building Bridges Project are not meant for Taiwan and China only. From the perspective of public policy, these new initiatives serve to link up the "broken chain" between China and Taiwan in the global context. As a result, firms from other economies need not to be forced to take side between China and Taiwan, if they want to explore the economic potential in the Greater China Area. As argued by Nobuyuki Idei, a former Chairman and CEO of Sony, the new economic situation across the Taiwan Strait may make Taiwan a valuable partner for Japanese firms to tap the Chinese market[10].

7. Conclusions

The ECFA, a preface to a full-fledged FTA arrangement between Taiwan and China was concluded for Taiwan to come to terms with China's growing economic strengths after the global financial crisis and the formation of ASEAN+1. The debates in Taiwan and the existing evaluations of the impact of the ECFA have surrounded the trade effect, referring particularly to the trade creation and trade diversion effect suggested by the conventional wisdom.

From the trade perspective, trade creation effect is the key to the welfare gain of

[10] This is an unofficial translation of part of Nobuyuki Idei' s speech in Taipei on the 8th of December, 2009.

such an FTA as the ECFA. Quite often, trade creation effect is associated with horizontal division of labor and specialization which enables the members of the FTA each to exploit economy of scale in the sector to their favor. In addition, underlying such conventional wisdom is an implicit assumption that FTAs enables firms in one party not to get engaged in tariff-jumping (or trade barrier-jumping) outward investment to the FTA partner.

However, the current economic relationships cross the Taiwan Strait do not seem to be in line with the context set by the conventional wisdom. The role played by many of the Taiwan's industries, the ICT sector in particular, in GPNs has shifted from a key producer and exporter of end products to those of important components and parts (intermediate goods). As a result, Taiwan's exports to China have been driven to quite an extent by its outward investment to China. Over time, escalating outbound investment to China has steadily changed the structure of Taiwan's exports.

With a deep understanding of the trend of Taiwan-based firms' localization in China, we suggest that when the ECFA comes in effect, there will be two forces at work that may shape cross-strait trade. On the one hand, trade creation effect, and even trade diversion effect, tends to function to Taiwan's favor from the trade perspective. Such effects tend to take the form of specialization along the line of horizontal division of labor. On the other hand, against the backdrop of GPNs, it is possible that Taiwan-based firms' operations and manufacturing capacities are on a constant trend of relocating to China, eventually generating a diminishing effect of investment induced trade, as they move further upstream in Taiwan. Due to path dependence, even when the Taiwan-based firms turn to local market in China, their Chinese subsidiaries may become even more localized because of accumulated strengths in local supply chain and market potential. On balance, from the Taiwanese perspective, the trade creation effect anticipated by the conventional wisdom and projected by the existing evaluations may be offset in part by the complicated and dynamic relationships between Taiwan's investment-induced trade and structural shift in Taiwan's exports to China. The results of our analyses tend to support a cautious view about the trade effect of the ECFA.

Without denying the significance of the ECFA and deepening cross-strait economic relationships, we argue that the impact of these initiatives should be interpreted in a wider context than just the trade perspective, as the conventional wisdom and the existing evaluations suggested. In our opinion, the existing evaluations are flawed with

a narrow focus on the trade perspective. Even just to address the trade impact of the ECFA and an FTA, we need to take into account the dynamic relationships between outbound investment and structural shift in exports, constantly shaped by GPNs.

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Appendix Summary of Variables

Variable	Meanings	Mean	Std. Dev.
LCMR	**Ratio of local machinery**	57.96	41.01
LMPR	**Ratio of local materials and parts**	57.64	35.84
LMR	Local sale ratio (%)	60.32	40.63
SCPE	Value-added functions	3.42	2.09
DHQ	Dummy of regional Headquarters	0.10	0.30
DYR	Year dummy	0.53	0.50