RTAs Network and Market Factor Effects on Trade: Evidence from Taiwan's Major Electronics Industry

Yi-Long Jaw
National Taiwan University

Kuo-Feng Wang
National Taiwan University

This study aims to examine the impact of evolution process of regional trade agreements (RTAs), focusing on the dynamics of regional networks formed by RTAs at different stages of participation in Asia-Pacific economies, and the impact of changes in market factors on Taiwan's major electronics industry's export. Trade effects research is divided into three levels: country, industry and product, estimated period is 2001-2017. Estimated findings imply that market factors have impacts on the exports of EPCM and IC products to major trading partners, particularly China and ASEAN. RTAs have no significant impacts on the exports of EPCM and IC products.

INTRODUCTION

This study aims to examine the impact of the dynamics of regional network integration and market factors on the progress of foreign trade in Taiwan's major electronics industry - the electronic parts and components manufacturing (EPCM) industry and integrated circuit (IC) products. This study consists of four research sections: First, the context exploration of the development process of Taiwan's major electronics industry. Second, examining the impacts of regional network dynamics and the changes in market factors under market dynamics on the progress of Taiwan's EPCM industry's foreign trade, research on the export trade effects is divided into three levels: country, industry and product. Third, empirical analysis and result. Fourth, conclusion and discussion.

Since the beginning of the 20th century, the FTAs in East Asia have seen intra- and extra-regional expansion. The formation of RTAs forms the state of the integrated network of regional economies, not only enhance their competitiveness but also foster links and cooperation with other regions, and the economic and political commitments have changed the ecology of regional economies and development. Taiwan faces the challenge of the regional network integration, the factors of market seeking will change due to the network integration, the changes in national income and economic growth will also lead to changes in consumption and cost fluctuations. Currently Taiwan's diplomatic predicament has hindered its participation in regional integration, and being in a marginalized dilemma, whether this will affect foreign trade due to regional network dynamics and market factors changes, or whether the industry with strong advanced technologies will be affected by the dynamics of these economic integrations, these are the main research subjects of this study.

After the Second World War, from 1950 to 1970, Taiwan began to develop into a capitalist economy in agriculture and light industry, supplemented by public sector and heavy industry development and inward

investments. In the 1980s, the government turned the import substitution policy into an export-oriented policy, and shifted from the traditional labor-intensive industry to the capital-intensive industry, especially the development of the electronics industry, which received strong support from the government. After the 1990s, Taiwan entered the development of knowledge-intensive industries and advanced high-tech. Taiwan's electronics industry has developed into a world-leading technology industry, and its foreign trade has become an important economic pillar of Taiwan. The process of Taiwan's economic development stage is shown in Figure 1.

FIGURE 1
TAIWAN'S ECONOMIC DEVELOPMENT STAGE

	Factor input	Commercial output
1950-1970 Agricultural economy	Land, Infrastructure, Capital, Labor, Policy.	Variety, Farm, Production and management.
1970-1990 Industrial economy	Energy, Land, Raw material, Infrastructure, Capital,	Processing and export, Traditional industrial manufacturing, & OEM,
1990-2010- Knowledge economy	• Technology innovation, • Advanced technologies, • Capital intensive, technology intensive, and knowledge intensive industries, • Business network,	Integrated manufacturing, Creative intensive services, E-commerce, AI industry, Global supply chain, Globa operations center.

Although Taiwan is a latecomer to economic development compared with advanced developed countries, it has developed advanced technology and market-oriented technologies. Technological capability is an important determinant of promoting the competitive advantage of firms and is seen as an important strategic resource that enables firms to gain a competitive advantage in their industry. Firms with superior technology capabilities can drive productivity growth and achieve greater efficiency through innovative processes and innovative products that respond to changing market conditions and achieve higher product differentiation and promote innovation. Therefore, if a country attempts to improve its competitiveness or increase productivity and economic efficiency, it needs to pay attention to the accumulation of technological capabilities of firms, as well as the supporting systems and measures of the country. This is an overall development strategy that requires the support and guidance of government (Mathews, 1997, 2006; Hsu & Chiang, 2001; Porter, 1998; Griffiths & Zammuto, 2005; Chen et al., 2013; Wang & Chiu, 2014).

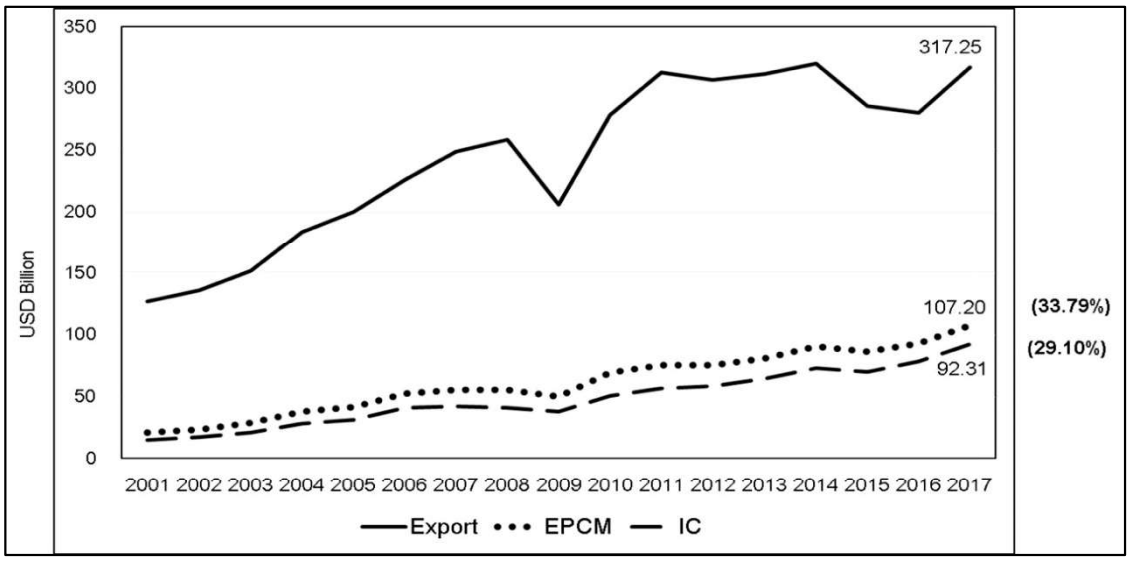
The primary competitive edges of Taiwan's semiconductor industry benefit from the cooperation between the public and private sectors in Taiwan, as well as the government policy making, bridging

institutions, establishment of public infrastructure, vertical disintegration, entrepreneurship and human capital development, which create the high-quality industries (Chen et al., 2013; Wang & Chiu, 2014). Taiwan's semiconductor industry has established a capital and knowledge-intensive high-tech industry, from the fast followers to the forerunner of a relatively mature state, making it the world's leading industry (Wang & Chiu, 2014).

Compared with the world famous Silicon Valley industrial ecosystem in California, United States, Taiwan has formed a similar industrial clustering ecology, especially the electronics industry. Currently, Taiwan has formed three major science parks: Hsinchu Science Park (expanded to a total of 6 sub-parks, since 1980), Central Taiwan Science Park (expanded to a total of 5 sub-parks, since 2002), and Southern Taiwan Science Park (expanded to a total of 2 sub-parks, since 1995) (Source: Ministry of Science and Technology, Taiwan, 2018). More than 60% of the cities in Taiwan have set up science parks, for such a cluster of high-tech science parks, Taiwan can be regarded as a technology country. The formation of these science parks has produced the effect of industrial agglomeration and has also formed the business networks. The network state of industrial agglomeration generates the interconnection, learning, cooperation and competition, and creates a gradual improvement in technological capabilities, which contributes to the productivity efficiency and growth. Since the successful establishment of the first science park model in Taiwan, it effectively introduces high-tech talents with relevant technologies and economic development, and has upgraded Taiwan to a world-class leading position in science and technology. This has caused the industries well clustered in Taiwan, and its synergistic effects have accumulated potential impetus for global business activities.

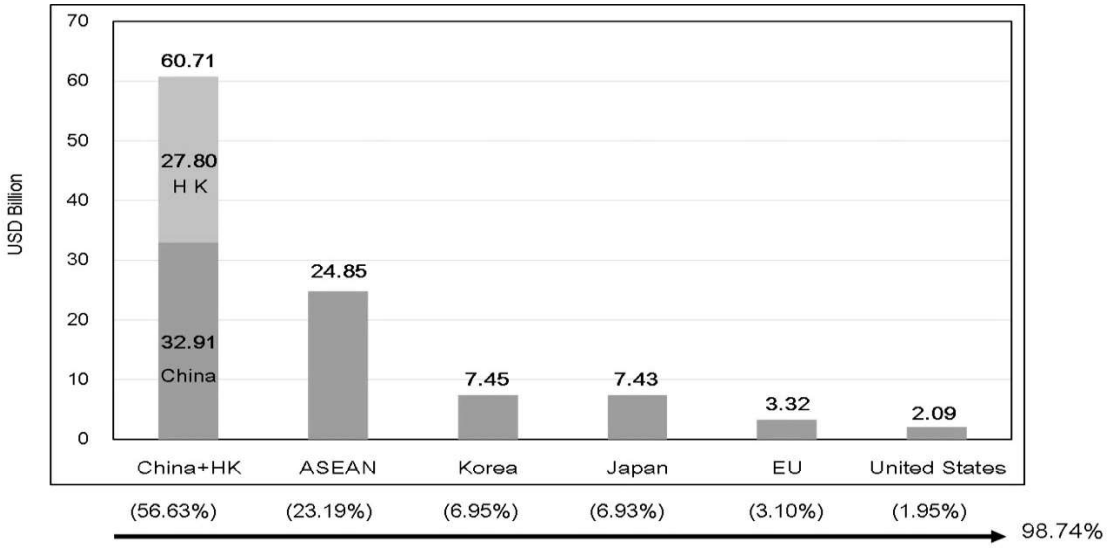
From the beginning of 21st century, the export of EPCM industry, especially integrated circuit (IC) products, forms the major and most important part of Taiwan's export. According to the statistic of MOF, Taiwan (2018), the export volume of ECPM industry is USD 107.20 billion (33.79% of total export volume) and the export volume of IC products is USD 92.31 billion (29.10% of total export volume), and the ratio of export volume of IC products to ECPM industry is 86.11%, in 2017. The volumes of Taiwan's total, EPCM industry and IC products' exports (2001-2017) are shown in Figure 2. The major exporting countries (organizations) of Taiwan's ECPM industry are China (including Hong Kong) (56.63%), ASEAN (23.19%), Korea (6.95%), Japan (6.93%), EU (3.10%) and United States (1.95%) in 2017 are shown in Figure 3. The volumes of Taiwan's major exporting countries (organizations) in 2017 are shown in Figure 4.

FIGURE 2
VOLUMES OF TAIWAN'S TOTAL, EPCM INDUSTRY AND IC PRODUCTS EXPORTS (2001-2017)



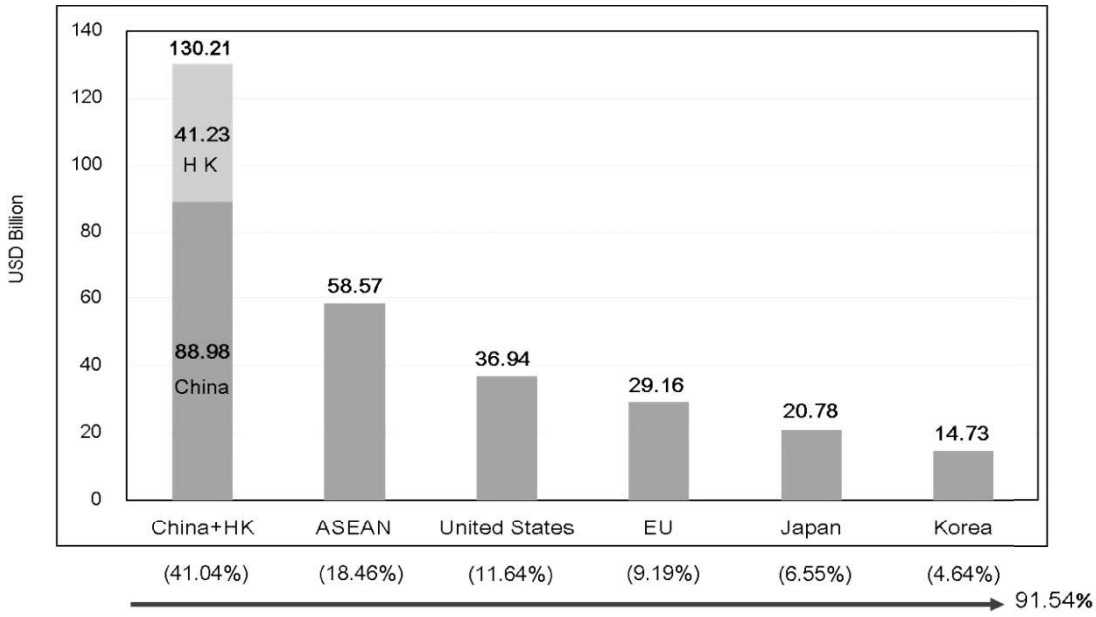
Source: Ministry of Finance, Taiwan, 2018.

FIGURE 3
MAJOR EXPORTING COUNTRIES (ORGANIZATIONS) OF TAIWAN'S EPCM, 2017



Source: Ministry of Finance, Taiwan, 2018.

FIGURE 4
VOLUMES OF TAIWAN'S MAJOR EXPORTING COUNTRIES (ORGANIZATIONS), 2017



Source: Ministry of Finance, Taiwan, 2018.

The electronic industry in Taiwan has been developing for nearly 40 years. It has established the ecological chain and plays a key role in the global high-tech supply chain. The early development pattern was divided into three stages, the up-, middle-, and down-stream of the professional division of labor (fragmentation of production), and currently the vertical integrated production state of the up-middle-down stream is presented. In 2016, Taiwan's IC output value ranked the second in the world, second only to the United States, exceeding Japan and South Korea. Taiwan's current IC packaging and testing, wafer foundry and computer products are all ranked the first in the world. IC design, semiconductor industry and panel

output accounts for the second largest in the world as well (Sources: Industrial Technology Research Institute (ITRI), Taiwan, 2017; Industry & Technology Intelligence Service (ITIS), Ministry of Economic Affairs , Taiwan, 2017). The value and rank of 2015-2017 major global foundries companies are shown in Table 1.

TABLE 1
2015-2017 MAJOR GLOBAL FOUNDRIES COMPANIES

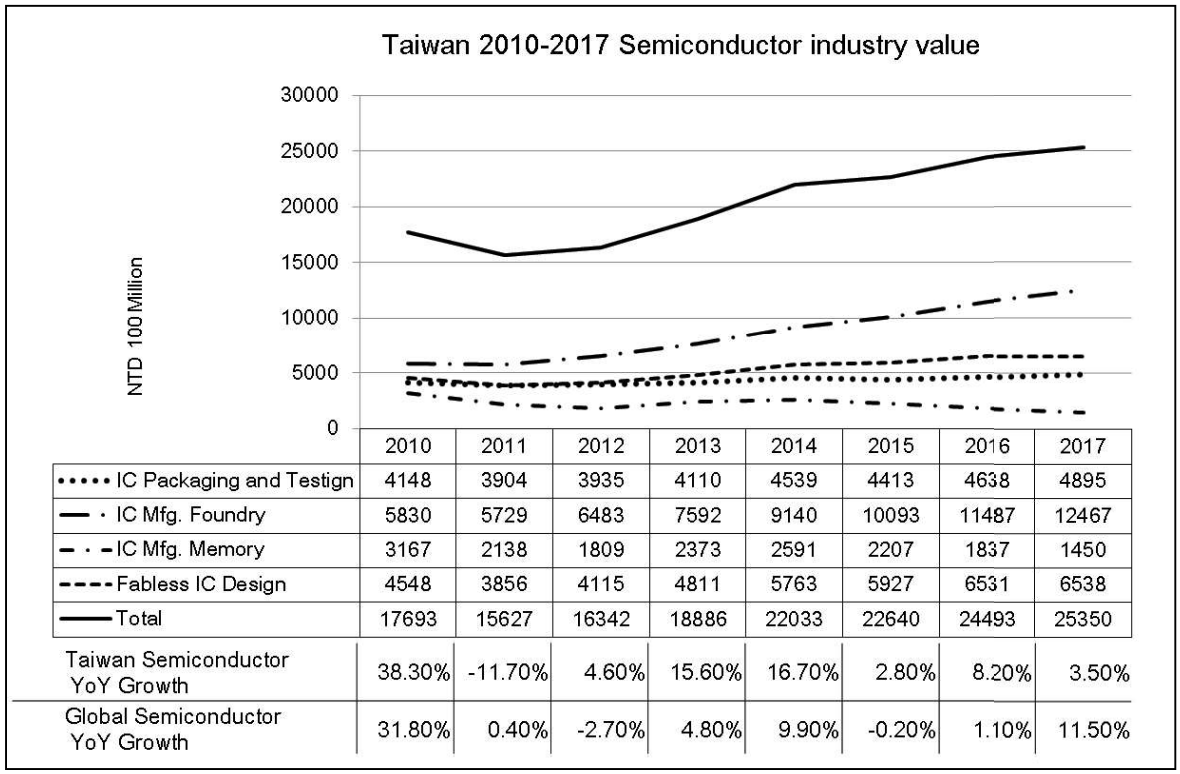
Company	Foundry Type	Site	2015				2016				2017			
			Sales (US$M)	Market Share	2015/14 Change (%)	Rank	Sales (US$M)	Market Share	2016/15 Change (%)	Rank	Sales (US$M)	Market Share	2017/16 Change (%)	Rank
TSMC	PP	Taiwan	26574	53%	6%	1	29488	51%	11%	1	32163	52%	9%	1
Global Foundries	PP	US	5019	10%	14%	2	5495	10%	9%	2	6060	10%	10%	2
UMC	PP	Taiwan	4464	9%	3%	3	4582	8%	3%	3	4898	8%	7%	3
Samsung	IDM	S Korea	2670	5%	11%	4	4410	8%	65%	4	4600	7%	4%	4
SMIC	PP	China	2236	4%	14%	5	2914	5%	30%	5	3101	5%	6%	5
Powerchip	PP	Taiwan	1268	3%	38%	6	1275	2%	1%	6	1498	2%	17%	6
Hunhong	PP	China	971	2%	46%	7	1184	2%	22%	8	1395	2%	18%	7
Tower Jazz	PP	Israel	961	2%	16%	8	1250	2%	30%	7	1388	2%	11%	8
Top 8 Total			44163				50598				55103			
Top 8 Share			—	87%	—		—	88%	—		—	88%	—	
Total Foundry			50760	—	—		57710	—	—		62310	—	—	

Source: IC insight, Company reports, 2018. (USD: Million) Note: PP: Pure-Play and IDM: Integrated Device Manufacture
Note: compilied by authors.

Not only has the electronics industry become the core industry in Taiwan, it has produced the optimal export value for Taiwan, and has also provided Taiwan with a large number of employment opportunities. As many international brands in the world enter artificial intelligence (AI) development, it is expected to drive demand for efficient computing, energy-efficient ICs and integrated smart products. Taiwan is in a strong position to take advantage of its strength in semiconductor technology to seize newly developing business opportunities. According to Taiwan's ITRI report, 2018, Taiwan's IC output value has reached 2.5 trillion NTD (about 80 billion USD) in 2017.

At present, most international semiconductor companies have encountered bottlenecks to reduce or stop technological progress, and currently only three companies' technologies continue to advance. Taiwan Semiconductor Manufacturing Co., (TSMC), is one of them (the other two are Samsung and Intel). TSMC began the construction of a new 5 nm plant in Taiwan in January 2018. By 2020, it will be the first manufacturer of large-scale production of 5nm plant in the world. The output value of semiconductor industry in Taiwan during 2010-2017 is shown in Figure 5.

FIGURE 5
TAIWAN 2010-2017 SEMICONDUCTOR INDUSTRY OUTPUT VALUE



	2010	2011	2012	2013	2014	2015	2016	2017
IC Packaging and Testign	4148	3904	3935	4110	4539	4413	4638	4895
IC Mfg. Foundry	5830	5729	6483	7592	9140	10093	11487	12467
IC Mfg. Memory	3167	2138	1809	2373	2591	2207	1837	1450
Fabless IC Design	4548	3856	4115	4811	5763	5927	6531	6538
Total	17693	15627	16342	18886	22033	22640	24493	25350
Taiwan Semiconductor YoY Growth	38.30%	-11.70%	4.60%	15.60%	16.70%	2.80%	8.20%	3.50%
Global Semiconductor YoY Growth	31.80%	0.40%	-2.70%	4.80%	9.90%	-0.20%	1.10%	11.50%

Source: ITRI, Taiwan, 2018. Note. Compiled by authors.

Previous studies have shown that trade flows between two countries differ depending on whether countries share the FTAs. This study contributes to a more discussion on these issues. First, examine the characteristics and development of the specific industry, and review the evolution of regional economic integration, then explore the changes in market factors caused by market dynamics related to regional integration, and then introduce these factors into the analysis of impacts on trade. Our study established a continuous variable in the time series to more accurately measure the extent to which the evolution of FTAs/RTAs and market dynamics affect trade flows.

LITERATURE REVIEW

Network Perspective

An important element of the network is embeddedness, Granovetter (1973) suggest that networks can be classified as strong ties and weak ties, and the weak-tie strategies, instead of no-tie (rule-based) strategies, will be dominant during an intermediated phase of institutional transitions. Granovetter (1973, 1985, 2005) suggest that strong ties characterize a dense network of actors that connect to each other. Strong network ties are created through a high degree of closeness and reciprocal actions, weak network ties connect individuals with others outside the group, weak ties provide more diverse and richer link to the sources of information that may be needed to generate innovative activity. While strong ties may be suitable for exchanging complex knowledge, weak ties may be more conducive to searching for informations, collecting informations through weak ties is more important than trust and exchange openness (Granovetter, 1985, 2005). In addition, (Peng, 2003; Peng & Zhou, 2005) suggest that regarding the network-intensive, as institutional transitions unfold, the strong-ties-based networks, instead of being phased out, may be transformed into weak-ties-based networks. The networks not only differ in strength but also in content,

and the evolution of network is driven by the impact of different dimensions (eg., political and legal institutions) of institutional transitions governing the business-to-government (B2G) and business- to-business (B2B) relationships (Peng & Zhou, 2005). Institution-based view conceptualizes a nation's institutions as the rules of the game that comprise informal constrains as well as formal rules (North, 1990). North (1990) argues that the institutional framework of a society serves as constraints to regulate economic activities by providing the rules of the game, the interaction between institutions and organizations that shapes economic activities.

The concept of relational embeddedness is defined as the interdependence between social relations and economic exchange in the network of relations (Granovetter, 1985), and also argues that firms have frequent social contacts with customers as they conducting the transactions, the economic actions are not autonomous activities separate from the social context. The interaction in the network generate trust and cooperation between partners, and the ability to embed business in social relations is an important process (Granovetter, 1985; Uzzi, 1997). Firms' relationships are not isolated from each other but are interconnected networks (Anderson et al., 1994). Strong relationships have the characteristics of mutual trust and commitment, and are the result of social contacts and interactions (Morgan & Hunt, 1994; Sivadas & Dwyer, 2000; Johnson & Vahlne, 2009).

Network theory has emerged to explain internationalization for more than 20 years (Johnson & Vahlne, 2009). Industry is a business network, which is a combination of diversified businesses (or firms) behaviors and organizations, and the establishment of business networks is a strategy for firms or industries to seek internationalization, opportunities and economic scale expansion (Oviatt & McDougall, 1994; Johanson & Vahlne, 1990, 2009). There are some studies on the interaction between the network and insidership and outsidership, Johanson & Vahlne (2009) extend the internationalization process model to a new version, focusing not only on the liability of foreignness, but also on the liability of outsidership, and being a network outsider is an impediment for developing business abroad. They indicate the importance of the network and argue that embeddedness in business relationships and networks (insidership) is a necessary condition to succeed abroad. (Almodovar & Rugman, 2015) study the role of dyadic business relationship and business networks and the effect on international performance, arguing that insiders perform better than outsiders, and testing their interactions found that technological skills as an alternative means to overcome the liability of outsidership. Some studies argue that the network is a mechanism for knowledge acquisition (Johanson & Vahlne, 2009; Evers & Knight, 2008), and not only important for existing relationships, but also important for further international expansion (Hohenthal et al., 2014). Most studies view the network as a given state, lack of studies on the network configuration and structure, or the processes unfolding in the network, and its impact on internationalization (Hohenthal et al., 2014). Nevertheless, for the firms' exports and sales, the main drivers of opportunity are new products and technological innovations rather than firms in foreign markets (Govindarajan & Ramamurti, 2011).

The integration of regional economies forms the state of the network of regional economic integration. Researchers define 'regional integration' as iterated co-operation games of a regional group in multiple issue areas (Krapohl & Fink, 2013). Recently scholars have discussed the gap between European Union (EU) studies and comparative regionalism (De Lombaerde, 2011; Sbragia, 2008), arguing that EU integration theories should brought back into comparative regionalism (Warleigh-Lack & Van Langenhove, 2011; Soderbaum & Sbragia, 2010). Therefore, an analysis is given regarding the influence of background condition - economic structure on regional integration (Krapohl & Fink, 2013).

Business networks differ not only in strength but also in content, and their evolution is driven by the impact of different dimensions of institutional transitions (Peng & Zhou, 2005). Due to different economic structures, regional integration among industrialized countries is more successful, while developing countries face difficulties (Mattli, 1999). EU integration relies on economic interdependence within the region as a precondition, while a region with little economic interdependence is hardly to have spillover effects of new functionalism. Moravcsik (1998) argues that liberal intergovernmentalism regards the economic interdependencies as the motive for co-operation among member states. Stone Sweet & Sandholtz (1997) state that the neo-institutionalists presume a mutually reinforcing relationship between intra-regional trade and regional institution-building.

New regionalists emphasize the outward orientation of regional integration (Mansfield & Milner, 1999). The focus on open regionalism has co-evolved from an import substitution to an export-based development strategy (Krueger, 1993). Regional integration can complement an export-based development strategy as it implies the effects of size and stability, and is attractive for market-seeking investments (Buthe & Milner, 2008). Regional integration in economies of scale (or size) effects can improve the negotiating position in international trade and improves the quality of political institutions and reduces conflicts (Doctor, 2007; Mansfield & Reinhardt, 2003). For regional integration in developing countries, extra-regional factors have a decisive influence not only on opening up internal liberalization trade, but also on seeking interactions of external organizations and improve their position in global competition. The resulting network organization is conducive to economic development (Krapohl & Fink, 2013; Krapohl, 2017).

Competitive Advantage and Development Path Perspective

The important market factors behind export growth are related to innovation, productivity growth, trade liberalization and national economic growth. The increasing intensive international competition is driven by the specialization of products and services and the global market seeking as an export orientation for exploiting economies of scale (Baldwin & Gu, 2003). Market size is critical to innovation and thus for productivity. Improving access to foreign markets will thus encourage firms to export and invest simultaneously to increase productivity (Lileeva & Trefler, 2010). Competition in overseas trade will lead to change in technology and economic structure, and reallocate resources to more technologically advanced firms (Bloom et al., 2016).

The government plays an important role in industrial development, especially in developing countries (Mathews, 1997; Hsu & Chiang, 2001; Porter, 1998; Griffiths & Zammuto, 2005; Chen et al., 2013). Policymakers in an evolutionary economy must consider the specific technological, economic, and institutional environments in which they operate in order to properly identify the path of dependence and development that fits them, especially their own conditions and characteristics, and strategies for preparatory development (Dobusch & Schu¨ßler, 2013). Research efforts to understand the dynamics of industry and technology have led to the development of the concept of technology path dependence, which has been used to explain the cumulative, sequential process of technological development characterized by persistence and self-reinforcing mechanisms (Fai, 2003; Cantwell & Vertova, 2004; Bergek & Onufrey, 2014; Onufrey & Bergek, 2015). When the institutions that make up the system span all necessary activities and engage in intensive interactions, the self-reinforcing process of technological innovation can be initiated, and it can also drive the evolution of technology.

Porter's (1990) theory of 'national competitive advantage' suggests that the government can provide a good development platform for the industry, which make it easier to gain competitive advantages. Innovative behavior is thought to follow this path, which constitutes an ideological framework that provides opportunities for technology and guides the exploration and exploitation of enterprises. This path dependence is related to the accumulation of knowledge, information and experience (learning process). Onufrey & Bergek (2015) explain how different technologies coexist in the market while defining multiple technology paths in the presence of positive reinforcement mechanisms.

Gravity Model

The gravity model was developed by Tinbergen (1962), Pöyhönen (1963) and Linnemann (1966) aims to explain the flow of trade volume between any two countries by considering economic size of both and the distance between them. The theoretical basis model was first proposed by Anderson (1979). After 1980s, some new trade theoretical foundations have been proposed based on increasing returns to scale, firm-level product differentiation and imperfectly competitive markets (Bergstrand, 1985, 1989; Helpman & Krugman, 1985). Later further by considering the difference of per capita incomes of the two trading countries, and the reality of international economy -"GDP", the "purchasing power", which dominated the flow of international trade.

A particular application of gravity model is to explain the effects of FTAs on trade (Baier & Bergstrand, 2007, 2010). FTAs have been a widely implemented means of strengthening trade among countries. The gravity model has been used to study trade patterns, and the estimation of models of geography and trade (Limao & Venables, 2001; Head & Mayer, 2004; Hanson, 2005; Davis & Weinstein, 2003), also serves as a favored tool to assess ex-post trade effects of a currency union (Glick & Rose, 2002), and the trade creating and diverting effects associated with RTAs (Soloaga & Winters, 2001).

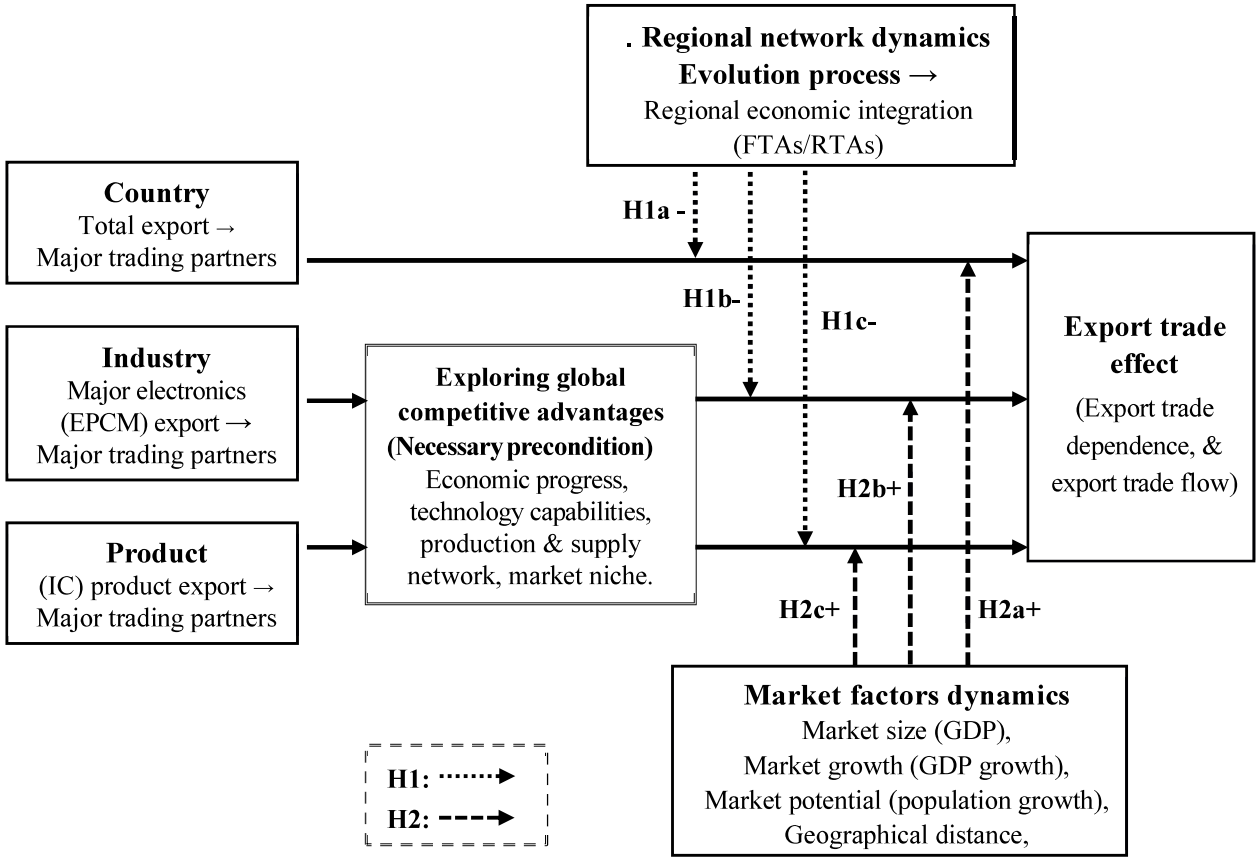
Carrere, (2006) investigated 130 countries for assessing ex-post RTAs. Introducing the correct number of dummy variables to identify Vinerian trade creation and diversion effects, results show that regional agreements have generated a significant increase in trade between members, often at the expense of the rest of the world. Baier & Bergstrad (2007) attempt to explain FTA effects in trade by applying gravity model and modern econometric studies. They regard FTAs as endogenous variables and are influenced by interactions, and conclude that FTAs have significant impacts on trade. Dur et al. (2014) present a new data set on trade agreement design with which the most comprehensive in terms of both variable coded and agreements covered, and illustrated the dataset's usefulness in re-visiting the questions if and to what extend preferential trade agreements impact trade flows.

METHODOLOGY

Research Framework

This study aims to examine the impact of regional network integration and market factors effects on the progress of foreign trade in Taiwan's major electronics industry- the electronic parts and components manufacturing (EPCM) industry and integrated circuit (IC) products. The IC products were selected for analysis as they accounted for the majority of exports in the EPCM industry. Research on the export trade effects is divided into three levels: country, industry and product. The research framework of this study is shown in Figure 6.

FIGURE 6
RESEARCH FRAMEWORK



Due to some political factors in Taiwan, therefore, only a small number of trade agreements have been signed with its trading partners, which has also led to Taiwan is not involved in the network organization of Asia-Pacific regional integration. Under the state of being outside the network, will the phenomenon of liabilities of outsidership affect Taiwan's foreign trade? To examine the relationship between RTAs network effects and Taiwan's total, EPCM, and IC products' export trade, this study proposes the following hypothesis:

Hypothesis 1a*: Regional trade agreements network effects are negative related to the growth of Taiwan's total export volume and export flows.*

Hypothesis 1b*: Regional trade agreements network effects are negative related to the growth of Taiwan's EPCM industry's export volume and export flows.*

Hypothesis 1c*: Regional trade agreements network effects are negative related to the growth of Taiwan's IC products' export volume and export flows.*

Market factors are important factors influencing the export trade of industries or firms, such as market size, market potential, market growth, and the costs of the distance between the two countries. To examine the relationship between market factors and Taiwan's total, EPCM, and IC products' export trade, this study proposes the following hypothesis:

Hypothesis 2a*: Market factors are positively related to the growth of Taiwan's total export volume and export flows.*

Hypothesis 2b*: Market factors are positively related to the growth of Taiwan's EPCM industry's export volume and export flows.*

Hypothesis 2c*: Market factors are positively related to the growth of Taiwan's IC products' export volume and export flows.*

Analysis of Taiwan's Total Export, EPCM Export, and IC Products Export

This study uses gravity model and the empirical analysis applying time-series data, which account for the endogeneity in estimating the trade effects, investigated period from 2001 to 2017, for country level (***total export*** to major export countries) which is an analysis between Taiwan and its top 6 ***major export*** trading countries/organizations, i.e. China plus Hong Kong, ASEAN, Japan, South Korea, United States, and EU; and for industry level which is Taiwan's ***EPCM industry's export*** to its 6 major trading countries (or organizations); and for product level which is Taiwan's ***IC products' export*** to its 6 major trading countries (or organizations).

Data Source

The data source are monthly data on bilateral trade volume (current US$) for the period 2001~2017 have been collected from "Trade Statistic System", Customs Administration, Ministry of Finance, Taiwan, 2018; GDP PPP (current prices. purchasing power parity; international dollars), GDPG (GDP growth), POPG (Population growth), were gathered from "World Economic Outlook Database 2018", IMF, 2018.

Method

The basic gravity model for international trade postulates that the trade between country *i* and country *j* is proportional to the product of GDP*i* and GDP*j*, and inversely proportional to the physical distance between them. This basic model can be augmented by using other variables that can facilitate or hinder bilateral trade flows; and dummy variables reflecting contiguity and geographical and cultural proximity factors.

Basically, the traditional gravity model of trade was a cross-section model, and present in the form of logarithm as equation (1) below:

$$\ln VOT_{ij} = \alpha_0 + \alpha_1 \ln Y_i + \alpha_2 \ln Y_j + \alpha_3 \ln DIST_{ij} + \sum_h \delta_h D_h + \varepsilon_{ij}, \quad (1)$$

where, ln VOT_{ij} is the volume of trade from country i to j;
ln Y_i is the exporting country i's GDP;
ln Y_j is the importing country j's GDP;
ln $DIST_{ij}$ is the geographical distance between the capital of country i and j;
D_h are dummy variables which affect trade flow;
ε_{ij} are the error terms.

The GDP as a measure of size and self-sufficiency of a country is considered for the estimation. In empirical estimation of GDP, this study applies ($\ln Y_i + \ln Y_j$) approach for the estimation and on purchasing-power-parity (PPP) valuation of country GDP. lnVOT_{ij} is estimated according to the volume of export (Aitken, 1973). Follow the research of (Carrere, 2006; Baier & Bergstrad, 2007; Dur, et al, 2014), the empirical gravity equation of this study was estimated by the model as below:

VOT_{ti} = Export volume of trade from country T(Taiwan) to i (China plus Hong Kong, ASEAN, Japan, South Korea, United States, and EU), and was estimated by each country (and/or regional organizations).

Under the consideration of these dummy variables, the empirical gravity equation for estimating trade effects of Taiwan's total, EPCM industry and IC products' export to its major trading countries (or organizations), and can be rewritten as equation (2) below:

$$\ln VOT_{Ti} = \alpha_0 + \alpha_1 \ln GDP_T + \alpha_2 \ln GDP_i + \alpha_3 \ln DIST_{Ti} + \alpha_4 GDPG_i + \alpha_5 POPG_i + \alpha_6 APT + \alpha_7 ECFA + \alpha_8 APS + \alpha_9 RCEP + \varepsilon_{Ti} \quad (2)$$

where *APT, ECFA, APS, RCEP* are dummy variables, that takes a value of 1 if country T and country i have signed FTA/RTA; 0 otherwise.

Variables

Dependent Variables

VOT_{Ti}: the export trade volume of Taiwan. In order to comparison with EPCM's export volume to the total export and its major component (IC products), this paper apply three different types of dependent variables, total export of Taiwan, the EPCM industry's exports and IC products' export to its major trading partners;

VOT_{Ti} denote the export volumes of Taiwan to its major trading partners.

Independent Variables

Y_T (GDP_T): denote Taiwan's GDP; Y_i (GDP_i) denote the major export countries' GDP (respectively), which captures the market size of a host economy.

GDP_T : the gross domestic product (GDP) of Taiwan;

GDP_i : the gross domestic product (GDP) of Taiwan's major trading countries (organizations) : China (including Hong Kong), ASEAN, Japan, Korea, United States and EU, respectively;

$DIST_{Ti}$: is the geographical distance between the capital of Taiwan and country i;

$GDPG_i$: GDP growth rate, which captures the potential growth of the market of Taiwan's exporting country (or organization) i;

$POPG_i$: population growth rate, which captures the potential size of the market of Taiwan's exporting country (or organization) *i*.

Dummy Variables

Selections of dummy variables of the empirical gravity equation are according to the following FTAs/RTAs :

APT : ASEAN plus three (China, Japan, Korea), a forum that functions as a coordinator of co-operation between the ASEAN and the three East Asia nations: China, Japan, and South Korea, official declaration and started functioned since ***2005***;

ECFA : Cross-Straits Economic Cooperation Framework Agreement, the major preferential trade agreement between Mainland China and Taiwan, signed on June 29, ***2010***, is the most important trade agreement signed by Taiwan with its major trading partners;

APS : ASEAN plus six (China, Japan, Korea, Australia, New Zealand and India), the 'Joint Declaration' on the launch of negotiation for RCEP were started from ***2012***;

RCEP : Regional Comprehensive Economic Partnership, a proposed FTA between ASEAN and the 6 countries with which ASEAN has existing FTAs (China, Japan, South Korea, India, Australia, and New Zealand), which FTAs negotiation of concessions started from ***2015***.

RESULTS

Empirical analysis estimates the 6 major exporting countries (organizations) of Taiwan, and 6 equations were estimated by three dependent variables (Taiwan's total export, EPCM industries, and IC products, respectively). The statistics of dependent variable (Taiwan's export to its major trading partner) is shown in Table 2, and the statistic period was 2001 to 2017. Empirical regression estimates results are shown in Table 3, Table 4, and Table 5.

TABLE 2
STATISTICS OF DEPENDENT VARIABLE
(TAIWAN'S EXPORTS TO MAJOR TRADING PARTNERS)

Countries/Organizations	M	SD	Max	Min
Total Export				
China (+HK)	95.79	30.75	130.21	33.81
ASEAN	39.57	15.86	60.17	15.42
Japan	17.01	2.90	20.78	12.40
Korea	9.20	3.68	14.73	3.38
United States	31.39	3.65	36.94	23.71
EU	26.05	3.82	31.43	18.81
Electronic Parts and Components Manufacturing (EPCM) Industries				
China (+HK)	32.59	14.95	60.71	7.79
ASEAN	12.84	6.55	24.85	4.22
Japan	5.08	1.71	7.43	2.18
Korea	4.81	2.40	8.05	1.28
United States	2.27	0.22	2.68	1.75
EU	2.72	0.76	4.32	1.56
Integrated Circuit (IC)				
China (+HK)	24.87	12.63	51.20	5.42
ASEAN	11.48	6.25	23.09	3.02
Japan	4.34	1.57	6.87	1.80
Korea	4.12	2.18	7.31	1.07

United States	1.45	0.17	1.81	1.14
EU	1.40	0.33	2.22	0.98

Note: USD billion.
Source: Ministry of Finance, Taiwan, 2018.
Statistic period: 2001-2017.

TABLE 3
GRAVITY MODEL ESTIMATES RESULTS (COUNTRY LEVEL – TOTAL EXPORT)

Variables	China+HK	ASEAN	Japan	Korea	United States	EU
Constant	-6.299** (-2.278)	-10.760*** (-3.740)	-14.298* (-1.460)	-4.120* (-1.340)	0.240 (0.018)	-36.516*** (-4.546)
ln GDP_T	2.675** (2.231)	2.510* (1.634)	-0.611 (-0.392)	2.205 (1.295)	2.285 (1.011)	-3.080*** (-2.659)
ln GDP_i	-0.964* (-1.621)	-0.276 (-0.225)	2.577 (1.130)	-1.487 (-0.992)	-0.939 (-0.339)	6.248*** (4.004)
ln $DIST_{Ti}$	-0.278*** (-3.240)	-0.086 (-0.800)	-0.072 (-0.581)	-0.316** (-2.091)	-0.348** (-1.909)	-0.070 (-0.833)
$GDPG_i$	0.017 (1.221)	0.030** (2.015)	-0.001 (-0.013)	0.012 (1.013)	0.040*** (2.734)	0.003 (0.441)
$POPG_i$	-0.020 (-0.391)	0.025 (0.779)	-0.015 (-0.694)	0.020 (1.291)	-0.014 (-0.173)	0.089*** (2.583)
APT	-0.072 (-1.047)	0.001 (0.003)	0.051 (0.785)	-0.067 (-0.720)	-0.048 (-0.644)	-0.055 (-1.107)
ECFA	0.034 (0.571)	-0.083 (-0.893)	0.199 (1.103)	0.123* (1.694)	-0.144 (-0.468)	0.474*** (3.245)
APS	-0.054 (-0.987)	0.043 (0.540)	-0.110* (-1.345)	-0.037 (-0.487)	-0.116** (-1.785)	-0.066* (-1.490)
RCEP	-0.117** (-2.177)	-0.211** (-2.275)	-0.090* (-1.493)	0.005 (0.077)	0.003 (0.027)	-0.378*** (-6.682)
Obs.	17	17	17	17	17	17
adj. R^2	0.989	0.983	0.951	0.989	0.847	0.956
F	156.291***	105.740***	35.374***	156.494***	10.829***	39.510***

Note: Value in parentheses represents T value. ***, ** and * significant at the 1%, 5% and 10% levels, respectively.

TABLE 4
GRAVITY MODEL ESTIMATES RESULTS
(INDUSTRY LEVEL – EPCM INDUSTRY EXPORT)

Variables	China+HK	ASEAN	Japan	Korea	United States	EU
Constant	-7.536**	-15.733***	-11.972	-4.781*	3.636	-48.642**
	(-2.545)	(-3.939)	(-0.399)	(-1.360)	(0.166)	(-1.924)
ln GDP_T	0.607	0.531	1.243	7.896***	2.293	-1.380
	(0.473)	(0.249)	(0.261)	(4.052)	(0.624)	(-0.379)
ln GDP_i	0.303	1.613	0.768	-6.739***	-1.623	6.458
	(0.476)	(0.946)	(0.110)	(-3.930)	(-0.360)	(1.315)
ln $DIST_{Ti}$	-0.472***	-0.068	-0.187	-0.315**	-0.334	-0.488**
	(-5.141)	(-0.456)	(-0.494)	(-1.823)	(-1.127)	(-1.845)
$GDPG_i$	0.041***	0.061***	0.014	-0.014	0.036*	-0.022
	(2.849)	(2.976)	(0.357)	(-1.037)	(1.526)	(-1.089)
$POPG_i$	0.099**	0.079**	-0.105*	0.020	0.029	0.108
	(1.861)	(1.767)	(-1.609)	(1.097)	(0.226)	(0.999)
APT	-0.125*	0.039	0.124	-0.206**	-0.038	-0.039
	(-1.704)	(0.279)	(0.624)	(-1.931)	(-0.313)	(-0.247)
ECFA	0.032	-0.094	0.028	0.086	-0.140	0.574
	(0.500)	(-0.729)	(0.050)	(1.040)	(-0.280)	(1.250)
APS	-0.031	0.025	-0.447**	-0.009	-0.092	-0.532***
	(-0.532)	(0.228)	(-1.793)	(-0.099)	(-0.869)	(-3.796)
RCEP	-0.044	-0.059	0.220	0.077	0.019	-0.249*
	(-0.766)	(-0.458)	(1.191)	(0.952)	(0.091)	(-1.401)
Obs.	17	17	17	17	17	17
adj. R^2	0.993	0.979	0.904	0.992	0.388	0.875
F	271.587***	82.817***	17.670***	211.385***	2.129*	13.415***

Note: Value in parentheses represents T value. ***, ** and * significant at the 1%, 5% and 10% levels, respectively.

TABLE 5
GRAVITY MODEL ESTIMATES RESULTS
(PRODUCT LEVEL – IC PRODUCTS EXPORT)

Variables	China+HK	ASEAN	Japan	Korea	United States	EU
Constant	-7.600** (-2.039)	-17.538*** (-4.234)	-15.688 (-0.501)	-6.312** (-2.004)	-6.898 (-0.257)	-27.749* (-1.374)
ln GDP_T	-0.116 (-0.072)	0.117 (0.053)	0.980 (0.197)	8.328*** (4.771)	1.602 (0.355)	-0.773 (-0.265)
ln GDP_i	0.711 (0.887)	2.025 (1.145)	1.433 (0.197)	-6.939*** (-4.517)	-0.021 (-0.004)	3.693 (0.942)
ln $DIST_{Ti}$	-0.543*** (-4.701)	-0.033 (-0.213)	-0.224 (-0.568)	-0.298** (-1.925)	-0.383 (-1.050)	-0.330* (-1.562)
$GDPG_i$	0.051*** (2.777)	0.070*** (3.304)	0.009 (0.229)	-0.012 (-0.994)	0.038 (1.316)	0.043*** (2.614)
$POPG_i$	0.149** (2.215)	0.093** (2.002)	-0.128** (-1.880)	0.031*** (1.946)	0.012 (0.074)	0.015 (0.179)
APT	-0.166** (-1.802)	0.071 (0.488)	0.131 (0.634)	-0.264*** (-2.763)	-0.076 (-0.506)	-0.042 (-0.333)
ECFA	0.023 (0.288)	-0.135 (-1.009)	0.067 (0.116)	-0.005 (-0.067)	-0.275 (-0.447)	-0.191 (-0.519)
APS	0.002 (0.022)	0.001 (0.001	-0.573** (-2.200)	0.064 (0.821)	-0.092 (-0.713)	0.158* (1.413)
RCEP	-0.021 (-0.287)	-0.009 (-0.739)	0.345** (1.795)	0.129** (1.776)	0.007 (0.027)	0.122 (0.860)
Obs.	17	17	17	17	17	17
adj. R^2	0.991	0.982	0.905	0.994	0.351	0.864
F	195.166***	96.629***	17.935***	286.735***	1.962	12.306***

Note: Value in parentheses represents T value. ***, ** and * significant at the 1%, 5% and 10% levels, respectively.

CONCLUSION AND DISCUSSION

This study aims to examine the impact of the 'evolution process' of FTAs/RTAs in Asia-Pacific region and market factors on Taiwan's export and major electronics industry's export to major trading countries (or organizaitons).

Among the RTAs analyzed in this study, ECFA and RCEP are the most important trade agreements for Taiwan, because ECFA is an agreement between Taiwan and its major trading partner, China, and RCEP is currently a relatively mature ongoing trade agreement in the Asia-Pacific region, the main trading area of Taiwan is in the Asia-Pacific region. Therefore, these two trade agreements are the most important influence and correlation to Taiwan.

Table 2 demonstrate the statistics of Taiwan's export to its major trading partners, during the period of 2001 to 2017. The mean value of Taiwan's export to China (plus Hong Kong) is USD 95.79 billion (SD 30.75 billion), which show that nearly for the past two decades China is the most important export area of Taiwan (or the most important trading partner). The mean value of Taiwan's export to ASEAN is USD 39.57 billion (SD 15.86 billion), which show that the ASEAN (10 countries) are the most fast growing trading area to Taiwan, and become the second important trading partner of Taiwan.

According to the estimating results of Table 3 the country level (total export), estimated findings imply that the relationship of mutual dependence (GDP effect) of Taiwan's export trade with its trading partners : China, ASEAN, and EU, are identified, one point to note is that Taiwan's major trading partner, China, while its GDP grows (i.e., China's economy continues to grow), it may have an adverse impact on Taiwan's export trade; the market factors effects on total export have no significant effects mostly, except ASEAN and United States (GDP growth effect) and EU (POP growth effect) are positive and significant; RTAs effects on total export have negative effects mostly, especially for RCEP effect, most of which are negative and significant.

The estimating results of Table 4 the industry level (EPCM industry export), estimated findings imply that the relationship of mutual dependence only with Korea is identified, which may be related to the homogeneity of industry, and therefore has a greater impact; the market factors effects on EPCM export have positive effects mostly, espeically for China and ASEAN have positive and significant effects; RTAs have no positive and significant effects on EPCM's exports mostly.

The estimating results of Table 5 the product level (IC products export), estimated findings imply that the relationship of mutual dependence only with Korea is identified, which may be related to the homogeneity of products, and therefore has a greater impact; the market factors effects on IC products export have positive effects mostly, especially for China, ASEAN, Korea and EU have positive and significant effects; RTAs have no positive and significant effects on IC products export mostly, only Japan and Korea have positive and significant effects on RCEP.

RTAs have no significant effects on EPCM and IC products, probably due to the characteristics of advanced technologies and the global competitive advantages of established production and supply networks, therefore, they are less affected by regional integration.

Taiwan's major electronics industry, EPCM, especially IC products, has the leading position and technological capabilities in the world, and has the advantage of continuous technological developments and close connection with the industrial supply chain. These electronic products have a dominant and favorable market niches and future vision in the world, and are therefore less affected by external environment and the integration of regional economies.

For the research limitations, this study does not address further analysis on the evolution of the structure and development of the industries or firms, as well as the impact of the industry's network, and the effects of the dynamics and evolution of the current global and national institutions on the interaction and mutual influence of industries and firms, which in turn affects the development of foreign trade. Future research may further analyzed for these effects and factors.

There are many studies related to the impact of FTAs/RTAs and regional integration on foreign trade, but less on the evolution (or the network dynamics) of RTAs (or regional integration) to analyze the impact on foreign trade, or even on the foreign trade of specific industries or products. This study contributes to the research of how regional networks, regional economic integration and dynamic market factors affect foreign trade, and provides some implications for Taiwan's policymakers and emerging economies that are committed to the development of high-tech industries.

REFERENCES

Aitken, N. D. (1973). The effect of EEC and EFTA on European trade: A temporal cross-section analysis. *American Economic Review,* 63(5), 881-892.

Almodovar, P. & Rugman, A. M. (2015). Testing the revisited Uppsala model: Does insidership improve international performance? *International Marketing Review*, 32, (6), 686-712.

Anderson, J. E. (1979). A theoretical foundation for the gravity equation. *American Economic Review*, 6, 9(1), 106–116.
Anderson, J. C., Hakansson, H. & Johanson, J. (1994). Dyadic business relationships within a business network context. *Journal of Marketing*, 58(4), 1 – 15.
Baier, S. L. & Bergstrand, J. H. (2007). Do free trade agreements actually increase members' international trade? *Journal of International Economics*, 71(1), 72–95.
Baier, S. L. & Bergstrand, J. H. (2010). Approximating general equilibrium impacts of trade liberalizations using the gravity equation. In: Van Bergeijk, P., Brakman, S. (Eds.), *The gravity model in international trade: advances and applications,* Cambridge University Press, (4), 88–134.
Baldwin, J. R. & Gu, W. (2003). Participation in export markets and productivity performance in Canadian manufacturing. *Canadian Journal of Economics*, 36, 634–657.
Bergek, A. & Onufrey, K. (2014). Is one path enough? Multiple paths and path interaction as an extension of path eependency teheory. *Industrial and Corporate Change,* 23(5), 1261–1297.
Bergstrand, J. H. (1985). The gravity equation in international trade: Some microeconomic foundations and empirical evidence. *Review of Economics and Statistics*, 67(3), 474–481.
Bergstrand, J. H. (1989). The generalized gravity equation, monopolistic competition and the factor-proportions theory in international trade. *Review of Economics and Statistics*, 71(1), 143–153.
Bloom, N., Draca M. & Reenen, V. J. (2016). Trade induced technical change? The impact of Chinese imports on innovation, IT, and productivity. *Review of Economic Studies,* 83, 87–117.
Büthe, T. & Milner, H. (2008). The politics of foreign direct investment into developing countries: increasing FDI through international trade agreements? *American Journal of Political Science*, 52(4), 741– 62.
Cantwell, J. & Vertova, G. (2004). Historical evolution of technological diversification. *Research Policy*, 33, 511–529.
Carr`ere, C. (2006). Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model. *European Economic Review*, 50(2), 223–247.
Chen, W.-T, Lin, Y.-L, Lee, C.-Y, Chiang, J.-L, Chang, M.-F & Chang, S.-C. (2013). Strengthening modern electronics industry through the National Program for intelligent electronics in Taiwan. *Access, IEEE*, 1, 123–130.
Davis, D. R. & Weinstein, D. E. (2003). Market access, economic geography and comparative advantage: an empirical assessment. *Journal of International Economics*, 59, 1 – 24.
De Lombaerde, P. (2011). The good, the bad and the ugly in comparative regionalism: A comment on Sbragia. *Journal of Common Market Studies*, 49(3), 675–81.
Dobusch, L. & Schu¨ßler, E. (2013). Theorizing path dependence: A review of positive feedback mechanisms in technology markets, regional clusters, and organizations. *Industrial and Corporate Change*, 22(3), 617–647.
Doctor, M. (2007). Why bother with inter-regionalism? Negotiations for a European Union– Mercosur Agreement. *Journal of Common Market Studies*, 45(2), 281–314.
Dür, A., Baccini, L. & Elsig, M. (2014). The design of international trade agreements: Introducing a new dataset. *Review of International Organizations*, 9(3), 353-375.
Evers, N. & Knight, J. (2008). Role of international trade shows in small firm internationalization: A network perspective. *International Marketing Review*, 25(5), 544-562.
Fai, F. M. (2003). *Corporate technological competence and the evolution of technological diversification.* Edward Elgar: Cheltenham.
Glick, R. & Rose, A. K. (2002). Does a currency union affect trade? The time-series evidence. *European Economic Review,* 46(6), 1125–1151.
Govindarajan, V. & Ramamurti, R. (2011). Reverse innovation, emerging markets, and global strategy. *Global Strategy Journal*, 1(3–4), 191–205.
Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology*, 78, 1360-1380.

Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91(3), 481–510.
Granovetter, M. (2005). The impact of social structure on economic outcomes. *Journal of Econnomic Perspect*, 19(1), 33–50.
Griffiths, A. & Zammuto, R. F. (2005). Institutional governance systems and variations in national competitive advantage: An integrative framework. *Academy of Management Review*, 30(4), 823–842.
Hanson, G. (2005). Market potential, increasing returns and geographic concentration. *Journal of International Economics*, 67(1), 1–24.
Head, K. & Mayer, T. (2004). The empirics of agglomeration and trade. *Handbook of regional and urban economics*, 4, 2609–2669.
Helpman, E. & Krugman, P. (1985). *Market Structure and Foreign Trade*. MIT Press, Cambridge, MA.
Hohenthal, J., Johanson, J. & Johanson, M. (2014). Network knowledge and business relationship value in the foreign market. *International Business Review*, 23(1), 4–19.
Hsu, C. W. & Chiang, H. C. (2001). The Government strategy for the upgrading of industrial technology in Taiwan, *Technovation,* 21, 123–132.
Johanson, J. & Vahlne J. E. (1990). The Mechanism of Internationalisation, *International Marketing Review,* 7(4), 11–24.
Johanson, J. & Vahlne, J. E. (2009). The Uppsala internationalization process model revisited: From liability of foreignness to liability of outsidership. *Journal of International Business Studies*, 40(9), 1411–1431.
Krapohl, S. & Fink, S. (2013). Different paths of regional integration: Trade networks and regional institution-building in Europe, Southeast Asia and Southern Africa. *Journal of Common Market Studies*. 51(3), 472–488.
Krapohl, S. (Ed.) (2017). *Regional Integration in the Global South: External Influence on economic cooperation in ASEAN, MERCOSUR and SADC*. Cham, Switzerland: Springer International.
Krueger, A. O. (1993). Virtuous and vicious circles in economic development. *American Economic Review*, 83(2), 351–55.
Lileeva, A. & Trefler, D. (2010). Improved access to foreign markets raises plant-Level productivity ...for Some Plants. *Quarterly Journal of Economics*, 125(3), 1051-99.
Limao, N. & Venables, A. J. (2001). Infrastructure, geographical disadvantage, transport costs, and trade. *World Bank Economic Review,* 15(3), 451–479.
Linnemann, H. (1966). *An Econometric Analysis of International Trade Flows*, North-Holland, Amsterdam.
Mansfield, E. D. & Milner, H. V. (1999). The new wave of regionalism. *International Organization*, 53(3), 589–627.
Mansfield, E. D. & Reinhardt, E. (2003). Multilateral determinants of regionalism: The effects of GATT/WTO on the formation of preferential trading arrangements. *International Organization*, 57(4), 829–62.
Mathews, J. A. (1997). A silicon valley of the East: Creating Taiwan's semiconductor industry. *California Management Review*, 39(4), 26–54.
Mathews, J. A. (2006). Dragon multinationals: New players in 21st century globalisation. *Asia Pacific Journal of Management*, 23(1), 5–27.
Mattli, W. (1999). *The logic of regional integration: Europe and Beyond.* Cambridge: Cambridge University Press.
Moravcsik, A. (1998). *The choice for Europe: Social purpose and state power from Messina to Maastricht,* Ithaca, NY: Cornell University Press.
Morgan, R. M. & Hunt, S. D. (1994). The commitment-trust theory of relationship marketing. *Journal of Marketing*, 58(3), 20–38.
North, D. C. (1990). *Institutions, institutional change, and economic performance.* Cambridge, MA: Harvard University Press.

Onufrey, K. & Bergek, A. (2015). Self-reinforcing mechanisms in a multi-technology industry: Understanding sustained technological variety in a context of path dependency. *Industry and Innovation*, 22(6), 523–551.
Oviatt, B. M., & McDougall, P. P. (1994). Toward a theory of international new ventures. *Journal of International Business Studies*, 25(1), 45–64.
Peng, M. W. (2003). Institutional transitions and strategic choices. *Academy of Management Review*, 28(2): 275– 286.
Peng, M. W. & Zhou, J. Q. (2005). How network strategies and institutional transitions evolve in Asia. *Asia Pacific Journal of Management*, 22(4), 321–336.
Porter, M. E. (1990). *The competitive advantage of nations*, New York: The Free Press.
Porter, M. E. (1998). Clusters and competition: New agendas for companies, governments, and institutions. In M. Porter (Ed.), *On competitiveness*: 197-288. Boston: Harvard Business School Press.
Pöyhönen, P. (1963). A tentative model for the volume of trade between countries. *Weltwirtschaftliches Archiv*, 90, 93–99.
Sbragia, A. (2008). Review Article: Comparative Regionalism: What Might It Be? *Journal of Common Market Studies*, 46, 29–49.
Sivadas, E. & Dwyer, F. R. (2000). An examination of organizational factors influencing new product success in internal and alliance-based processes. *Journal of Marketing*, 64, 31–49.
Soderbaum, F. & Sbragia, A. (2010). EU Studies and the "new regionalism": What can be gained from dialogue? *Journal of European Integration*, 32(6), 563–682.
Soloaga, I. & Winters, A. (2001). How has regionalism in the 1990s affected trade? *North American Journal of Economics and Finance,* 12, 1–29.
Stone Sweet, A. & Sandholtz, W. (1997). European integration and supranational governance. *Journal of European Public Policy*, 4(3), 297–317.
Tinbergen, J. (1962). *Shaping the world economy: Suggestions for an international economic policy*. New York: The Twentieth Century Fund.
Uzzi, B. (1997). Social structure and competition in interfirm networks: The paradox of embeddedness. *Administrative Science Quarterly*, 42(1), 35–67.
Wang, C. T. & Chiu, C. S. (2014). Competitive strategies for Taiwan's semiconductor industry in a new world economy. *Technology in Society,* 36, 60-73.
Warleigh-Lack, A. & Van Langenhove, L. (2011). Rethinking EU Studies: The contribution of comparative regionalism. *Journal of European Integration*, 32(6), 541–62.