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Ascertaining the competitiveness of Thai exports to PRC

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Abstract

Purpose – This study aims to fundamentally focus on the comparative advantage measurement and the trend of change in the international competitiveness of five Thai economic products exporting to the People's Republic of China during the first half of the 2010s via the analysis of the revealed comparative advantage (RCA) index and market share.

Design/methodology/approach – The RCA index has been computed to show the comparative advantages of the product to a certain extent: whether it is cost-effective to produce that product in a certain location compared to opportunity cost of the resources in producing that product. The data set of number and value of five important export products from Thailand to China during 2010-2013 has been obtained from the Thai Ministry of Commerce and Thai-Chinese Business Information Centre.

Findings – The study reveals that of these five important economic products, cassava has the highest comparative advantage and continues to have a rapid growth trend, whilst computer equipment and components have been shown to have comparative disadvantage and the lowest comparative advantage index scores.

Research limitations/implications – Measuring with various sophisticated indices may provide clearer results. Also, according to unavailability of data set, the four-year period may not be able to show the long-term trend of competitiveness. Future studies are encouraged to study in the longer-term period with numerous indices.

Practical implications – The research also provides policy implications and measures to develop each sector to enhance competitiveness.

Originality/value – This is the original attempt to use both indices to assess the competitiveness of important Thai exports to the Chinese market.

Keywords Competitiveness, Export, ASEAN, Comparative advantage, Chinese market, Thai economy

Paper type Research paper

1. Introduction

The 2015 report of the World Bank indicates that the Thai economy grew by 0.9 per cent in 2014, as domestic demand was dampened in the first half of the year and exports fell amid lower demand from abroad. The country's real GDP was expected to increase by up to 3.5 per cent in 2015, primarily due to lower oil prices, increased tourism receipts and higher public spending. Thai exports are expected to continue growing slowly. The Bank of Thailand (2014) points out that in 2013, the Thai economy slowed compared with the previous year, mostly owing to weakness in domestic demand. In 2013, the Thai economy expanded by 2.9 per cent, moderating considerably from 2012 because of a slowdown in private spending. Exporters of processed agricultural products and fisheries faced shortages of raw materials following the ongoing shrimp disease outbreak. As a result, Thailand's export value in 2013 declined by 0.2 per cent from 2012. The sluggish recovery compared poorly with many

countries in the region, such as South Korea, Malaysia and the Philippines, whose exports had been improving visibly since the third quarter of 2013 (Bank of Thailand, 2014).

From these phenomena, the Bank of Thailand (2014, p. 10) concludes that:

> […] factors that could lead to accumulation of imbalances in the Thai economy and hence require close monitoring are: 1) volatility of capital flows as a result of major advanced economies' monetary policy implementation during times of abundant global liquidity, which could lead to fragile confidence of foreign investors; 2) higher risk to fiscal stability from rising public debt due to government spending to stimulate the economy in the short term, especially spending related to quasi-fiscal activities conducted through specialised financial institutions as part of the rice pledging scheme, along with subsidies of energy and other utilities. Such a development could affect the country's credit rating, resulting in a higher cost of finance and loss of competitiveness of the corporate sector; and 3) threats to overall economic and financial stability, especially household debt, which remained elevated despite some moderation from the previous year.

NESDB (2013) explains that these constraints represent a threat to the sustainability of Thailand's economic growth. The most notable constraints are labour shortage due to an increase in Thailand's aging population, low growth in labour productivity and inability of businesses to upgrade technology to cater for fast-changing global demand in a timely manner. These issues would require time to address, but their resolution would be crucial to uplift Thailand's competitiveness in the global arena (NESDB, 2013; Bank of Thailand, 2013, 2014).

A similar view of the situation and trend of the Thai economy can also be found in the report of the World Bank (2014), that comments that the Thai economy has been recovering more slowly from the Global Financial Crisis than such countries as Malaysia and China. Growth in 2013 is shown to be 3 per cent, with performance slower than expected in all components of GDP – consumption, investment, net exports and government spending. While some of the weakness in exports can be explained by the structure of production, falling global PC sales relative to tablets may have reduced exports of hard disk drives, and sectors such as agro-products and metals have also performed poorly. The weakness in household consumption is partly explained by tax incentives for car purchases that expired at the end of 2012 and led to preponing of consumption. Fast growing levels of household debt, more rigorous macro-prudential measures by the Bank of Thailand and arrears in payments on the Paddy Pledging Program have also been contributing factors. The slowdown was evident by the third quarter, before protests began. The protests are unlikely to have had a significant macroeconomic impact in 2013 (World Bank, 2014).

It can be seen that the Thai economy has decelerated considerably over the past few years. A large number of economic reports indicate that export growth has decreased dramatically and continually since the early 2010s, in part due to erosion of Thailand's competitiveness. On average, exports grew 13 per cent per year from 2006 to 2011, before slowing to less than 1 per cent from 2012 to 2014. Thailand's market share in world exports has declined correspondingly during the same period (World Bank, 2015). Hence, it is necessary to conduct a study to assess the competitiveness of Thai manufacturing exports to show the real situation, as well as to point out possible measures or make recommendations to stakeholders and policymakers to uplift this situation. These are the main purposes of this research. This paper is structured as follows: first, the literature review related to Sino–Thailand trade situation, comparative advantage, competitiveness and competitiveness measurement is discussed. Then, the research methodology is presented, followed by the results, discussion and policy implications, and empirical and theoretical contribution of the study. The final section is limitations of the study and future research agenda.

2. Literature review

According to McKean *et al.* (1994), by the late 1980s, Thailand had emerged as one of the fastest-growing economies in the world. Although Thailand's growth rates averaged more than 7 per cent in the 1960s and 1970s, its more recent growth is unprecedented. Between 1986 and 1989, real gross domestic product (GDP) increased by 10 per cent annually. Thailand's economy is heavily export-dependent, with exports accounting for more than two-thirds of GDP. Exports as a percentage of GDP had risen from 17 per cent in 1970 to 38 per cent by 1988. Thai exports tripled in value between 1985 and 1990, with total exports in constant dollars rising from nearly 5.2bn in 1985 to 15.5bn in 1990 (McKean *et al.*, 1994). According to the Ministry of Commerce (MOC) (2015), exports in Thailand averaged US$9,348.86m from 1991 until 2015, reaching an all-time high of US$21,227.12m in August of 2011.

Manufactured exports have led the export boom. Thailand's exports had been shifting from agriculture and primary commodities to manufacturing for more than 20 years. The overall structure of Thai exports has also changed. Manufacturing's contribution to the domestic economy has increased rapidly, whereas agriculture's contribution to GDP has declined. Manufactures rose from about 10 per cent of total exports in 1971 to 66 per cent in 1990, while agriculture, principally primary commodities, dropped from 63 to 27 per cent in this same period (Narongchai, 1991). Textiles and apparel has been the lead sector in the export boom. Other sectors with outstanding gains since 1985 include jewellery, electronic components, integrated circuits, machinery parts, footwear and processed and canned food. Traditional agricultural commodity exports (e.g. rice, maize and tapioca) lost ground.

Thailand has developed an increasingly broad and diversified export base. In 1990, no sector represented more than 9 per cent of total export earnings, with the exception of clothing and textiles, which accounted for nearly 15 per cent of the total. Thailand has excelled in various niche markets and, to date, has been the world's largest tuna exporter and exporter of frozen prawns to such highly competitive markets as Japan. Food processing industries have encouraged the diversification of agriculture, leading to tremendous success in canned and frozen exports. At the present time, Thailand exports mainly manufactured goods (86 per cent of total shipments), with electronics (14 per cent), vehicles (13 per cent), machinery and equipment (7.5 per cent) and food processing products (7.5 per cent). Agricultural goods, mainly rice and rubber, account for 8 per cent of total shipments. Major export partners are China (12 per cent), Japan (10 per cent), the USA (10 per cent) and the European Union (EU, 9.5 per cent). Others include Malaysia, Australia and Singapore [Ministry of Commerce (MOC), 2015]. Thus it can be seen that, for Thailand, China is one of its major export markets.

This phenomenon has been studied by Manarungsan (2015) and Hongfang (2013), and they conclude that the past decade has witnessed an expansion of Sino–Thai bilateral economic relations unprecedented in the history of economic relations between the two countries. They ascribe this to the signing of the China–ASEAN (Association of Southeast Asian Nations) Free Trade Agreement (CAFTA). Three agreements under CAFTA have been the driving force behind expansion of the two countries' economic exchanges. These are the Agreement on Trade in Goods, the Agreement on Trade in Services and the ASEAN–China Investment Agreement, which were signed in 2004, 2007 and 2009, respectively. The free trade area came into effect on 1 January 2010 (Chan, 2009). Owing to many positive factors, Thailand has been one of the most active participants among the ASEAN member countries in taking advantage of this free trade deal (Hongfang, 2013, p. 1).

According to the Department of Trade Negotiations, Ministry of Commerce (2016), the free trade agreement reduced tariffs on 7,881 product categories, or 90 per cent of imported

goods, to zero (The Jakarta Post, 2010; Li, 2009). This reduction took effect in China and the six original members of ASEAN: Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand in 2010. The remaining four countries followed suit in 2015. The average tariff rate on Chinese goods sold in ASEAN countries decreased from 12.8 to 0.6 per cent on 1 January 2010. Meanwhile, the average tariff rate on ASEAN goods sold in China decreased from 9.8 to 0.1 per cent (Coates, 2009). The six original ASEAN members also reduced tariffs on 99.11 per cent of goods traded among them to zero (Dyer and Kunmakara, 2010; China Daily, 2009; The China Post, 2010).

2.1 The overall trade situation between Thailand and China
Data from the Thai-Chinese Business Information Centre (2015) show that Thailand has become one of China's largest sources of imports. Table I shows the rank of major exporting countries to China, and the data indicate that four ASEAN countries, namely, Malaysia (ranked 8), Thailand (ranked 14), Indonesia (ranked 16) and the Philippines (ranked 25), are

Rank	Imports Country	Value 2012	Value 2013	(%) Share 2012	2013	(%) Change 13/12
0	– World –	1,817,344.03	1,949,300.33	100	100	7.26
1	Korea, South	166,589.71	182,881.54	9.17	9.38	9.78
2	Japan	177,726.83	162,219.41	9.78	8.32	-8.73
3	China	142,819.21	156,799.28	7.86	8.04	9.79
4	Taiwan	132,194.25	156,512.20	7.27	8.03	18.4
5	USA	127,754.59	145,925.97	7.03	7.49	14.22
6	Germany	92,029.03	94,131.11	5.06	4.83	2.28
7	Australia	78,593.07	91,558.19	4.33	4.7	16.5
8	Malaysia	58,246.52	60,053.94	3.21	3.08	3.1
9	Switzerland	22,809.49	56,009.79	1.26	2.87	145.55
10	Brazil	52,059.67	53,666.06	2.87	2.75	3.09
11	Saudi Arabia	54,945.13	53,499.28	3.02	2.75	-2.63
12	South Africa	44,615.46	48,313.95	2.46	2.48	8.29
13	Russia	43,952.07	39,565.19	2.42	2.03	-9.98
14	Thailand	38,455.86	38,107.06	2.12	1.96	-0.91
15	Angola	33,458.34	31,948.02	1.84	1.64	-4.51
16	Indonesia	32,032.83	31,478.44	1.76	1.62	-1.73
17	Singapore	28,428.98	29,861.85	1.56	1.53	5.04
18	Iran	24,929.44	25,396.68	1.37	1.3	1.87
19	Canada	22,759.46	24,132.09	1.25	1.24	6.03
20	France	24,227.96	23,004.90	1.33	1.18	-5.05
21	Unidentified Country	20,306.27	21,763.42	1.12	1.12	7.18
22	Oman	16,952.70	20,993.57	0.93	1.08	23.84
23	Chile	20,611.19	20,800.17	1.13	1.07	0.92
24	UK	16,808.06	18,983.16	0.93	0.97	12.94
25	Philippines	19,677.80	18,204.68	1.08	0.93	-7.49
26	Iraq	12,643.23	17,968.06	0.7	0.92	42.12
27	Italy	16,241.54	17,554.57	0.89	0.9	8.08
28	India	18,820.37	17,046.05	1.04	0.87	-9.43
29	Vietnam	16,230.07	16,885.78	0.89	0.87	4.04
30	Hong Kong	17,955.26	16,225.27	0.99	0.83	-9.63

Table I.
Total imports of China from the world (US$ million)

Source: Thai-Chinese Business Information Centre (2015)

among the leading exporters to China. For Thailand, the total value of exports to China in 2012 and 2013, respectively, was US$38,455.86m and US$38,107.06m.

Table II shows Thailand's major exports to China classified by product. Overall, the data in Table II and Table III show that the pattern of bilateral trade in goods between China and Thailand during 2012-2013 has not changed considerably. The top export products from Thailand to China in Table II include machinery, electrical machinery, rubber, plastics, organic chemicals, mineral fuel/oil and vegetables, whilst the major imports of Thailand from China in Table III are machinery, electrical machinery, iron and steel, furniture and bedding, plastics, vehicles, medical and pharmaceutical products, iron/steel products and organic chemicals.

Furthermore, Table II and Table III also reveal that Thailand enjoyed a trade surplus during 2012-2013. The data indicate that in Sino–Thai bilateral trade, the trade surplus in Thailand's favour was US$36,296.65m in 2012, and decreased slightly to US$35,475.09m in 2013. Hongfang (2013) explains that the trade structures of China and Thailand have undergone tremendous changes in the past decade, with machinery, intra-industrial goods containing electronic products, parts and intermediate goods as the major exports and

Products	Value		(%) Share		(%) Change
	2012	2013	2012	2013	- 13/12 -
Total	38,455.86	38,107.06	2.12	1.96	-0.91
Machinery	10,532.93	7,435.82	27.39	19.51	-29.4
Electrical machinery	6,120.18	6,587.79	15.92	17.29	7.64
Rubber	5,987.16	6,259.82	15.57	16.43	4.55
Plastics	3,267.46	3,607.93	8.5	9.47	10.42
Organic chemicals	2,617.79	2,890.25	6.81	7.59	10.41
Mineral fuel, oil, etc	1,858.98	2,393.82	4.83	6.28	28.77
Vegetables	1,248.24	1,446.96	3.25	3.8	15.92
Edible fruit and nuts	1,056.36	1,292.3	2.75	3.39	22.34
Wood	1,019.51	1,167.3	2.65	3.06	14.5
Medical and pharmaceutical products	752.36	769.09	1.96	2.02	2.22

Source: Thai-Chinese Business Information Centre (2015)

Table II.
Ten major exports of
Thailand to China
(US$ million)

Products	Value		(%) Share		(%) Change
	2012	2013	2012	2013	13/12
Total	2,159.21	2,631.97	1.44	1.41	-2.08
Machinery	488.84	536.59	22.64	20.39	9.77
Electrical machinery	397.49	473.78	18.41	18	19.19
Iron and steel	115.58	183.14	5.35	6.96	58.45
Furniture and bedding	46.34	55.97	2.15	2.13	20.78
Plastics	64.03	87.99	2.97	3.34	37.42
Vehicles, not railway	85.42	123.53	3.96	4.69	44.61
Medical and pharmaceutical products	94.96	122.70	4.4	4.66	29.22
Iron/Steel products	62.00	84.66	2.87	3.22	36.54
Organic chemicals	73.07	59.03	3.38	2.24	19.21
Misc. chemical products	31.64	42.50	1.47	1.62	34.33

Source: Thai-Chinese Business Information Centre (2015)

Table III.
Ten major imports of
Thailand from China
(US$ million)

imports. In other words, a large part of trade in PCAs (parts, components and accessories) is of the intra-firm variety, that constitutes the major part of the two countries' foreign trade. The trade structures between China and Thailand have not only diversified but also overlapped, with horizontal division of labour leading to a departure from the old pattern, where agriculture-based products constituted the greater part of China's imports from Thailand, while textiles and garments, iron and steel products and chemical products were China's major exports to Thailand (Manarungsan, 2015; Hongfang, 2013).

2.2 The concept of comparative advantage, international competitiveness and measurement

2.2.1 Comparative advantage. According to Prasad (2004), Seyoum (2007), Jayawickrama and Thangavelu (2010), Wei and Chunming (2012), Kathuria (2013), Huo (2014) and Erkan and Saricoban (2014), the concept of comparative advantage is widely used in economic and export competitiveness literature. This concept is originally created by Ricardo (1817) to explain trade specialisation patterns among countries as a function of a nation's resource endowments. Domestic natural resources and factors of production being fixed, a country which possessed them could produce a good more cheaply than a country which had to import them. Simply put, countries that have a comparative advantage in the production of a good should be found to export a higher proportion of that good relative to other countries (Addison-Smyth, 2005). Thus, comparative advantage in essence became a cost-based notion of a country's economic competitiveness, based on the fixity of basic inputs into the production process.

Likewise, Leishman *et al.* (1999), Cai and Leung (2007) and Erkan and Saricoban (2014) argue that the concept of comparative advantage is largely derived from the propositions on opportunity cost and labour specialisation. The theory explains that the driving force behind international trade is not "absolute" but "comparative" advantage. That is, even if an autarky country has absolute advantage in all the goods (i.e. it can produce all the goods more efficiently than other countries), it can still benefit from international trade through increasing specialisation in the goods where its comparative advantage lies (Erkan and Saricoban, 2014, p. 118). Correspondingly, Siggel (2007) points out that each country would produce and export products with obvious comparative advantage or weaker comparative disadvantage, and import products with obvious comparative disadvantage. So-called comparative advantage meant that one country had less comparative cost for a certain quality of the same product than another country.

In addition, Thornhill (1988), Siggel (2007) and Erkan and Saricoban (2014) rationalise that the comparative advantage concept is a microeconomic level, focusing on industry-specific trade, explaining why one country might export labour-intensive products while another country might specialise in capital-intensive ones. In other words, each country has a comparative advantage in the production of some products for which it has a lower relative (opportunity) cost than its competitors. Comparative advantage is an equilibrium concept, predicting a pattern of trade when prices, trade flows and exchange rates are in equilibrium. Business decisions, in contrast, often explicitly consider short-term developments (Erkan and Saricoban, 2014).

2.2.2 International competitiveness. According to Adams *et al.* (2004), international competitiveness has been defined as the ability under present conditions of a country's products to command world market, while the Organisation for Economic Cooperation and Development (OECD) (1992) explained [international] competitiveness as the degree to which, under open market conditions, a country can produce goods and services that meet the test of foreign competition while simultaneously maintaining and expanding domestic

real income. Assche *et al.* (2007) argue that a country gains international competitiveness if it is able to export products and services at a relatively cheaper price and therefore grab a larger export market share. A country loses international competitiveness if it loses export market share. However, the concept of competitiveness is still evolving and controversial (Krugman, 1994, Siggel, 2007, Erkan and Saricoban, 2014).

Welch and Lyford (2007) argue that a key aspect of evaluating whether a producer of a given good is competitive in its market offering depends on both a definition and measure of the term competitiveness. Welch and Lyford (2007, p. 66) cite Drescher and Maurer's (1999) definition of competitiveness as the ability of firms and industries "[…] to protect and/or improve their position in relation to competitors which are active in the same market". This definition is consistent with that of Sharples (1986) and Kennedy and Rosson (2002), who define competitiveness as the ability to achieve market share. The producer who attains a market share for its product is, by definition, competitive. A product for which market share is increasing can be said to be increasing in competitiveness and, conversely, a product is regarded as decreasing in competitiveness if the market share for that product is in decline.

Competitiveness is an ex-post concept and could ideally involve comparisons between countries in regard to the efficiency of production (Thornhill, 1988; Siggel, 2007; Erkan and Saricoban, 2014). On the other hand, comparative advantage is an ex-ante theoretical concept involving comparisons between countries and products. Measurement of comparative advantage would ideally enable researchers to predict trade flows and to evaluate the extent to which the resource allocation between industries is optimum or not (Erkan and Saricoban, 2014).

Siggel (2007) argues that, comparing to comparative advantage, the concepts of [international] competitiveness proposed in the economic and business literature have not been defined rigorously in the early economic literature. Therefore, over time and after many attempts of definition, it has become a somewhat ambiguous concept. Some researchers use the term synonymously or in a similar way as comparative advantage, others view it as an economy-wide characteristic. The concept of competitiveness has been given interpretation at both the macroeconomic and the microeconomic level (Siggel, 2007).

The first macroeconomic interpretation uses the World Competitiveness Index computed and published yearly by the World Economic Forum and Institute of Management Development (WEI/IMD, annual since 1995). The index is the basis for an international ranking of countries in terms of their business climate. It is a composite of a large number of attributes condensed into a single index. Siggel (2007) contends that this method may serve a useful purpose to international investors, but its theoretical base and, especially, its aggregation method are problematic.

The second interpretation of macroeconomic competitiveness defines an economy to be competitive if it harbours a large number of internationally competitive enterprises and industries. This idea underlies the concept used by Dollar and Wolff (1993), who defined a competitive country as one that succeeds in international trade via high technology and productivity, with accompanying high income and wages. Similar approaches are the concepts proposed by Hatsopoulos *et al.* (1988) and Markusen (1992).

The third macroeconomic interpretation is real exchange rate (RER) and the real effective exchange rate (REER) proposed by researchers from the International Monetary Fund (Lipschitz and McDonald, 1991; Marsh and Tokarick, 1994). As the RER implicitly compares the nominal exchange rate with the purchasing power parity rate, it measures the degree of currency misalignment based on the purchasing power parity assumption. Under-valuation enhances and overvaluation reduces the international competitiveness of domestic producers. This indicator is clearly macroeconomic, but it has also been used as a micro-level

concept, by using the price indices of single industries rather than economy-wide price indices (Helleiner, 1991). At the macro level, it is essentially a monetary indicator, capturing the distortion of the currency value, rather than factors of real competitiveness, although those are not unrelated to the currency misalignment (Siggel, 2007).

The weakness of the macroeconomic approaches in measuring competitiveness has triggered many researchers to adopt microeconomic concepts and indicators of competitiveness in the recent past. Siggel (2007, p. 8) points out that the microeconomic approach is preferred because it has a more solid theoretical background by focusing on the essential characteristics of producers in competition for market share and profits or the ability to export. This ability can be measured by the size or increase of market share (Mandeng, 1991), by export performance (Balassa, 1965), by price ratios (Durand and Giorno, 1987), cost competitiveness (Turner and Gollub, 1997; Siggel and Cockburn, 1995) or by more complex and multi-dimensional indicators (Porter, 1990; Buckley *et al.*, 1992; Oral, 1993). These indicators differ from each other in terms of various characteristics, especially in terms of the number of dimensions they focus on.

2.2.3 International competitiveness measurement. A large number of researchers (Rugman, 1993; Jin and Moon, 2006; Chikan, 2008; Seyoum, 2007; Siggel, 2007; Welch and Lyford, 2007; Baldwin and Robert-Nicoud, 2008; Wei and Chunming, 2012; Kathuria, 2013; Huo, 2014) argue that the measurement of international competitiveness has been widely adopted from two prominent approaches: Porter (1990) and Balassa (1965). Porter's method assesses competitiveness along the value-added chain. For example, it not only evaluates the competitiveness of the farmer but that of all the participants in the value-added chain. This method therefore allows to identify and analyse the structure of a sector and to point out the strengths and weakness. Thus, critical success factors can be identified to which participants in a chain have to pay attention to develop and sustain competitive advantage as successfully as possible.

According to Smit (2010), in Porter's diamond framework, there are six broad attributes of a nation that shapes the environment in which local firms can compete that promote the creation of competitive advantage. These are factor conditions, demand conditions, related and supporting industries, firm strategy, structure and rivalry, government and role of chance. Chance events are occurrences that have little to do with circumstances in a country and are often largely outside the power of firms and also the national governments to influence. These include events such as wars, political decisions by foreign government, large increases in demand, shift in world financial markets and exchange rates, discontinuity of technology and input demand (Porter, 1990; Rugman, 1993; Jin and Moon, 2006; Chikan, 2008).

Balassa's competitiveness indicators are ex-post concepts (Balassa, 1965). Many studies have determined a country's competitiveness via the paradigm of Balassa by comparing a commodity share in its exports to the commodity share in world exports, referred to as its revealed comparative advantage (RCA) (Balassa, 1965; Seyoum, 2007; Huo, 2014). If the RCA is greater than 1, it is taken as evidence of international competitiveness. It compares how well a country has done in export of some particular set of goods. Balassa (1967) claims that comparative advantage is revealed by observed trade patterns, i.e. high shares of export markets. RCA is grounded in conventional trade theory and measures a country's exports of a commodity relative to that of a set of countries (Seyoum, 2007).

Erkan and Saricoban (2014) argue that in empirical work, the concept of comparative advantage has been used extensively, although the notion of comparative advantage faces a measurement problem because it is defined in terms of relative autarkic price relationship that are not observable in post-trade equilibria. This is because trade statistics reflect

post-trade positions (Sharma and Dietrich, 2004). The linkage between comparative advantage and competitiveness (RCA) is as follows (Ballance *et al.*, 1987): EC → CA → TPC → RCA. Economic condition (EC) in the various trading countries ultimately determines the international pattern of comparative advantage (CA). This pattern, in turn, governs the pattern of international trade, production and consumption (TPC) among countries. Indices constructed from TPC and, perhaps, other post-trade variables are normally used to indicate comparative advantage and referred to as indices of "revealed comparative advantage (RCA)".

The index of RCA was first introduced by Liesner (1958) and operationalised by Balassa (1965) to measure comparative advantages (Balassa, 1965).

The export index of RCA has been defined as the ratio of a country's exports in a particular commodity category to its share in total merchandise exports (Balassa and Noland, 1989). Benedictis and Tamberi, (2002) argue that this measurement was initially created in an attempt to overcome obstacles in measuring Ricardo's index because of unobserved relative autarkic prices. This approach uses value of exports to measure a comparative advantage in production of each country. The index can be presented as:

$$RCA = (X_{ij}/X_j)/(X_{iw}/X_w)$$

Where X stands for exports, and i, j and w refer to industry (product category), country and world, respectively. The index neutralises the effect of the size of a country's economy or industry, thereby making it possible to make meaningful comparisons between countries and the international performance of different industries.

The value of index varies between zero to infinity, where zero indicates a country has no exports in the industry being considered, and infinity means that the industry is a major exporter relative to other industries of the economy. A sector with an *RCA* index of over 1 has a share in the world market share which exceeds the average share of the country in world exports. This means that it is relatively competitive, compared to the rest of its home economy. Such a sector has therefore a comparative advantage (Rivlin, 2000).

According to Hinloopen (2001) and Erkan and Saricoban (2014), a more detailed analysis, to demonstrate the power of comparative advantage, the Balassa's RCA indices, can be classified into four types (Hinloopen, 2001): Comparative disadvantage has been named as Type 1, where $0 < RCA \leq 1$. Type 2 is a weak comparative advantage ($1 < RCA \leq 2$), while the moderate comparative advantage has been categorised as Type 3 ($2 < RCA \leq 4$). The RCA with scores greater than 4 has been classified as Type 4, the strong comparative advantage.

2.3 The new trade theory

According to Smit (2010), up until the 1970s, international trade theory was dominated by the theory of comparative advantage, which can be loosely defined as trade due to differences between countries. Two of the basic underlying assumptions of comparative advantage are perfect competition and constant returns to scale. In terms of these assumptions, monopoly profits are competed away as firms strive to improve their strategic positions in markets. However, a large and growing part of trade has come from massive two-way trade in similar industries since the Second World War (Grubel and Lloyd, 1975; Linder, 1961; Vernon, 1966; Krugman, 1990; Neary, 2009; Smit, 2010) that could not be explained by comparative advantage and was principally driven by advantages resulting from economies of scale. This changing pattern of world trade has made the traditional assumption of constant returns to scale unworkable to explain intra-industry trade.

Correspondingly, Neary (2009) argues that the increased recognition of such intra-industry as opposed to inter-industry trade was not just of interest from the perspective of positive science. Comparative advantage theories predicted that adjusting to trade liberalisation would be disruptive, as the process of specialisation encouraged factors of production to move out of sectors in which each country had a comparative disadvantage and into its expanding sectors:

> Though classroom expositions of this process often suggested a smooth movement along a production possibility frontier, it was clear that factor specificities and factor-price rigidities could make for painful adjustment in the short run (Neary, 2009, p. 219).

However, while this was undoubtedly true of many real-world episodes of adjustment to trade liberalisation, it seemed inadequate as a description of the major such episode in the immediate post-war era: the integration of the relative similar economies of the EU (Neary, 2009). Studies by Balassa (1967) and others showed that this process proceeded with surprisingly few costs of adjustment. Once again, specialisation appeared to be intra-industry rather than inter-industry (Markusen, 1995; Markusen and Venables, 1998; Neary, 2009).

A number of researchers (Krugman, 1986; Markusen and Venables, 1998; Smit, 2010), hence, point out that a new approach was needed to explain the advantages of trade due to large-scale production, cumulative experience and transitory advantages resulting from innovation. Furthermore, to explain economies of scale (internal and external), a new market structure was needed that was altogether different from perfect competition (Krugman, 1986). Also, Smit (2010) denotes that the breakthrough came during the late 1970s with the introduction of new models of monopolistic competition by industrial organisational theorists (Spence, 1976; Dixit and Stiglitz, 1977) that allowed trade theorists (Krugman, 1981, 1986, 1990; Lancaster, 1980; Helpman, 1981; Ethier, 1982) to overcome the complexity of modelling oligopolistic rivalry in a general equilibrium framework. The main appeal for using monopolistic competition was to focus on economies of scale as the core in explaining trade rather than on imperfect competition (Krugman, 1990).

The dissimilarity between the traditional and the new trade theory (based on monopolistic competition) is that at the level of inter-industry trade, comparative advantage continues to be the dominant explanation of trade flows, whereas at the level of intra-industry trade, economies of scale become the dominant explanation of trade flows in differentiated products (Krugman, 1986; Smit 2010). The similarity is that in both the traditional and the new thinking about trade, advantage comes through specialisation. However, in the former, specialisation takes place because of country differences, while in the latter, the inherent advantage of specialisation is based on increasing returns. Smit (2010) claims that the most important insight of the new trade theory based on monopolistic competition is that under free trade, there will be gains from trade (Krugman, 1981, 1990), which implies, as in the case of comparative advantage, that trade is a positive sum game (Krugman, 1990).

3. Research methodology
The data set of this study has been obtained from the Thai Ministry of Commerce and the Thai-Chinese Business Information Centre. This research measures international competitiveness using the RCA index and market share. World Bank (2010) notes that RCA is the ratio of the export output of a product of a certain country to that product in the world market. The measure of competitiveness can be straightforwardly computed by the RCA index, which can, to a certain extent, show the comparative advantages of the product:

whether it is cost-effective to produce that product in a certain location compared to the opportunity cost of the resources in producing the product.

The measure of competitiveness by the RCA index can be computed straightforwardly and it can show the comparative advantages of the product to a certain extent: whether it is cost-effective to produce that product in a certain location compared to opportunity cost of the resources in producing that product. In this study, the RCA index is calculated as follows:

$$RCA = (X_{ia}/X_{ta})/(X_{iw}/X_{tw})$$

Where:

X_{ia} = Total exports of goods (i) from Thailand to China.
X_{ta} = Total exports from Thailand to China.
X_{iw} = Total imports of goods (i) of China.
X_{tw} = Total imports of China.

The criteria determining the index of comparative advantage (RCA) are as follows:

- $RCA > 1$ means that the country has a comparative advantage in exporting goods (i) to China.
- $RCA < 1$ means that the country has a comparative disadvantage in exporting goods (i) to China.

A number of researchers (Siggel, 2007; Suriya, 2001; Benedictis and Tamberi, 2002) point out that there are a number of limitations to interpretation of the RCA index. Firstly, the data obtained from a preceding period have been computed, but there has been no measurement of the potential for change. Secondly, the index does not reflect other implicit costs of the country, such as trade barriers and transportation costs. Hence, the calculation and the interpretation of this index must rest on the assumption that there is no market distortion or market intervention by the government or other related stakeholders. Thirdly, the RCA index is a static analysis. Fourthly, the RCA index does not reveal the source of comparative advantage (Vanek, 1968). Finally, the RCA index is not symmetric and its mean is not fixed (Benedictis and Tamberi, 2002). Because of this limitation, many researchers (Suriya, 2001; Benedictis and Tamberi, 2002; World Bank, 2010) suggest using a variety of indices to measure export competitiveness, to obtain a clearer picture of competitiveness. Accordingly, like the previous study of Mandeng (1991), this study adopts market share as a second tool to assess trade competitiveness.

Market share as an empirical measure of competitiveness is founded on the performance of a given product in the marketplace. As the focus of this study is the global marketplace, export shares will be used as indicators of international competitiveness. These relative shares will be analysed for the clues they may provide as to how and in which direction the competitiveness of a given industry may be changing (Drescher and Maurer, 1999). Direct observation of trade performance may then reveal comparative advantage (competitiveness) in the production of that commodity. According to Mandeng (1991), Suriya (2001) and Farris *et al.* (2010), market share is the proportion of the value of exports of a good (i) of an individual exporting country entering the importing country compared to the total value of world exports of good (i) to that importing country:

$$MSi_{(th\text{-}chi)} = Xi_{(th\text{-}achi)}/Xi_{(w\text{-}chi)}$$

Where:

$MSi_{(th-chi)}$ = Market share of product (i) from Thailand in People's Republic of China (PRC) market.

$Xi_{(th-chi)}$ = Total value of exports of product (i) from Thailand to China.

$Xi_{(w-chi)}$ = Total value of imports of product (i) from the world to China.

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A number of researchers (Mandeng, 1991; Suriya, 2001) argue that high market share means a high percentage of an industry or market's total sales earned by a particular company or nation over a specified period. This comes about as a result of such factors as price, product quality, delivery service and so forth. Relatively lower production cost compared to other countries is one way of gaining a high market share. This could be an absolute advantage over other trading countries or partners. Hence, market share reflects absolute advantage rather than comparative advantage (Suriya, 2001). For instance, if a country (J) has a high market share of product (I) in market (M), but the RCA index shows low scores, this could be interpreted as meaning that country (J) has an absolute advantage over the trading partner country (M) due to cost advantages or other reasons. However, country (J) has little comparative advantage over country (M). It is unlikely to be worthwhile to increase production of product (I) compared to transferring resources to produce other products within country (J). This means that manufacturers in other industries have little interest in transferring their resources to production of product (I). Consequently, the market share of product (I) in market (M) is unlikely to change. However, if the RCA index shows high scores, this indicates that it will be very cost-effective to transfer resources from other industries to produce product (I), the output of industry (I) will expand greatly and the market share of product (I) will tend to increase considerably. Suriya (2001) asserts that where the RCA index scores are lower than 1 (indicating high opportunity cost), manufacturers may consider whether to move production to other industries in the country or to relocate their current production to other countries that could create comparative advantage for them.

## 4. Results, discussion and policy implications

Table IV and Figure 1 indicate that the RCA index scores of Thai rubber (SITC Rev.3 code 23) exported to China have generally been growing steadily during the four-year period, but slumped slightly in 2012 before again soaring in 2013. The data show that the RCA index scores of rubber during 2010-2013 are 9.39, 13.27, 11.83 and 13.56, respectively. The average RCA index score is 12.01 during the four-year period. This can be interpreted as indicating that rubber from Thailand has a very high comparative advantage over the Chinese market.

Table V and Figure 2 show the market share of rubber exports from Thailand in the PRC market. The result shows that the market share of Thai rubber in the Chinese market has had

Year	RCA of rubber	RCA of chemicals	RCA of plastic pellets	RCA of PC equipment and electronic components	RCA of cassava
2010	9.39	9.49	1.66	1.04	49.58
2011	13.27	11.55	2.31	0.81	49.44
2012	11.83	12.88	2.52	0.80	42.03
2013	13.56	14.60	2.84	0.43	56.40

Table IV.
The annual RCA index of Thai exports to China by products
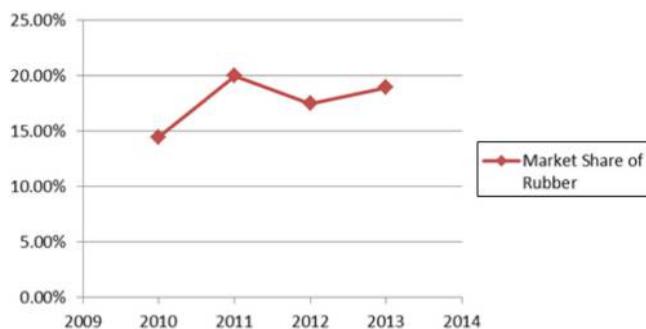
Source: Calculation
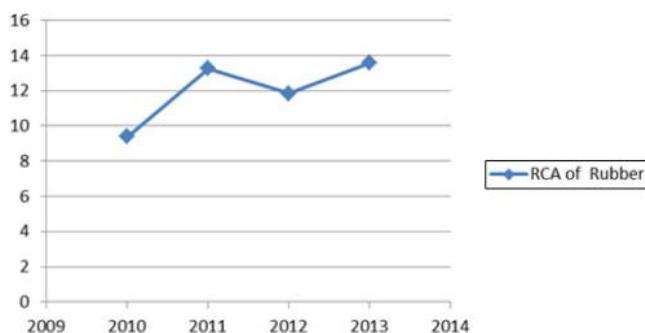
Figure 1.
RCA index of rubber

Year	Rubber (%)	Chemicals (%)	Plastic pellets (%)	PC equipment and electronic components (%)	Cassava (%)
2010	14.47	14.63	2.56	1.60	76.38
2011	20.00	17.41	3.48	1.22	74.52
2012	17.49	19.04	3.72	1.18	62.15
2013	18.94	20.39 cent	3.97	0.60	78.80

Source: Calculation

Table V.
The annual market
share of Thai exports
by products

Figure 2.
Market share of
rubber

an unstable upward trend, with a market share of 14.47 per cent in 2010, jumping to 20.00 per cent in 2011, slumping slightly in 2012 to 17.49 per cent of market share, before increasing slightly to 18.94 per cent in 2013. Rubber products are sensitive to price (Owen, 1998), which leads to the fluctuating market share in China. In respect to both the RCA Index and market share, Thai rubber has been very competitive and has had considerable comparative advantage over the Chinese market. This product from Thailand dominates the Chinese market.

However, according to the Thai Ministry of Commerce (MOC) (2015), a number of potential problems or barriers to exporting rubber from Thailand to China are labour shortages, high operating cost, volatility of the rubber price and a low rate of rubber product development. The Thai Government and related stakeholders urgently need to find measures to address these problems. The best way to strengthen this sector and boost rubber exports to the Chinese market is discussed next.

Firstly, according to Albarracin *et al.* (2006), the Thai Government could support production by rubber planters directly and promote the use of new production technologies to increase yield per rai effectively and consistently. Secondly, the Thai Government might seek new approaches and measures to solve the labour shortage in the agricultural sector. It might also accelerate development of agricultural machinery to reduce labour dependency. Planters might upgrade their machines or invest in new machines for more efficient use and cost reduction. Thirdly, Thai government officers may wish to encourage planters to change their production technology, by encouraging the use of organic fertilisers to reduce operating cost. Finally, Thai policymakers may wish to foster research and development from the upstream industry to the downstream industry by setting up joint research projects between the Thai rubber research centre and other rubber research centres in other top rubber export countries, Malaysia and Indonesia, to increase productivity, support the learning of planters and develop the rubber industry as a whole (Doner and Abonyi, 2013).

Table IV and Figure 3 show the RCA index scores of Thai chemical (SITC Rev.3 code 51) exports to China. It can be seen these have grown significantly and consistently during the four-year period, from 9.49 in 2009 to 14.60 in 2013. The annual average RCA index score is 12.13. This is a very high RCA index score. Thailand thus had a very high comparative advantage in the export of chemical products over the PRC during 2010-2014.

In terms of the market share of Thai chemicals in the PRC, the analysis shows that during the four-year period of 2010 to 2013, there was steady growth of the market share of Thai chemicals in the Chinese market, namely, 14.63, 17.41, 19.04 and 20.39 per cent, respectively. This can be seen from Table V and Figure 4. This was an impressive trend for Thai exports in this sector to the Chinese market and could signal a good opportunity for Thai manufacturers to expand to other overseas markets. To summarise, after considering both RCA and market share, chemical products from Thailand have been very competitive in the PRC market.

A number of factors may, nevertheless, adversely affect the growth of this sector for Thailand. These could be the shrinking of the electrical appliances and electronics sector in Europe and Asia (the chemical industry is the upstream industry of these sectors) and increased competitiveness in this sector from rival countries. For example, Malaysia has a relative cost advantage over Thailand [Ministry of Industry (MOI), 2015]. Accordingly, the Thai Government may wish to enhance the competitiveness of manufacturers in this sector in a number of ways. For instance, in terms of technology transfer from foreign firms. To date, this has not lived up to the hopes of the Thai Government. The Thai Government may wish to consider giving higher priority to education to improve this situation, supporting links and collaboration between Thai higher education institutions and foreign
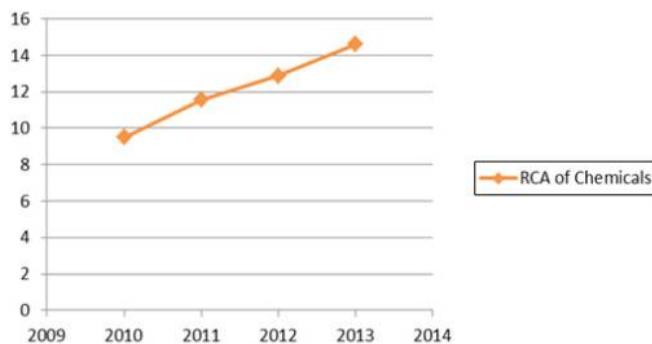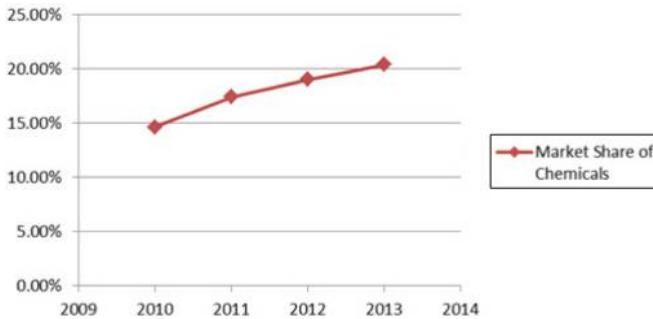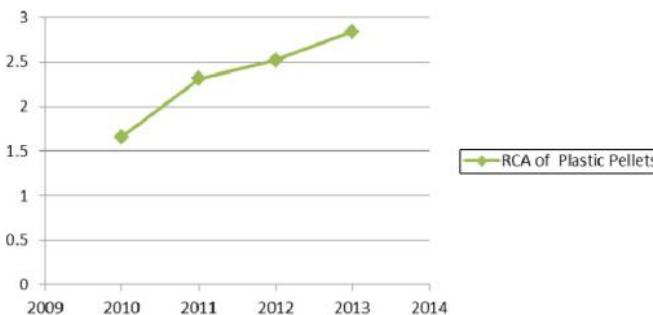

Figure 3.
RCA index of
chemicals

Figure 4.
Market share of
chemicals

manufacturers operating in this sector in Thailand. Foreign and Thai companies might be
encouraged to send specialists to teach and collaborate with Thai students and scholars, or
to set up courses for, say, final-year engineering students. These students would then be of
great value directly to their companies or as key players in the chemical sector. Thai
universities could act as intermediaries in promoting such links among firms in the industry,
with the aim of expanding the supply of highly qualified and compatible managers and
workers for the industry in the future and enhancing the competitiveness of this sector as a
whole.

Table IV and Figure 5 indicate that the average RCA index scores of Thai plastic pellets
(SITC Rev.3 code 57) during the four-year period (2009-2013) are greater than 2. This can be
interpreted as meaning that Thailand has a comparative advantage in the export of plastic
pellets over the PRC market. In other words, the opportunity costs in producing plastic
pellets in Thailand are lower than in China. Table V and Figure 6 also show the same trend
as a result of market share analysis. The analysis indicates that the market share of plastic
pellets from Thailand in the Chinese market grew consistently during the four-year period
(2010-2013), namely, by 2.56, 3.48, 3.72 and 3.97 per cent, respectively. Both indicators show
that Thailand has a comparative advantage in this product in the Chinese market and
consistent export growth of plastic pellets could be anticipated in the future.

However, the report of Thai Ministry of Industry (MOI) (2015) shows a dramatic slump in
market growth for this product in the USA and the EU. The Thai Government may wish to
establish a number of supporting schemes to promote Thai exporters of this product in
expanding into new markets like South America and Africa, as studied by Thailand Board of
Investment (Thansettakij, 2016; Suwannarat, 2016). Also, the Thai Government could
support manufacturers, especially small and medium enterprises (SMEs), to develop their

Figure 5.
RCA index of plastic
pellets

Figure 6.
Market share of plastic pellets
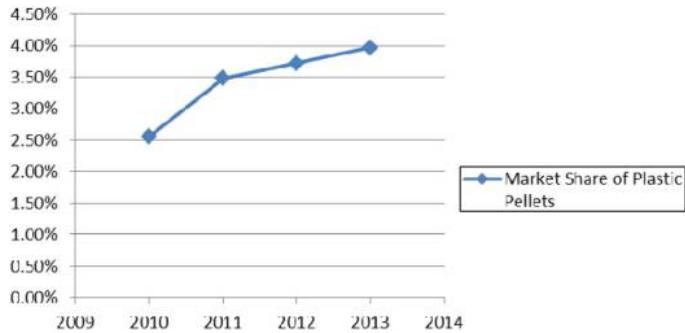
products to raise the standard of the product. Government financial institutions in Thailand like EXIM (Export-Import) Bank, SME Bank and so forth could promote the expansion of financial services to diverse international markets to facilitate overseas transactions and increase export volume.

As can be seen from Table IV and Figure 7, the RCA index scores of computer equipment and electronic components (SITC Rev.3 code 76, 77) exports from Thailand to the PRC during 2010-2013 were as follows: 1.04, 0.81, 0.80 and 0.43 per cent, respectively. This clearly suggests that Thailand has a comparative disadvantage in this sector in the Chinese market, as the RAC index scores are below 1. The data in Table V and Figure 8 also show a dramatic decrease in market share of Thai exports of PC equipment and electronic components in the Chinese market. This fell from 1.60 per cent of market share in 2010 to 0.60 per cent in 2013. Correspondingly, the Department of Trade Negotiations, Ministry of Commerce (2016) and Percival (2007) point out that Thailand has long run a trade deficit with China. The manufactures trade deficit is particularly large, and is concentrated in electrical and electronic components. Anecdotal evidence suggests that Thai manufacturers of small appliances and electronics have been particularly hard hit by Chinese competition. (Percival, 2007, p. 49).

This may be due to the fact that products in this sector can generally be produced in China with lower costs (and lower opportunity costs) than in Thailand. In other words, China has cost advantage owing to cheap labour cost (Office of Industrial Economics, 2016). Also, Thai firms have high relative logistic costs compared to those of their Chinese counterparts. Altogether, this leads to a decline in Thai exports' competitiveness in this sector in the Chinese market. In addition, proximity and location advantage of such industrialised

Figure 7.
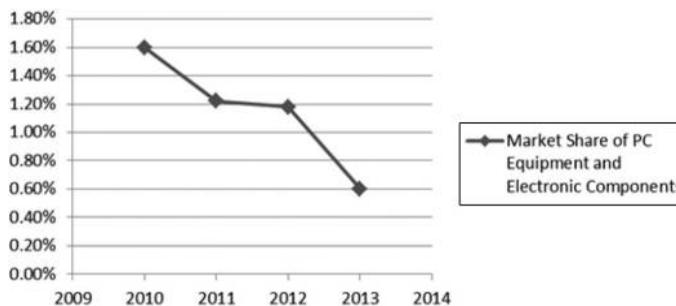RCA index of PC equipment and electronic components
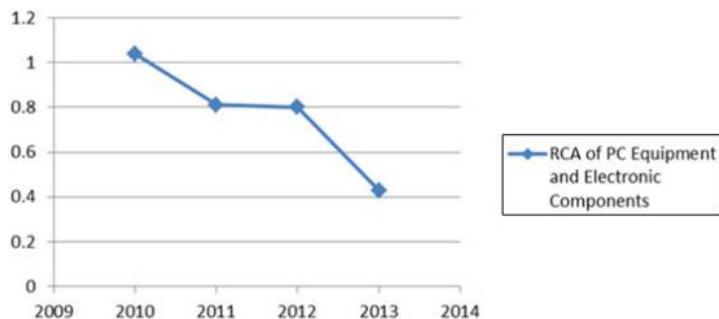
countries in Eastern Asia as Japan, South Korea and so forth may enhance the competitiveness of these countries in this sector in terms of lower logistics and transportation costs (Department of Trade Negotiations, Ministry of Commerce, 2016).

In view of these problems of Thai exports in the computer equipment and electronic components sector to the Chinese market, the Thai Government may wish to increase both the capacity and the productivity of this sector to raise competitiveness in the long run, to increase market share in the PRC and to raise the quality of Thai products by differentiating Thai products from low-cost products of its Chinese counterpart and the rest of the world. This could focus on research and development in collaboration with the private sector. To further compensate for the disadvantage of Thai products in this sector in the Chinese market, the Thai Government may wish to expand to new international markets by collaborating with new, emerging economies like those of the countries of the Middle East, ASEAN and India (Office of Industrial Economics, 2016). Manufacturers and the Thai Government could further collaborate to find strategies, best practices and measures to lower logistics and transportation costs in this sector to promote sustainable growth and enhance the competitive advantage of Thailand.

Linking upstream and downstream industries is to be strongly encouraged for cost efficiency and integration within this industry. Next, knowledge transfer between foreign firms and Thai local firms could be encouraged to enhance and develop the skills of Thai skilled labour. The Thai Government may also wish to support association and collaboration among manufacturers and exporters in this sector to increase their bargaining power with their overseas traders and partners.

Furthermore, the recent data of the Department of Trade Negotiations, Ministry of Commerce (2016) indicate that in 2013, the total export of Thailand in computer equipment and electronic components sector to the world market amounted to US$30,841.2m that dropped from the previous year by 1.6 per cent. The major export contraction in this sector can be seen in the Chinese market, where the export value decreased from 2012 by 32.8 per cent. Also, the production of this sector in Thailand in 2013 fell by 4.4 per cent compared to the preceding year, as the production of hard disk drive, the prime export product in this sector, dropped by 7.4 per cent compared to the previous year. Because, China is one of the main locations for PC assembly of the world market and its orders from trade partners and customers in the PC market declined by 20-30 per cent. As a result, China reduced imports of parts and equipment used by the PC assembly industry (Department of Trade Negotiations, Ministry of Commerce, 2016). For this phenomenon, as mentioned earlier, a number of researchers (Krugman, 1981, 1990, Neary, 2009) explain that most of the enormous growth in trade in the decades after the Second World War came in relatively similar goods (manufactures) between relatively similar countries. Moreover, this feature was robust to the

level of disaggregation: empirical work by many researchers (Grubel and Lloyd, 1975; Krugman, 1990; Neary, 2009) showed that, no matter how finely industries were defined, a high proportion of trade took place within industries rather than between them. Therefore, the situation of China–Thailand trade in this sector may be the case.

According to the Department of Trade Negotiations (2026), the Chinese Government applies one form of non-tariff trade barrier, the technical barrier to trade (TBT), to the products in this sector from Thailand. All of Thai computer equipment and electronic components products must be certified with trademark "CCC" for the safety of Chinese environment and consumers. This is a costly and time-consuming process and may contribute to the slump of Thai market share in this sector in the Chinese market. Hence, the assessment of competitiveness in the computer equipment and electronic components sector under this situation via the RCA index (as discussed earlier) might reveal the partial picture of trade competitiveness between these two countries, as this index does not reflect other implicit costs of the country such as trade barriers and transportation costs, and the calculation and the interpretation of the RCA index rest on the assumption that there is no market distortion or market intervention by the government or other related players (Siggel, 2007; Suriya, 2001; Benedictis and Tamberi, 2002).

The RCA index scores of cassava (SITC Rev.3 code 05, 59) from Thailand exported to China in 2010 and 2011 show high figures, with an average annual RCA index value of 49.5, whilst the RCA index value dipped slightly in 2012 to 42.03, but recovered considerably in 2013 to 56.4. This can be seen in Table IV and Figure 9. Likewise, the market share of cassava from Thailand in China shows the same trend, as illustrated in Table V and Figure 10. The
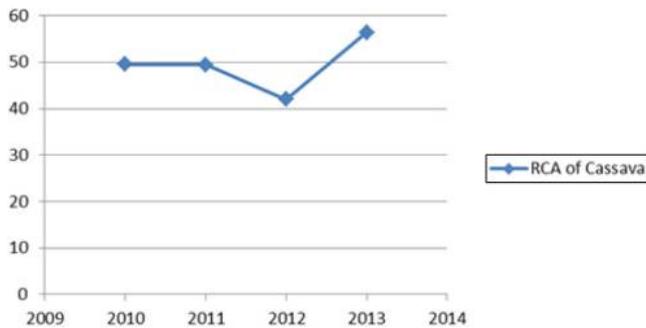

Figure 9.
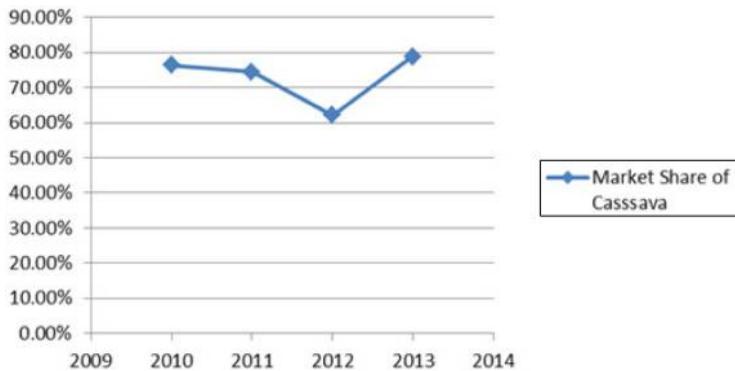RCA index of cassava

Figure 10.
Market share of cassava

high market share of Thai cassava during 2010-2013 was 76.38, 74.52, 62.15 and 78.80 per cent, respectively. The market growth of Thai cassava has been moving in the right direction. To sum up, cassava exports from Thailand have very high comparative advantage in the PRC market.

Correspondingly, these findings are consistent with those of Kaplinsky *et al.* (2011), who argue that Thailand has long been the largest cassava exporter in the world, and China and the EU are the main export markets for Thailand in terms of value and volume. The origin of Thailand's cassava industry can be traced back to the introduction of the EU's Common Agricultural Policy (CAP) in 1962, where the resulting high domestic cereal price triggered the demand from EU feed manufacturers for cheaper alternative feed ingredients. The cassava from Thailand exports to the EU expanded rapidly, reaching almost 9 million tons in 1989 (Kaplinsky *et al.*, 2011, p. 1181). However, the competitiveness of Thai cassava in the EU was undermined by a series of trade restrictions through the 1980s and the early 1990s, particularly the 1992 reform of the CAP. By 2005, cassava export to the EU had collapsed to 250,000 tons, compared to 9 million tons in 1989 (FAO, 2007; TTTA, 2009 cited in Kaplinsky *et al.*, 2011). Fortuitously, the Chinese market began to grow rapidly soon after the EU market was falling.

According to Kaplinsky *et al.* (2011), China's growing demand for cassava is the outcome of a combination of the following factors. Firstly, the Chinese Government's policy on grain self-sufficiency discourages the use of domestic grain for non-food purposes like bioethanol. Secondly, the shift towards a protein-rich diet as income grows increases the demand for feed. Also, China's growing industrial and consumers' energy needs increase the demand for ethanol. Concerns over agflation and food security led the government to place a moratorium on grain-based ethanol plants in 2007, leading to a scramble for non-grain ethanol inputs, including cassava (Tian, 2007). The direct and indirect implications of all these stimulated the imports of cassava from Thailand (OAE – Office of Agricultural Economics, 2006; Kaplinsky *et al.*, 2011).

However, as can be seen from the literature [Ministry of Commerce (MOC), 2015] and from this study, we need to be aware of a number of barriers and obstructions in this sector, and there are a number of measures the Thai Government could take to resolve them. Firstly, the cost of cultivation of cassava has risen dramatically because of the higher cost of fertiliser, labour, transportation and so forth (Amornpol and Petcharaburanin, 2007). This could be subsidised (under the framework of the WTO) or assistance provided by the Thai Government to sustain Thailand's leading position in the world market and enable the country to compete with rival countries that have a relative lower cost. Secondly, the evidence shows that there is a shortage of labour in the agricultural sector. The Thai Government may wish to solve this problem by collaborating closely with the Ministry of Agriculture and Cooperatives and the Ministry of Labour. Immigrant workers from neighbouring countries like Laos, Cambodia and Myanmar might be another source of labour for this sector. However, the Thai Government would need to collaborate closely with neighbouring countries to acquire legal labourers to work in the country. Furthermore, the Thai Government may also seek alternative measures to solve the shortage of agricultural workers by promoting the use of machinery to increase productivity and reduce production costs.

5. Empirical and theoretical contribution
This paper is the first attempt to assess the competitiveness of Thai exports to China in respect of five economic products, namely, rubber, chemicals, plastic pellets, PC equipment and electronic components and cassava, using the RCA index and market share. This

provides new data and empirical insights into the literature of export, trade and competitiveness assessment. Also, this study integrates the concept comparative advantage with competitiveness via the microeconomic level, as these two terms are often used interchangeably. In general, comparative advantage refers to situations of unrestricted free markets of Ricardo, in which resources are allowed free flow to their most efficient and productive uses, while competitiveness explains trade as it exists in the real world. This includes the influence of trade barriers, exchange rate variation, product differentiation and other factors which Ricardian comparative advantage does not consider. Furthermore, the international trade situation has changed dramatically and continues to do so. Competitiveness assessment could be an important tool to enable all firms and nations to perceive their strengths and weaknesses, and then find strategies and measures to move ahead of their rivals in a sustainable manner.

6. Limitations of the study and future research agenda

We need to be aware of the weaknesses of the RCA index, noted in the literature, since the data obtained from the previous period were computed. The index gives no indication of the potential for change. It also fails to reflect other implicit costs to the country, such as trade barriers and transportation costs. Hence, the calculation and the interpretation of this index rest on an assumption that there will be no market distortion or market intervention by the government or related stakeholders. Also, RCA Index does not indicate the source of comparative advantage. Because of that limitation, this study has adopted market share as a second criterion to obtain a clearer picture of competitiveness. Measuring with other sophisticated indices [e.g. Domestic Resource Costs (DRC), Constant Market Share (CMS), Michaely Index (MI) and Comparative Advantage Index (CAI)] could, however, provide even clearer results. Hence, assuming future availability of the database, a future project is encouraged to conduct this same type of research using the aforementioned indices for comparison with the results of this study. This would contribute significantly to the literature. In addition, as can be seen, to date, a large and growing part of trade has come from two-way trade in similar industries that could not be explained by comparative advantage. To explain intra-industry trade, a number of researchers put forth a new set of trade theories that relax the assumptions of perfect competition and constant economies of scale. A new trade theory could perhaps augment the understanding of trade competitiveness, especially the trade among developing countries, which have similar trade development.

Further, future study of this issue could be conducted with other major trading partners of Thailand (e.g. Japan, the USA and the EU) to understand the competitive position of Thailand in the world market. Last but not least, if a broader range of export products could be studied, this would provide a greater understanding of competitiveness for academicians, policymakers and all stakeholders.

References

Adams, F.G., Gangnes, B. and Shachmurove, Y. (2004), "Why is China so competitive? Measuring and explaining China's competitiveness", SMU Economics and Statistics Working Paper Series, Paper No: 07-2004, Singapore, March, pp. 1-33.

Addison-Smyth, D. (2005), "Ireland's revealed comparative advantage", *Central Bank Quarterly Bulletin*, pp. 101-114.

Albarracin, G., Kalame, F.B., Glover, E., Kainulainen, O., Koskipaa, T., Makkonen, S. and Na Takuathung, C. (2006), "Rubber plantations in Southern Thailand: management and social and economic functions", available at: www.helsinki.fi/vitri/research/Educational_Projects/forrsa/RE_1_Proceedings/Forrsa_RE_1/RE_1_proceedings_pdf/Report_Gr6.pdf (accessed 15 July 2015).

Amornpol, V. and Petcharaburanin, C. (2007), "How to increase productivity of Cassava cultivation", *Kasikorn*, Vol. 79 No. 5, pp. 27-31.

Assche, A.V., Hong, C. and Slootmaekers, V. (2007), "China's international competitiveness: reassessing the evidence", Discussion Paper 201/2008, LICOS Centre for Institutions and Economic Performance, pp. 1-18.

Balassa, B. (1965), *Trade Liberalization and Reveal Comparative Advantage*, Vol. 33, Manchester School of Economics and Social Studies, pp. 99-123.

Balassa, B. (1967), *Trade Liberalization Among Industrial Countries*, McGraw Hill, New York, NY.

Balassa, B. and Noland, M. (1989), "Revealed comparative advantage in Japan and USA", *Journal of International Economic Integration*, Vol. 4 No. 2, pp. 8-22.

Baldwin, R.E. and Robert-Nicoud, F. (2008), "Trade and growth with heterogeneous Firms", *Journal of International Economics*, Vol. 74 No. 1, pp. 21-34.

Ballance, R.H., Forstner, H. and Murray, T. (1987), "Consistency tests of alternative measures of comparative advantage", *The Review of Economics and Statistics*, Vol. 69 No. 2, pp. 157-161.

Bank of Thailand (2014), *Thailand's Economic Conditions in 2013*, Bank of Thailand, Bangkok.

Benedictis, L. and Tamberi, M. (2002), "A note on the Balassa index of revealed comparative advantage", Working Paper 158, Universita' Politecnica delle Marche (I), Dipartimento di Economia.

Buckley, P.J., Pass, C.L. and Prescott, K. (1992), "The meaning of competitiveness", *Servicing International Markets: Competitive Strategy of Firms*, Blackwell, Oxford.

Cai, J. and Leung, P. (2007), "A review of comparative advantage assessment approaches in relation to aquaculture development", in Leung, P., Lee, C.-S. and O'Bryen, P.J. (Eds), *Species and System Selection for Sustainable Aquaculture*, Blackwell Publishing, Ames, IA.

Chan, F. (2009), "ASEAN-China FTA to kick-off", *The Straits Times*, 31 December.

Chikan, A. (2008), "National and firm competitiveness: a general research model", *Competitiveness Review: An International Business Journal*, Vol. 18 Nos 1/2, pp. 20-28.

Coates, S. (2009), "ASEAN-China open free trade area", *Agence France-Presse*, 31 December.

Department of Trade Negotiations, Ministry of Commerce (2016), "Thailand and electronic and electric products in the free trade area (FTA)", available at: www.thaifta.com/thaifta/portals/0/Product Profile%E0%B8%AD%E0%B8%B8%E0%B8%9B%E0%B8%81%E0%B8%A3%E0%B8 %93%E0%B9%8C%E0%B8%AD%E0%B8%B4%E0%B9%80%E0%B8%A5%E0%B9% 87%E0%B8%81%E0%B8%97%E0%B8%A3%E0%B8%AD%E0%B8%99%E0%B8%B4 %E0%B8%81%E0%B8%AA%E0%B9%8C.pdf (accessed 31 July 2016).

Dixit, A.K. and Stiglitz, J.E. (1977), "Monopolistic competition and optimum product diversity", *American Economic Review*, Vol. 67 No. 3, pp. 297-308.

Dollar, D. and Wolff, N.E. (1993), *Competitiveness, Convergence and International Specialisation*, The MIT Press, Cambridge, MA.

Doner, R. and Abonyi (2013), "Upgrading Thailand's rubber industry: opportunities and challenges", available at: www.econ.tu.ac.th/oldweb/doc/article/fulltext/364.pdf (accessed 15 July 2015).

Drescher, K. and O. Maurer (1999), "Competitiveness in the European dairy industries", *Agribusiness*, Vol. 15, pp. 163-177.

Durand, M. and C. Giorno (1987), "Indicators of international competitiveness: conceptual aspects and evaluation", *OECD Economic Studies*, Vol. 9, pp. 147-182.

Dyer, E. and Kunmakara, M. (2010), "With new year, kingdom joins world's largest FTA", *The Phnom Penh Post*, 1 January.

Erkan, B. and Saricoban, K. (2014), "Comparative analysis of competitiveness in the export of science-based goods regarding Turkey and the EU+13 countries", *International Journal of Business and Social Science*, Vol. 5 Nos 8/1, pp. 117-130.

Ethier, W.J. (1982), "National and international returns to scale in the modern theory of international trade", *American Economic Review*, Vol. 72 No. 3, pp. 389-405.

FAO (2007), *State of the World's Forests 2007*, Food and Agriculture Organisation of the United Nations (FAO), Rome.

Farris, P.W., Bendle, N.T., Pfeifer, P.E. and Reibstein, D.J. (2010), *Marketing Metrics: The Definitive Guide to Measuring Marketing Performance*, Pearson Education, Upper Saddle River, NJ.

Grubel, H.G. and Lloyd, P. (1975), *Intra-industry Trade: The Theory and Measurement of International Trade in Differentiated Products*, Macmillan, London.

Hatsopoulos, G., Krugman, P. and Summers, L. (1988), "US competitiveness: beyond the trade deficit", *Science*, Vol. 241, pp. 299-307.

Helleiner, G.K. (1991), "Increasing international competitiveness: a conceptual framework", in Wen, Y. and Sengupta, J. (Eds), *Increasing the International Competitiveness of Exports from Caribbean Countries, Economic Development Institute*, World Bank.

Helpman, E. (1981), "International trade in the presence of product differentiation, economies of scale and monopolistic competition: a Chamberlin-Heckscher-Ohlin approach", *Journal of International Economics*, Vol. 11 No. 3, pp. 305-340.

Hinloopen, J. (2001), "On the empirical distribution of the Balassa index", *Review of World Economics*, Vol. 137 No. 1, pp. 1-49.

Hongfang, S. (2013), "The economic relations between China and Thailand under the context of CAFTA: an assessment", *Chinese Studies*, Vol. 2 No. 1, pp. 52-60.

Huo, D. (2014), "Impact of country-level factors on export competitiveness of agriculture industry from emerging markets", *Competitiveness Review*, Vol. 24 No. 5, pp. 393-413.

Jayawickrama, A. and Thangavelu, S.M. (2010), "Trade linkages between China, India, and Singapore: changing comparative advantage of industrial products", *Journal of Economic Studies*, Vol. 37 No. 3, pp. 248-266.

Jin, H. and Moon, H.-C. (2006), "The diamond approach to the competitiveness of Korea's apparel industry", *Journal of Fashion Marketing and Management: An International Journal*, Vol. 10 No. 2, pp. 195-208.

Kaplinsky, R., Terheggen, A. and Tijaja, J. (2011), "China as a final market: the Gabon timber and Thai Cassava value chains", *World Development*, Vol. 39 No. 7, pp. 1177-1190.

Kathuria, L.M. (2013), "Analysing competitiveness of clothing export sector of India and Bangladesh: dynamic revealed comparative advantage approach", *Competitiveness Review: An International Business Journal*, Vol. 23 No. 2, pp. 131-157.

Kennedy, P.L. and Rosson, C.P. III. (2002), "Impacts of globalization on agricultural competitiveness: the case of NAFTA", *Journal of Agricultural and Applied Economics*, Vol. 34, pp. 275-288.

Krugman, P.R. (1981), "Intra-industry specialisation and the gains from trade", *Journal of Political Economy*, Vol. 89 No. 5, pp. 959-973.

Krugman, P.R. (1986), *Strategic Trade Policy and the New International Economics*, MIT Press, Cambridge, MA.

Krugman, P.R. (1990), *Rethinking International Trade*, MIT Press, Cambridge, MA.

Krugman, P.R. (1994), "Competitiveness: a dangerous obsession", *Foreign Affairs*, Vol. 73 No. 2, pp. 28-44.

Lancaster, K. (1980), "Competition and product variety", *Journal of Business*, Vol. 53 No. 3, pp. S79-S103.

Leishman, D., Menkhaus, D.J. and Whipple, D.G. (1999), "Revealed comparative advantage and the measurement of international competitiveness for agriculture commodities: an empirical analysis of wool exporters", Western Agricultural Economics Association Annual Meeting, 11-14 July.

Li, Q. (2009), "New year new ASEAN free trade bloc", *Global Times*, 30 December.

Liesner, H.H. (1958), "The European common market and British industry", *Economic Journal*, Vol. 68, pp. 302-316.

Linder, S.B. (1961), *An Essay on Trade and Transformation*, Almquist and Wiksell, Stockholm.

Lipschitz, L. and McDonald, D. (1991), "Real exchange rates and competitiveness: a clarification of concepts and some measurements for Europe", IMF Working Paper, March.

Manarungsan, P. (2015), "Thailand-China cooperation in trade, investment, and official development assistance", available at: www.ide.go.jp/English/Publish/Download/Brc/pdf/01_thailandandchina.pdf (accessed 12 June 2015).

Mandeng, O.J. (1991), "International competitiveness and specialisation", *CEPAL Review*, Vol. 45, pp. 39-52.

Markusen, J.R. (1992), *Productivity, Competitiveness, Trade Performance and Real Income: The Nexus Among Four Concepts*, Minister of Supply and Services.

Markusen, J.R. (1995), "The boundaries of multinational enterprises and the theory of international trade", *Journal of Economic Perspectives*, Vol. 9 No. 2, pp. 169-189.

Markusen, J.R. and Venables, A. (1998), "Multinational firms and the new trade theory", *Journal of International Economics*, Vol. 46, pp. 183-203.

Marsh, L.W. and Tokarick, S.P. (1994), "Competitiveness indicators: a theoretical and empirical assessment", IMF Working Paper No. 94/29, March.

McKean, C., Toh, K. and Fisher, W. (1994), "Export and investment promotion in Thailand", USAID Technical Report No. 17, Centre for Development Information and Evaluation, US Agency for International Development (USAID), Washington, DC.

Ministry of Commerce (MOC) (2015), "Trade and economic indices", available at: www2.moc.go.th/main.php?filename=index_design4_en (accessed 15 June 2015).

Ministry of Industry (MOI) (2015), "MOI's Statistical Data", available at: www.industry.go.th/industry/index.php/2011-06-30-23-44-4/2013-10-10-05-50-05 (accessed 12 July 2015).

Narongchai, A. (1989), "Thailand in the international economic community, main report: synthesis", The 1989 TDRI Year-end Conference, The Thailand Development Research Institute, *Chon Buri*.

Neary, J.P. (2009), "Putting the new into new trade theory: Paul Krugman's Nobel Memorial Prize in economics", *Scandinavian Journal of Economics*, Vol. 111 No. 2, pp. 217-250.

NESDB (2013), "National economic and social development board: gross domestic product: Q4/2013", available at: http://eng.nesdb.go.th/Portals/0/eco_datas/account/qgdp/data3_13/BookQGDP4-2013.pdf (accessed 1 June 2015).

OAE-Office of Agricultural Economics (2006), "A study on the export potential of Thai Cassava chips export to China after Thailand –China free trade agreement", *Agricultural Economic Research* No. 114.

Office of Industrial Economics (2016), "How to manage the cheap imports in electric and electronic sectors from China?", available at: http://iiu.oie.go.th/Hot%20Issue/2549/6.doc (accessed 21 July 2015).

Oral, M. (1993), "A methodology for competitiveness analysis and strategy formulation in glass industry", *European Journal of Operational Research*, Vol. 68, pp. 9-22.

Organisation for Economic Cooperation and Development (OECD) (1992), *Programme on Technology and the Economy*, OECD, Paris.

Owen, K.C. (1998), "Scrap Tyres: a pricing strategy for a recycling industry", *Corporate Environmental Strategy*, Vol. 5 No. 2, pp. 42-50.

Percival, B. (2007), *The Dragon Looks South: China and Southeast Asia in the New Century*, Praeger, London.

Porter, M. (1990), "The competitive advantage of nations", *Harvard Business Review*, Vol. 2, pp. 73-91.

Prasad, R.N. (2004), "Fiji's export competitiveness: a comparison with selected small Island developing states", Working Paper 2004/06, Economics Department Reserve Bank of Fiji.

Ricardo, D. (1817), *On The Principles of Political Economy and Taxation*, London, available at: www. econlib.org/LIBRARY/Ricardo/ricP.html (accessed 1 January 2016).

Rivlin, P. (2000), "Trade potential in the middle east: some optimistic findings", *Middle East Review of International Affairs*, Vol. 4 No. 1, pp. 56-66.

Rugman, A. (1993), "The double diamond model of international competitiveness: the Canadian experience", *Management International Review*, Vol. 33, pp. 17-39.

Seyoum, B. (2007), "Revealed comparative advantage and competitiveness in services: a study with special emphasis on developing countries", *Journal of Economic Studies*, Vol. 34 No. 5, pp. 376-388.

Sharma, A. and Dietrich, M. (2004), "The Indian economy since liberalisation: the structure and composition of exports and industrial transformation (1980-2000)", *DRUID Summer Conference 2004 on Industrial Dynamics, Innovation and Development, Elsinore*, 14-16 June, Vol. 4, pp. 1-43.

Sharples, J.A. (1986), "US competitiveness in the world wheat market: a prototype study", *Proceedings of a Research Conference*, United States Department of Agriculture Economic Research Service.

Siggel, E. (2007), *International Competitiveness and Comparative Advantage: A Survey and a Proposal for Measurement in The Many Dimensions of Competitiveness*, CESifo Venice Summer Institute, 20-21 July, pp. 1-33.

Siggel, E. and J. Cockburn (1995), "International competitiveness and its sources: a method of development policy analysis", Discussion Paper 9517, Concordia University Department of Economics.

Smit, A.J. (2010), "The competitive advantage of nations: is Porter's diamond framework a new theory that explains the international competitiveness of countries?", *Southern African Business Review*, Vol. 14 No. 1, pp. 105-130.

Spence, A. (1976), "The third world and commodity prices: what next?"', *Banker*, Vol. 126 No. 608, pp. 1123-1126.

Suriya, K. (2001), "RCA and market share interpretation technique", *Chiang Mai University Journal of Economics*, pp. 10-15.

Suwannarat, P. (2016), "The study of export intermediary performance determinants", *Multinational Business Review*, Vol. 24 No. 2, pp. 123-143.

Thai-Chinese Business Information Centre (2015), "Data of trade between Thailand and China", available at: www.thaibizchina.com/thaibizchina/th/thai-china/trade-statistics/index.php? ELEMENT_ID=12966 (accessed 11 June 2015).

Thansettakij (2016), "New five prospective export market", available at: www.thansettakij.com/2016/ 07/07/68764 (accessed 10 July, 2016)

The China Post (2010), *Zero Tariffs for ASEAN-6 Starting*, 2 January

The Jakarta Post (2010), *ASEAN-6 Zero Tariffs Take Effect Immediately*, 2 January.

Thornhill, D.J. (1988), "The revealed comparative advantage of Irish exports of manufacturers 1969-1982", *Journal of the Statistical and Social Inquiry Society of Ireland*, Vol. 25 No. 5, pp. 91-146.

Tian, L. (2007), "Ban on use of corn for ethanol lauded", available at: www.chinadaily.com.cn/china/ 2007-2006/2022/content_899837.htm (accessed 13 July 2016).

TTTA (2009), *Annual Report 2008*, Thai Tapioca Trade Association, Bangkok.

Turner, A. and S. Gollub (1997), "Towards a system of unit labor cost-based competitiveness indicators for advanced, developing and transition countries", *Staff Studies for the World Economic Outlook*, IMF.

Vanek, J. (1968), "The factor proportions theory: the N-factor case", *Kyklos*, Vol. 21 No. 4, pp. 749-756.

Vernon, R. (1966), "International investment and international trade in the product cycle", *Quarterly Journal of Economics*, Vol. 80 No. 2, pp. 190-207.

Wei, H. and Chunming, Z. (2012), "The comparative advantage of Chinese manufactured exports", *Journal of Chinese Economic and Foreign Trade Studies*, Vol. 5 No. 2, pp. 107-126.

Welch, J.M. and Lyford, C.P. (2007), "Measuring competition for textiles: does the US make the grade?", *International Food and Agribusiness Management Review*, Vol. 10 No. 4, pp. 64-79.

World Bank (2010), "Trade indicators", available at: http://wits.worldbank.org/wits/wits/witshelp/Content/Utilities/e1.trade_indicators.htm (accessed 19 June 2015).

World Bank (2014), "Thailand economic monitor 2013", available at: www.worldbank.org/en/country/thailand/publication/thailand-economic-monitor-february-2014 (accessed 19 June 2015).

World Bank (2015), "Thailand economic monitor 2014", available at: www.worldbank.org/en/country/thailand/publication/thailand-economic-monitor-june-2015 (accessed 19 June 2015).

Further reading

Bank of Thailand (2013), *Economic and Financial Statistics: Fourth Quarter 2012*, Bank of Thailand, Bangkok.

China Daily (2009), *China-ASEAN FTA Pact Set to Boost Trade Volume*, 30 December.

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