Export Diversification in East Asian Economies: Some Factors Affecting the Scenario

Farazi Binti Ferdous

***Abstract*—This study finds that export diversification had been almost steady over the years in East Asian economies while all the countries in the study have concentrated trade in manufacturing products. Furthermore, greater economic integration in East Asian economies leads to export diversification, whereas exchange rates and tariff rates have significant negative impact on specialization. In contrast, GDP of the exporting country tend to be positively related with the specialization of that economy.**

***Index Terms*—economic integration, diversification, East Asia**

I. Introduction

In recent decades, several developing economies have undertaken structural reforms aimed to improve economic performance, targeting export diversification in particular. Therefore, it is important to analyze the effect of some reforms, such as trade liberalization and economic integration on export diversification. Recently, export diversification has been at the center of the debate about how developing countries can improve their economic performance and to achieve higher income [1]. Consequently, the recent research is extended to the impact of diversification on a country's trade and economic growth. At the same time there have been a number of researches that proved the positive effect of diversification on growth [2]. But the literature on a better understanding about the effect of particular reforms is not so abundant. There are a few papers exploring what factors are affecting export diversification in East Asian economies which is the research interest of this study.

Under the circumstances, this paper attempts to examine whether the economies in East Asia have become more specialized or less specialized ("diversified" in this paper) in their exports over the years. Usually, by changing the shares of commodities in the existing export mix, or by including new commodities in the export portfolio, a country can attain export diversification. This stage of the study will only concentrate on the former or intensive diversification of East Asian countries under consideration. The study examines the export diversification in the selected countries of Association of Southeast Asian Nations (ASEAN) which are Indonesia, Malaysia, Philippines, Singapore, Thailand and also China, Japan and South Korea (ASEAN5+3 in this paper). For economic integration, it takes into account the trade intensity among ASEAN economies. Moreover, it gives an effort to find out whether some selected factors like exchange rate, tariff rate and GDP of the exporting country are affecting the diversification of trade.

For the purpose of the study, fixed effect panel data model is used to find out the relation between regional integration and industrial specialization, and also to find the impact of other variables. The panel data consisted of a number data from each of the eight countries under investigation, for a period that spanned between 2000 and 2008. The study finds that greater economic integration in East Asian economies leads to trade diversification. Furthermore, different factors help to create different degrees of specialization.

A. Economic Cooperation in East Asian Economies:

Regionalization is defined as a market led process of increasing economic interaction that has been building up momentum in Asia for decades. Many researchers explain that it has been spurred by unilateral liberalization, market-oriented reforms and successful economic growth in Asia consistently above the global average (except for the crisis period of 1997-1998). It is a common view that since the Asian crisis of 1997-1998, East Asian economies have attempted to take various initiatives under the general title of economic regionalism in trade, investment, money and finance. In addition, the crisis encouraged the East Asian economies to realize the importance of economic cooperation and to make efforts to institutionalize such interdependence [3]. Therefore, for greater trade openness, important institutional and policy changes have also played a role in developing Asia's economies. For example, unilateral trade liberalization, including the early elimination of tariffs on capital and intermediate goods and the reduction of nontariff barriers, played a prominent role in igniting and then sustaining growth of trade.

Consequently, formal preferential trading arrangements in the region, particularly in the form of free trade areas (FTAs), are being developed as a means of enhancing regionalism. Therefore, it might be argued that regionalism is being used as part of the overall process of economic reform in most of Asia, to strengthen the outward oriented development strategies of the region's economies [3]. Thus, East Asia often moved ahead of World Trade Organization (WTO) obligations and the net of trade liberalization was widened [4].

B. Specialization or Diversification?

International trade and specialization are closely interrelated as trade requires specialization, and specialization requires trade as a means for the resulting

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surplus. The theme of sectored diversification is important, as a high degree of overall specialization - implying concentration of resources in few sectors - may be dangerous considering the risk associated with asymmetric shocks. The consequences may be particularly serious if such shocks hit the core sectors of the economy in which its activity is predominantly intense [5]. This paper typically identifies growing specialization as an uneven increase in the propensity, or proportion of commodities exported. Export dependency on primary products of a country can be reduced through diversification of the export portfolio. However, export diversification can take place in different forms and dimensions and thus its analysis can be undertaken at different levels.

The intensive margin captures changes in the trade that take place within surviving trade relationships, e.g. trading more or less of the same product to the same country. On the other hand, the extensive margin tracks changes in the number of products or trading partners [6]. At this first stage of this study, this paper will solely concentrate on this intensive diversification measurement.

C. Research Questions:

To understand the situation in the East Asian economies, this study tries to find the answers of the following questions:

- What is the trend of change in the export sector diversification in the East Asian economies?
- What factors are affecting the East Asian trade diversification?

D. Hypothesis:

Greater economic integration (through trade) leads to export diversification in the selected economies of East Asia.

II. Background

One strand of the literature paid attention on export product diversification in terms of export growth at its intensive or extensive margin. Recent empirical research emphasizes that variation in trade flows across countries, products and years are governed by two types of margins which are, the intensive margin and the extensive margin.

Reference [7] argue that export growth does not consist solely of expansion in the quantities of the same goods (intensive margin). As an alternative, if export growth comes through expansion in the number of range of products exported (extensive margin), the outcome of export growth may be much more promising. Other research proves that poor countries tend to have highly homogeneous (specialized) export structures and thus the extensive margin is generally more important for poorer countries [5, 8, and 9].

Reference [10] argue that it is not only important how much is exported, but also what is exported. They concluded that regions with less specialization and more diversified exports generally experienced higher economic growth rates and contributed much more to the overall exports from South Africa.

Some studies are searching for additional determinants of the export diversification process along the path of economic developments and found that trade openness induce specialization and not diversification. They suggested avoiding overvalued exchange rates as a good policy to increase export diversification. Reference [11] tried to find whether the specialization in East Asia has changed over time, in their study. Their analysis showed that pattern of trade specialization in East Asian countries has moved towards manufacturing products. They argue that as countries in the region become increasingly integrated, their trades tend to diversify more. Reference [12] finds that country size, tariff, transportation costs, and market entry costs play a key role in determining the pattern of geographic export diversification. Reference [13] uses a cross-section of observations on the level of diversification of manufacturing plants and multivariate analysis and finds that higher Canadian and U.S. tariff rates are linked to greater plant diversification (less specialization).

A. Theoretical Background:

David Ricardo's gains from trade argument have been used to promote the need for trade liberalization over the past two centuries. He argued that as a country specializes in the products that it produces most efficiently relative to other countries and then trades those goods in surplus, it is able to improve its standard of living. Therefore, according to the traditional trade theory, when all countries specialize in their comparative advantage products, the entire world is better off and global prosperity is maximized.

On the other hand, the more recent development in trade theory suggests that this may not always be the case. The Krugman model fundamentally argues that trade occurs even between countries with identical tastes, technology and factor endowments because consumers have a taste for a variety of differentiated products. The model also shows that as countries become more similar, the trade between them becoming more intra industry in nature. Thus, Krugman [14] develops a model where trade is driven by economies of scale.

It is certain that exploiting economies of scale is an important motivation for regional integration. Resource pooling and market sharing have been known as unambiguous goals of ASEAN through its deepened economic integration over time. As economies evolve over time from low skilled production, of agricultural and labor-intensive goods, into more sophisticated products, their comparative advantage tend to come together. Economic integration changes from inter-industry trade to intra-industry trade. Recent trends of trade in East Asia clearly draw attention to this process [3].

B. Methodology Used to Measure Export Diversification

Diversification can be thought of as occurring at the intensive margin, in the sense that it does not involve exporting any new products. This paper will solely concentrate on this intensive diversification measurement.

In this study, diversification will be constructed based on the most commonly used statistic for measuring export specialization/concentration that is the Herfindahl Index (also known as Herfindahl-Hirschman Index). This study uses Herfindahl Index (HI) as a measure of diversification, which accounts of export values across a given range of

products or sectors. This index takes values from 0 to 1, while higher value representing greater concentration/specialization. This study use Herfindahl index as the dependent variable to represent export specialization for the regression analysis. Economies in East Asia have been increasingly integrated since 1992. Therefore, this study would like to know whether those economies have become more specialized or less specialized in their exports as a result. For this purpose it is more appropriate to use Herfindahl index to measure the degree of export specialization.

The Herfindahl index $S_{i,t}$ for country i at year t is computed as following:

$$S_{i,t} = \sum_{k=1}^{J} (s_{i,t}^{k})^2$$

where

$$s_{i,t}^{k} = x_{i,t}^{k} / \sum_{k=1}^{J} x_{i,t}^{k}$$

$x^{k}_{i.t}$, is country i's export of good k in year t; J is the total number of industries in the country's economy. It follows $s^{k}i,t$, is the share of export of good k in country i's total export. The value of the index ranged between zero and one, as noted above, the higher the index the more specialized in export the country is.

1) Empirical results based on export diversification measures

Using the measure discussed above, the export diversification performance of the eight East Asian countries is calculated, for which the most recent data are available. The world Herfindahl index for each of the countries is represented in Fig. 1 (period 1980-2008) and Fig. 2 (period 2000-2008).

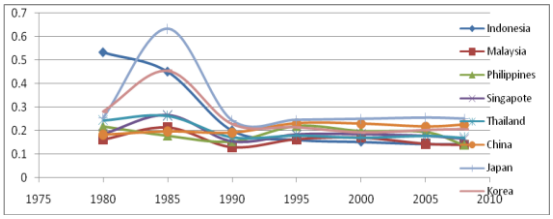

Fig. 1 Herfindahl Index in ASEAN5+3 (1980-2008) (own calculation from WTO Statistical data sets)

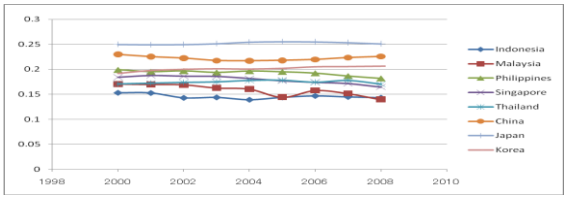

Fig.2 Herfindahl Index in ASEAN5+3 (2000-2008) (own calculation from WTO Statistical data sets)

It is clear from the Fig. 1 that after 1990 all the economies are having convergence in the index value and fluctuations are slight. After investigating the top 3 products in the export list, almost all the selected countries are found to have export concentration in manufacturing products, mainly electronics and machinery, except for Indonesia.

The recent global phenomenon of production sharing is heavily concentrated in machinery and transport equipment. Reference [15] found that the degree of dependence on this new form of international specialization is disproportionately high in East Asia. Component trade in East Asia is heavily concentrated in electronics and electrical industries, whereas the degree of concentration of component trade in electronics is much larger in Asian Free Trade Area (AFTA) (over 60%) compared with the regional average.

Again, the concentration of export market is also an important issue for these countries. The top 5 markets are almost same for the last decade (as shown in the Appendix). The strong influence of the United States of America, China, Japan, Hong Kong and Republic of Korea are observable from the top 5 export market list. It is clear from the scenario that there is a need for the diversification of targeted export market as well.

C. Factors Affecting Specialization

1) Tariff rates:

In recent decades, East Asia has seen a dramatic shift in trade patterns towards machinery and transport equipment, parts, and components. Policy reforms in East Asia have lowered barriers to trade and investment as tariffs and NTBs (non-tariff barriers) in manufactures have declined and spurred their trade [16].

2) Exchange rates:

Exchange rate depreciation leads to export expansion and export specialization. Therefore, there is a positive relation between exchange rate and diversification index (higher the index, more specialized the country is) [17]. Reference [18] finds that exchange rate management plays a crucial role providing incentive for exports. Removing real exchange rate misalignment and uncertainty can result in export diversification at the same time, export diversification, in turn, can result in higher income elasticity, and hence further export expansion induced by growth in the world income.

3) GDP (Gross domestic product):

The reason for including GDP is to see the effect of the size of the economy to its export diversification. Indeed, Parteka and Tamberi [5] have confirmed that poor countries tend to have highly homogeneous (specialized) export structures, exporting goods belonging to few sectors or few groups of products. Therefore this study assumes that GDP and diversification index is negatively related.

4) Trade intensity:

As for the degree of trade integration, this study used trade intensity index of the ASEAN5+3, assuming that AFTA has resulted in more intense intra-regional trade. To verify this, a commonly used indicator - trade intensity index – is used. The trade intensity (TI) index compares the share of a country's exports to a destination country relative to its total exports to the share of the world's exports to that same destination country to the world's total exports. In other words, the trade intensity index takes the ratio of the trade share of the source and the world trade share to the same destination which takes a value between 0 and infinity, with value greater than 1 indicating the export relation is greater

than average. An increase in the index to country/region j across time suggests that 'j' has become a more important export destination for country 'i'.

To capture the recent trend of TI index, the TI index of 1998 to 2007 is compiled using Asia-Pacific Research and Training Network on Trade (ARTNeT) through Asia- Pacific Trade and Investment Agreements Database (APTIAD) interactive trade indicators, which are represented in Fig. 3. Fig. 3 clearly shows the high trade intensity among the ASEAN5+3 and ASEAN economies, as all the values are greater than 1. Singapore being the most intense economy, while China being the lowest. On the other hand, it was found that TI with the rest of the world is less than unity.

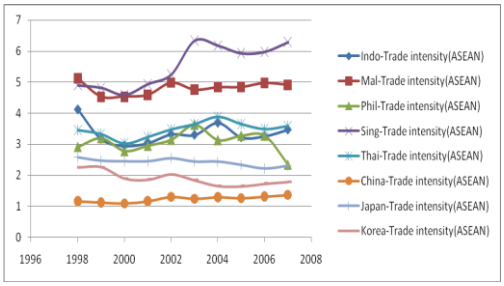

Fig. 3 Trade Intensity (within ASEAN) in East Asia, 1999-2007 Data compilation from: ARTNeT. APTIAD Interactive Trade Indicators

III. Methodology And Analysis

A. *Fixed Effect Panel Data Model:*

A panel data-set is created combining exports data using Standard International Trade Classification (SITC Rev.3, 2 digit level) for 8 countries and nine years (2000-2008), and employing statistical indices of specialization. This study tries to find out whether there is a relation between regional integration, exchange rate, GDP, tariff rate and industrial specialization.

For the purpose of the study, fixed effect panel data model is used as follows:

$\Delta \log(\text{hindex}) = \alpha + \beta 1 \log(\text{oxr}) + \beta 2 \log(\text{gdp}) + \beta 3 \text{ tia} + \beta 4 \text{ tapsimple} + \varepsilon$

The variables used are described below:

- hindex = Herfindahl Index
- oxr = Official exchange rate
- gdp = Gross domestic product
- tia = Trade intensity(ASEAN)
- tapsimple = Tariff rate, applied, simple mean, all products (%)

Herfindahl Index, the dependent variable, is derived from the author's own calculations. Official exchange rate and GDP is taken from the World Development Indicator (WDI) online database. Trade intensity (ASEAN) index is compiled from the ARTNET database. Finally, the tariff rate is taken from World Trade Organization (WTO) online data sourse. The study is expecting positive coefficient for exchange rate and a negative coefficient for trade intensity, GDP and tariff rates.

TABLE. I. SUMMARY OF THE REGRESSION RESULT

Hindex	**Coef.**	**Std. Err.**	**t**
loxr	-.0060195	.0008458	-7.12***
lgdp	.0107492	.002305	4.66***
tia	-.0158378	.0029291	-5.41***
tapsimple	-.003697	.0006974	-5.30***

B. *Results of the Model:*

The regression result find that all the variables are statistically significant at 1% level of significance. Among the independent variables, the negative relation is found with the exchange rate, tariff rate and trade intensity. While it finds positive relation with the log value of the gdp. The R-square is found to be 85%, which ensures that these variables are explaining the relationship well. This study tries to analyze the factors affecting the specialization of trade in the ASEAN5+3 are discussed. The summary of the regression result is presented in table-2.

Appendix

TABLE. II. TOP 5 EXPORT MARKETS

China			**Japan**		
2001	2005	2009	2001	2005	2009
'United States of America	'United States of America	'United States of America	'United States of America	'United States of America	'China
'Hong Kong (SARC)	'Hong Kong (SARC)	'Hong Kong (SARC)	'China	'China	'United States of America
'Japan	'Japan	'Japan	'Republic of Korea	'Republic of Korea	'Republic of Korea
'Republic of Korea	'Republic of Korea	'Republic of Korea	'Chinese Taipei	'Chinese Taipei	'Chinese Taipei
'Germany	'Germany	'Germany	'Hong Kong (SARC)	'Hong Kong (SARC)	'Hong Kong (SARC)
Republic of Korea			**Indonesia**		
2001	2005	2009	2001	2005	2009
'United States of America	'China	'China	'Japan	'Japan	'Japan
'China	'United States of	'United States of	'United States of	'United States of	'China

	America	America	America	America	
'Japan	'Japan	'Japan	'Singapore	'Singapore	'United States of America
'Hong Kong (SARC)	'Hong Kong (SARC)	'Hong Kong (SARC)	'Republic of Korea	'Republic of Korea	'Singapore
'Chinese Taipei	'Chinese Taipei	'Singapore	'China	'China	'Republic of Korea
Malaysia			**Philippines**		
2001	2005	2009	2001	2005	2009
'United States of America	United States of America	'Singapore	'United States of America	'United States of America	'United States of America
'Singapore	'Singapore	'China	'Japan	'Japan	'Japan
'Japan	'Japan	'United States of America	'Netherlands	'China	'Netherlands
'Netherlands	'China	'Japan	'Singapore	'Netherlands	'Hong Kong (SARC)
'Hong Kong (SARC)	'Hong Kong (SARC)	'Thailand	'Chinese Taipei	'Hong Kong (SARC)	'China
Singapore			**Thailand**		
2001	2005	2009	2001	2005	2009
'Malaysia	'Malaysia	'Hong Kong (SARC)	'United States of America	'United States of America	'United States of America
'United States of America	'United States of America	'Malaysia	'Japan	'Japan	'China
'Hong Kong (SARC)	'Indonesia	'China	'Singapore	'China	'Japan
'Japan	'Hong Kong (SARC)	'Indonesia	'Hong Kong (SARC)	'Singapore	'Hong Kong (SARC)
'Chinese Taipei	'China	'United States of America	'China	'Hong Kong (SARC)	'Australia

The higher official exchange rate in the panel data means the depreciation of local currency of the East Asian country. On the other hand, lower hindex means diversified trade. The negative sign of the exchange rate in the panel regression implicates that depreciation affects more de-specialization (anti-specialization or simply we can say more divergence). From this model it can be said that depreciation tends to reduce specialization, because depreciation creates more incentives for other exporters to export in more various products which will not much depend on particular products. This might be explained as, higher exchange rate gives incentive for investing more in differentiated export sectors. As a result: specialization is no longer maintained every time depreciation occurs in East Asian economies. This result does not support the study hypothesis but follows others` work [18].

The positive sign of the GDP coefficient supports the fact that rich countries in the ASEAN5+3 have more specialized trade sector. In other words, trade specialization increases with the size of the economy. This is again opposite of the study hypothesis that GDP and export diversification is positively related.

The trade intensity index variable assures the study hypothesis that more integration within ASEAN and ASEAN5+3 leads to diversified trade of these economies, to the world. Since the negative sign of the coefficient with the TI index refers to: higher the TI index, lower the hindex, which means diversified export.

Finally, the tariff rate coefficient is negative that could be explained as higher the tariff rate, lower the hindex i.e. trade diversification. Deeper study on the diversification of trade for each country under consideration is needed to understand this relation properly.

IV. Conclusion

The study concludes that export diversification had been almost steady over the years in East Asian economies and all the countries in the study have concentrated trade in manufacturing products. Furthermore, different factors help to create different degree of specialization. According to the findings of the study, exchange rates and tariff rates have significant negative impact on specialization. On the other hand, greater economic integration in East Asian economies leads to export diversification and GDP of the exporting country tend to be positively related with the trade specialization of that economy.

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