

## Openness of the Economy, Diversification, Specialization, and Economic Growth

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### Abstract

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This article examines whether openness of the economy promotes production diversification or production specialization and whether or not specialization/diversification spurs economic growth. International trade is important to stabilize and promote economic growth. However, promotion of international trade does not necessarily cause economic growth. This article focuses on the existence empirical patterns of production diversification/specialization between international trade and economic growth. The empirical results show that greater openness of the economy does not always mean the greater economic growth in emerging and developing countries. Economic conditions and market structures related to international trade must be considered carefully to achieve the economic growth.

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**Keywords:** production diversification, economic growth, openness of the economy, production specialization

### I. Introduction

This article reports on an empirical examination of whether openness of the economy promotes diversification or specialization of products and whether or not diversification can achieve economic growth. The relationship between international trade and economic growth has been examined a lot and most studies have shown that there is a positive relationship between them. However, this article focuses on the existence of production diversification/specialization between international trade and economic growth. Sometimes it may be important to consider this issue in spite of the fact that few studies have considered this relationship.

International trade is important to stabilize and promote economic growth (see, for example, Tung & Thanh, 2015). However, promotion of international trade does not necessarily cause economic growth. Greater openness of the economy does not always mean the greater economic growth. One must consider the economic conditions, market structure, and so on more carefully in some cases. In general, openness of the economy is welcomed and highly sought after for developing economies as many believe that such openness promotes exports and enriches these countries. On the other hand, some articles, such as Ulason (2013), have shown that lower trade barriers are not associated with economic growth. However, whether or not production specialization induces economic growth should be carefully examined as this situation can lead not only to microeconomic volatility or confusion but also to macroeconomic volatility or confusion. Empirical analyses in such a situation may help provide one of the answers policies should be taken.

This article is structured as follows. Section 2 reviews existing studies related to openness of the economy, production diversification (specialization), and economic growth. Section 3 provides theoretical analysis for empirical estimation analyses conducted in section 4. Section 4 shows the empirical analysis. Finally, this article ends with a brief summary.

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## 2. Existing Studies

Despite that many articles are available concerning the relationship between international trade and production diversification/specialization, few studies have been published related to openness of the economy and production diversification/specialization. Ibrahim and Amin (2003) found that manufacturing export expansion and export specialization can promote growth. Cadot, Carrere, and Strauss-Khahn (2011) showed that exports promote reduced production diversification. Ferreira and Harrison (2012) indicated that no long-run relationship was found between export diversification and economic growth. There is no consensus for that relationship.

On the other hand, some articles have focused on the relationship between production diversification/specialization and economic growth. Imbs (2004) and Giovanni and Levchenko (2009) showed that there is a strong tie between specialization and economic volatility. Beine and Coulombe (2007), Ortiz (2012), and Elhiraika, Abuouhakar, and Muhammad (2014) found that diversification should be promoted for growth. Dennis and Shepherd (2011) showed that international trade promotes export diversification in developing countries. Haddad, Lim, Panero, and Saborowski (2013) showed that diversification does not promote growth. Makhoul, Kellard, & Vinogradov (2015) indicated that openness is linked positively with production specialization and diversification depending on economic conditions. Cavalcanti, Mihaddes, and Raissi (2015) and Abubaker (2015) showed that volatility of commodity terms of trade growth enhances output but has a negative impact on growth. Ramanavake and Lee (2015) found that export specialization is not robust for economic growth. No consensus has been reached on this matter in spite of the fact that much discussion has occurred.

Many studies have reported on the relationship between openness of the economy and economic growth. Krugman (1990) showed the reason that international trade liberalization was good for economic growth in developing countries. Balassa (1978) found that the rate of growth of exports was linked to the rate of economic growth. Rodriguez and Rodrik (1999) proposed problems of over-enthusiasm to explain the questionable outcomes of studies that have shown a strong positive relationship between openness of the economy and growth. Edwards (1998), and Bhagwati and Srinivasan (2001) also showed empirical evidence of the positive effect on economic growth. Rogers (2003) indicated that investment and growth are closely linked and that hindered investments might reduce economic growth. Barboza and Trejos (2008) showed that openness of the economy does not lead to economic growth. Kim, Lin, and Suen (2012) showed that international trade causes economic growth in high income, low inflation, and nonagricultural economies but had a negative impact on economic growth in countries with opposite attributes. Manni, Siddiqui, and Afzai (2012) showed that greater openness of the economy has a positive effect on economic growth.

Recently, this issue has received additional attention. Andrews (2015) and Umesh and Pratikshva (2015) used a causality test and found that unidirectional causality runs from export to GDP. Hye and Lau (2015) employed a rolling window regression and also found that the effect of openness of the economy on growth is not stable. Sokvi, Villaverde, and Maza (2015) found a positive relationship between international trade openness and income level in the long run. Fitozová and Zidek (2015), Musila and Yiheyis (2015), Trejos and Barboza (2015), and Polat, Shahhaz, Rehman, and Satti (2015) found a positive relationship between international trade and GDP growth. Gangnon (2016) showed that no significant effect of trade liberalization is obtained either in least developed countries (LDCs) and non-LDCs.

Jacks, O'Rourke, and Williamson (2011) showed that production specialization is endogenous to political regimes. Bonnal and Yaya (2015) showed that political institution proxies do not hinder economic development. It appears necessary to take into account not only economic aspects but also political or sociological aspects.

The theory of comparative advantage states that a country should specialize in producing and exporting goods and services that it can produce at lower opportunity cost than other goods and services. If countries followed this theory, it would be beneficial to countries as each country could obtain benefits. However, Melitz (2002) stated, "The exposure to trade will induce only the more productive firms to enter the export market (while some less productive firms continue to produce only for the domestic market) and will simultaneously force the least productive firms to exit" (p. 1). Melitz then showed that further increases in the industry's exposure to trade lead to additional interfirm reallocations toward more productive firms. Each country has its own reasonable and ideal policy that accounts not only for factor endowments such as labor, capital, land, and climate and so on but economic conditions such as time, industrial structure, rules and customs, and so on. Empirical analysis would help provide more definitive answers.

### 3. Theoretical Analysis

As this problem whether promoting international trade is fruitful or not is a crucial issue for each country (in some cases, districts and so on), there has been a lot of existing studies presented by now. However, production specialization in very limited products or services seems sometimes dangerous in reality. From theoretical aspects, it would be beneficial; however, there are also cons like changing allocation of resources efficiently. Employment is one of the most important problems. Losing jobs would become a very serious problem. The theory of comparative advantage may be accepted by almost all the economists, however, there should be problems that we should be taken into account. It would be very difficult and impossible to consider all of the aspects that should be taken into account, so this article focuses on macroeconomic aspect, namely economic growth in a country.

To obtain an answer of this problem, two problems are analyzed.

- (1) Does openness of the economy cause production diversification (or production specialization) of the country?
- (2) Does production diversification (or production specialization) of the country cause economic growth?

To answer these two problems, two equations (1) and (2) are estimated empirically.

$$SPECIALIZATION_{it} = \alpha + \beta OPENNESS_{it} + \varepsilon_{it} \quad (1)$$

Where SPECIALIZATION is the export diversification index from IMF. OPENNESS is international trade openness.

$$GROWTH_{it} = \alpha + \beta SPECIALIZATION_{it} + \varepsilon_{it} \quad (2)$$

where GROWTH is the GDP growth rate from IMF.

Empirical methods and analyses are explained more concretely in section 4.

### 4. Empirical Analysis

#### 4-1 Data

The export production specialization index is from *Diversification Toolkit: Export Diversification and Quality Databases* (International Monetary Fund, 2014). International trade openness is the ratio of exports and imports to GDP from IFS (International Financial Statistics, International Monetary Fund). The data from the Diversification Toolkit covers many countries, including most low income countries, and provides indicators on export product diversification up to 2010. The data are based on an updated version of the UN-NBER dataset, which harmonizes COMTRADE bilateral trade flow data at the 4-digit SITC (Rev. 1) level (IMF, 2014).

#### 4-2 Estimation Methods

Estimation was performed using panel least squared (OLS) and robust estimation. Adding to the normal OLS method, robust estimation is also used for estimation and is unlike maximum likelihood estimation. OLS estimates for regression are highly sensitive to the observations that do not follow the pattern of the other observations. This is not a problem if the outlier is simply an extreme observation from the tail of a normal distribution; however, if the outlier is from non-normal measurement error or some other violation of standard OLS, it compromises the validity of the regression results if a nonrobust regression method is employed.

Granger causality tests also were performed to check the relationship among variables, explanation variable and dependent variable. This test is as follows: a time series  $X$  is said to Granger-cause  $Y$  if one can show a series of  $t$  value and  $F$  value on lagged values of  $X$  (lagged values of  $Y$  included) and those  $X$  values give statistically significant for values of  $Y$ . The estimations of the equations (1) and (2) in the previous section of this study are performed for advanced economies, emerging and developing countries, and whole countries. This classification for (1) ~ (3) is a result of the IFS explained above. Some data are lacking, so all of the available data are used for estimations. The sample period is from 1991 to 2010. The year 2010 is the most recent for which data are available (as of January 1, 2016). Furthermore, Granger causality tests are conducted to examine the relationships among variables.

## 4-3 Empirical Results

The results are listed in Tables 1a, 1b, 1c, 2a, 2b, and 2c. First, the results of equation (1) are as shown in Tables 1a, 1b, and 1c.

**Table 1a: Deterministic Elements of Diversification: Advanced Economies**

	OLS		Robust Estimation	
	Coefficient	Prob.	Coefficient	Prob.
C	0.664 (28.345)	0.000	0.663 (26.013)	0.000
OPENNESS	-0.0006 (-7.690)	0.000	-0.0005 (-6.893)	0.000
Adj.R2	0.744		0.778	
F-statistic/Rn-squared statistic	59.143		47.380	
Prob (F-statistic/Rn-squared statistic)	0.000		0.000	

*Note.* Figures in parentheses are t-statistics/z-statistics.

**Table 1b: Deterministic Elements of Diversification: Emerging and Developing Countries**

	OLS		Robust Estimation	
	Coefficient	Prob.	Coefficient	Prob.
C	2.122 (42.936)	0.000	2.132 (44.558)	0.000
OPENNESS	-0.0005 (-3.067)	0.006	-0.0005 (-3.290)	0.001
Adj.R2	0.296		0.445	
F-statistic/Rn-squared statistic	9.409		10.026	
Prob (F-statistic/Rn-squared statistic)	0.006		0.001	

*Note.* Figures in parentheses are t-statistics/z-statistics.

**Table 1c: Deterministic Element of Diversification: Whole Countries**

	OLS		Robust Estimation	
	Coefficient	Prob.	Coefficient	Prob.
C	1.435 (37.017)	0.000	1.428 (35.771)	0.000
OPENNESS	-0.0007 (-5.298)	0.000	-0.0006 (-4.943)	0.000
Adj.R2	0.575		0.623	
F-statistic/Rn-squared statistic	28.072		24.438	
Prob (F-statistic/Rn-squared statistic)	0.000		0.000	

*Note.* Figures in parentheses are t-statistics/z-statistics.

The results are very clear and persuasive. Promotion of international trade does not induce production diversification. Instead of production diversification, production specialization has been ongoing for all of the cases (advanced economies and emerging and developing countries). There are almost no large differences among countries.

The results of equation (2) are shown in Tables 2a, 2b, and 2c.

**Table 2a: Deterministic Elements of Growth: Advanced Economies**

	OLS		Robust Estimation	
	Coefficient	Prob.	Coefficient	Prob.
C	328.089 (9.023)	0.000	322.579 (8.270)	0.000
SPECIALIZATION	-438.261 (-5.915)	0.000	-426.107 (-5.361)	0.000
Adj.R2	0.630		0.677	
F-statistic/Rn-squared statistic	34.988		28.743	
Prob (F-statistic/Rn-squared statistic)	0.000		0.000	

*Note.* Figures in parentheses are t-statistics/z-statistics.

**Table 2b: Deterministic Elements of Growth: Emerging and Developing Countries**

	OLS		Robust Estimation	
	Coefficient	Prob.	Coefficient	Prob.
C	-6.180 (-2.932)	0.009	-3.945 (-3.155)	0.002
SPECIALIZATION	3.281 (3.075)	0.006	2.104 (3.324)	0.009
Adj.R2	0.506		0.522	
F-statistic/Rn-squared statistic	9.453		11.052	
Prob (F-statistic/Rn-squared statistic)	0.006		0.008	

*Note.* Figures in parentheses are t-statistics/z-statistics.

**Table 2c: Deterministic Element of Growth: Whole Countries**

	OLS		Robust Estimation	
	Coefficient	Prob.	Coefficient	Prob.
C	257.674 (9.425)	0.000	259.319 (8.949)	0.000
SPECIALIZATION	-103.021 (-7.350)	0.000	-164.407 (-6.393)	0.000
Adj.R2	0.726		0.761	
F-statistic/Rn-squared statistic	54.024		48.905	
Prob (F-statistic/Rn-squared statistic)	0.000		0.000	

*Note.* Figures in parentheses are t-statistics/z-statistics.

Increasing international trade promotes production specialization in both advanced economies and emerging/developing countries as confirmed in Table 1a, 1b, and 1c; however, specialization does not promote economic growth in emerging and developing countries.

For advanced economies, production specialization does promote economic growth. It is the most important issue to be noted. Both advanced economies and emerging/developing countries promote production specialization when they promote international trade; however, this process does not achieve economic growth in emerging/developing countries.

Moreover, causality tests were performed among the two variables, namely, openness of the economy and production specialization. Table 3 shows the results of the estimations.

**Table 3: Pair wise Granger Causality Tests**

Null Hypothesis	F-Statistic	Probability
OPENNESS does not Granger Cause SPECIALIZATION in advanced economies	7.520	0.006
SPECIALIZATION does not Granger Cause OPENNESS in advanced economies	0.262	0.773
OPENNESS does not Granger Cause SPECIALIZATION in emerging and developing countries	0.823	0.460
SPECIALIZATION does not Granger Cause OPENNESS in emerging and developing countries	0.584	0.571
OPENNESS does not Granger Cause SPECIALIZATION in whole countries	0.176	0.840
OPENNESS does not Granger Cause SPECIALIZATION in whole countries	1.634	0.230

*Note.* Lag (= 2) is selected by AIC.

The results are also clear. Economic growth by international trade is obtained in advanced economies as a result of changes in economic structure (specialization); on the other hand, this process has not been structured well in emerging and developing countries. Other processes and other variables should be taken into account.

## 5. Conclusions

This article focuses on two issues: Does openness of the economy cause production diversification (or production specialization) of the country *and* Does production diversification (or production specialization) of the country cause economic growth? The empirical results are clear. Increasing international trade promotes production specialization in both advanced economies and emerging/developing countries; however, production specialization does not promote economic growth in emerging and developing countries. For advanced economies, production specialization promotes economic growth. For emerging/developing countries, the results do not coincide with practical sense and traditional economic theory. Emerging and developing countries need a different process to achieve economic growth.

As showed by Meritz (2002), it seems that it may sometimes to dangerous to understand economic structure as specification or diversification like digital clarification and to implement policies based on one of the two. For example, vertical intra-industry trade should be taken into account (see, e.g., Chin and Yong, 2015). It seems necessary to examine intra- and inter-industry factors for each country. Furthermore, Alfaee and Al-Jafari (2015) found a short-term causality from financial development to trade openness. Sehwat and Giri (2015) showed a long-term relationship between financial development and growth using a cointegration test. If developing countries keep their own economic structures as they presently exist, the economic divide between advanced and developing countries seems likely to expand. New and different policies including more efficient financial systems or financial development may be necessary. For the relationship between diversification/specialization and economic growth, other processes or other variables or indexes should be taken into account. Further research is needed for the analysis.

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