Do Exports to Developed Countries Stimulate Export Sophistication? Evidence from ASEAN Countries

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Abstract—A country’s sophistication of production and exports is important for economic transformation. Theoretically, the export destination influences country’s export sophistication. One of the main mechanisms by which exports to developed countries can have a positive impact on production and export sophistication is skills upgrading. This paper aims to examine the effect of exports to developed countries on the export sophistication of ASEAN countries and relatively shows Indonesia’s position towards other ASEAN countries in terms of export sophistication. The method we used is fixed effect panel data model by using the UNCTAD’s index of comparative diversification vis-a-vis developed countries as dependent variable, which measures the similarity of exports with developed countries’ exports. Empirical results show that higher share of exports to developed countries are significantly associated with higher export sophistication, but there are diminishing returns to this effect. The results also show that the Indonesia’s export sophistication is relatively low compared to some other ASEAN countries, which is still below Malaysia and Thailand. This paper suggests that the Indonesian government needs to encourage Indonesian industries to target developed countries in order to enhance their productivity and product quality that lead to capability in exporting to the developed countries, which in turn will increase Indonesia’s exports in general.

Keywords—Destination of exports; Export sophistication; ASEAN

I. INTRODUCTION

Production sophistication is generally associated with productivity, which in turn can lead to higher wages and income and increased welfare. Therefore, product and export sophistication is important for the economic transformation of a country [1]. In addition, there is a relationship between export destination and export sophistication, which means that industries that export to developed countries are more sophisticated in production and exports [2].

One of the main mechanisms by which exports to developed countries can have a positive impact on production and export sophistication is skills upgrading [3]. First, exporting to developed countries will lead firms to improve their skills, cause sophistication to increase [4] [2] [5]. Developed countries need skill-intensive quality improvements. Second, exporting to developed countries requires services such as distribution, transportation, advertising, and intensive activities in skilled labor [6] [7]. Developed countries need skill-intensive products and services. Finally, what is referred to as “learning by exporting” [8] [9]. Firms that export more will learn more. However, learning by exporting does not necessarily encourage upgrading or export sophistication skills, because the countries may specialize in low-skill-labor-internal products.

A number of studies have explored the relationship between trade and export sophistication. A number of factors were found to affect export sophistication including FDI, trade liberalization, institutional quality, human capital, technology, infrastructure, and financial development [10] [11] [12] [13] [14] [15] [16]. Anand & Mishra (2012) found that educated labor, external liberalization, and information flows are important prerequisites for export sophistication. Iwamoto & Nabeshima (2013) found that FDI inflows correlate positively with export diversification and export sophistication. Zhu & Fu (2013) found that export sophistication is enhanced by capital deepening, engagement in knowledge creation, transfers via investment in education and R&D and FDI and imports. Weldemicael (2012) found that FDI has a positive effect on export sophistication, and the effect is greater in countries with low institutional quality.

Based on the similarity of exports with developed countries’ exports (SIMDEV), the export sophistication of ASEAN countries on average is relatively high, which is above 80 [3]. During the period 1995-2010, the export sophistication of ASEAN countries on average showed an increasing trend, from 80.77 in 2015 and reached 82.29 in 2010 (Fig. 1).

**Fig 1.** ASEAN countries’ export sophistication index and share of ASEAN countries’ export to the developed countries, 1995-2017

Source: UNCTAD Stat
However, during the period of 2011-2017 ASEAN export sophistication tended to decline and be below 81.3 in 2017. On the other hand, the share of ASEAN exports to developed countries (EXPDEV) also tended to decline, from 56.45% in 2000 and became only 36.68 in 2017. This shows a shift in different trade strategies in ASEAN, especially after the global economic crisis of 1997-1998, from concentration to diversification exports to new markets.

Among ASEAN countries, Thailand has the highest export sophistication value in 2017, amounting to 94.19, followed by Malaysia (90.05), Singapore (88.25), Vietnam (84.42), Indonesia (84, 24), and Phillipines (84.05) (Fig. 2).

Furthermore, considering the share of exports to developed countries, Cambodia is the ASEAN country with the largest share with 73.76 in 2017, followed by Vietnam (50.83) and Phillipines (46.02) (Fig 3). Meanwhile, the share of Indonesia's exports to developed countries is only 33.88.

This paper aims to test whether exports to developed countries affect the export sophistication of ASEAN countries during the period 2001-2017. Myanmar is excluded from the sample due to data availability on capital formation, FDI inflows and trade openness in the earlier period. Utilizing the time-fixed effect model estimation method of panel data, this study found that exports to developed countries are seen to increase export sophistication but there are diminishing returns in this influence. This finding is in line with previous research by Baliamoune-Lutz which saw the effect of exports to developed countries on export sophistication of developing countries [3].

II. METHODS

A. Model

The equations used in this study are as follows:

$$SIMDEV_{it} = \beta_0 + \beta_1 EXPDEV_{it} + \beta_2 GFCAP_{it} + \beta_3 FDI_{it} + \beta_4 OPEN_{it} + \beta_5 GOV_{it} + \beta_6 EXPDEV_{SQ}_{it} + \beta_7 GFCAP_{SQ}_{it} + \beta_8 FDISQ_{it} + \beta_9 OPENSQ_{it} + \beta_{10} GOVSQ_{it} + \mu_i + \epsilon_{it}$$

where SIMDEV is an indicator of export sophistication in country i at time t. SIMDEV refers to export sophistication by Balamoune-Lutz (2019) uses the UNCTAD's index of comparative diversification vis-a-vis developed countries, which measures export similarity with developed economies' products [3]. This research uses SIMDEV index of export sophistication rather than EXPY index of export sophistication because EXPY index has a limitation in that it...
does not take into account the quality differences within a product category thus causing the overvaluation of EXPY of low-income countries [3][16].

The determinant of export sophistication in this model includes export share to developed countries (EXPDEV), gross fixed capital formation as percentage of GDP (GFCAP), FDI inflow as percentage of GDP (FDI), trade openness (OPEN), and average governance indicators (GOV). The equation includes the square form of each independent variables (EXPDEVSQ, GFCAPSQ, FDISQ, OPENSQ, and GOVSQ) to see whether there is a nonlinear relationship to the dependent variable.

In general, there are two methods for measuring the export sophistication of a country. First, export sophistication (EXPY) index by Hausman et al (2007) [1]. EXPY measures the average income associated with a countries’ export bundles [14]. Product’s sophistication defined as the trade-share weighted average of income per capita of all the countries exporting this product, where the weights are each countries’ export shares of world exports [17]. When a developing country exports products similar to products exported by developed countries, the EXPY value will increase. Second, export sophistication (SIMDEV) index by Baliamoune-Lutz (2019) uses the UNCTAD’s index of comparative diversification vis-a-vis developed countries, which measures export similarity with developed economies’ products. This index is an application of the export similarity index (ESI) proposed by Schott (2008) as follows

\[
S_{(ab)} = \left(\sum_{i} \text{Minimum} \left[ X_i(a), X_i(b)\right] \times 100 \right) \tag{2}
\]

where S is the same pattern of exports of countries a and countries b. If the export pattern of country a is the same as the export pattern of country b, then the index will show a value of 100 [3][18].

B. Data

This study uses data from 9 ASEAN countries, namely Brunei Darussalam, Cambodia, Indonesia, Malaysia, Laos PDR, the Philippines, Singapore, Thailand and Vietnam. Myanmar is not included in the model due to data limitations on capital formation, FDI inflows and trade openness.

Export sophistication and export share to developed countries data are sourced from UNCTAD Statistics. As control variables: capital formation, FDI inflows and trade openness data are sourced from the World Development Indicator, World Bank, and governance data sourced from the Worldwide Governance Indicator, World Bank.

C. Estimation Strategy

The Equation (1) estimated by time-fixed effect model panel data. This estimation strategy can be chosen assuming that there are unobserved effects that differ between times rather than between units which have an impact on the dependent variable.

III. RESULTS AND DISCUSSION

Table I shows the descriptive statistics of the variables used in this study. The average of export sophistication in ASEAN countries (without Myanmar) during the period 2001-2017 is 82.23. This indicates that the export patterns of ASEAN countries have approached developed countries. The average share of exports of ASEAN countries to developed countries is only 47,118. This indicates that the exports of ASEAN countries tend to be diversified.

| Variable | Obs | Mean  | Std.Dev. | Min  | Max  |
|----------|-----|-------|----------|------|------|
| SIMDEV   | 153 | 82.23 | 7.945    | 68.35| 94.24|
| EXPDEV   | 153 | 47.118| 16.556   | 10.5 | 86.28|
| GFCAP    | 153 | 24.8  | 5.585    | 10.47| 39.46|
| FDI      | 153 | 5.447 | 5.886    | -1.86| 26.52|
| OPEN     | 153 | 140.045| 92.301  | 37.42| 441.6|
| GOV      | 153 | -1.104| .752     | -1.31| 1.62 |

Table II shows that the share of exports to developed countries has a positive and significant effect on export sophistication. This means that the greater the share of exports to developed countries, the higher the export sophistication of the country. However, the negative and significant sign of the form of the square of the share of exports to developed countries shows that there is a turning point in the influence of the share of exports to developed countries on export sophistication from positive to negative. This finding is in line with the findings of Baliamoune-Lutz (2019).

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Gross fixed capital formation and its squared form are also statistically significant, which indicates an inverted-U effect on export sophistication. This means that the greater the intensity of capital, the higher the export sophistication of the country. This finding is similar to Zhu and Fu (2013). In contrast, FDI and its squared form are also statistically significant and show U-shaped impacts on export sophistication. FDI which had a negative effect initially because the benefits received by ASEAN countries from FDI from developed countries were still limited in some sectors, as happened in Africa [19]. Trade openness has a positive and significant influence on export sophistication, while governance quality actually shows a negative and significant influence.

IV. CONCLUSION AND POLICY RECOMMENDATION

This study investigates whether exports to developed countries stimulate product sophistication of ASEAN countries. The estimation results of fixed effect model suggest that exports to developed countries are seen to increase export sophistication but there are diminishing returns in this effect. This finding is in line with previous research by Balamoune-Lutz (2019) which saw the effect of exports to developed countries on export sophistication of developing countries [3]. In addition, the same effect also occurs in gross fixed capital formation where there is an inverted-U pattern of the effect of gross fixed capital formation on export sophistication.

From this study, there are at least two recommendations for policy direction that can be taken. First, even though the diversification of exports to non-traditional markets is a strategic policy in the period of global uncertainty, it is important to target the markets of developed countries in order to improve export sophistication. Export sophistication, which means higher quality of existing products, will make exports more competitive and bring substantial benefits to developing countries in terms of economic growth [20]. The government needs to encourage industries to target the markets of developed countries so that upgrading skills occur. Upgrading skills will encourage increased quality and value added of export products and in turn increase overall export value. Second, the government needs to support industries in order to improve export sophistication by providing facilities as much as possible for industries and consistently maintain open trade policies.

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