<Articles (Economics)>

The Effects of Economic Policies on Trade Balance in Malaysia

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Abstract

Our study attempts to improve Malaysia's aggregate import demand functions by considering disaggregate imports using imports data classified by Broad Economic Category (BEC). Our results suggest that economic growth may not affect Malaysia's trade balance negatively; the country's integration into global production chain would not harm trade surplus. At the same time, as economies grow, they generally incur inflation. According to our results, inflation seems unimportant for trade in intermediate goods, but it is significant for consumption goods. However, since import share of consumption goods in Malaysia's total imports is very small, the overall effects could be limited.

Keywords

Production sharing, Vertical specialization, Import demand, price and income elasticities, trade policy, devaluation of the Ringgit

1. Introduction

Aggregate import demand functions have been investigated using a variety of model specifications and estimation methods for different countries. The estimated income and price elasticities provide answers to many important questions. For example, how should domestic policies be designed to reduce trade deficit? Among many applications, the effectiveness of devaluations for improving trade deficits has been particularly emphasized by previous studies. Moazzami and Wong (1988), Bahmani-Oskooee and Niroomand (1998), and Tang (2002, 2004) examine whether the Marshall–Lerner condition is satisfied by estimating import demand and export demand equations for several countries. Fukumoto (2012) evaluates disaggregate import demand functions to provide policy implications on China's trade balance.

Recent studies have emphasized the impact of vertical specialization[1] on import demand, and Gregori and Giansoldati (2019) evaluate import demand using import intensity-adjusted demand[2] as an income variable. Their result reveals a strong support to use import intensity-adjusted demand instead of other variables, such as GDP, GDP minus exports, and national cash flow given by GDP minus investment, government expenditure, and exports. Although their estimates indicate relevance of using import intensity-adjusted demand, they pool 34 countries consisting of developed nations, except for China, India, Indonesia, and Mexico. Thus, it is difficult to apply the results on developing countries. Also, it is preferable to estimate import demand for a single economy when deriving

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[1] Vertical specialization has been an important aspect in international trade. A key concept of vertical specialization is a sequential linkage of production processes across many countries, with each country engaging in some rather than all stages of the production process. Each country is vertically linked by using imported inputs in the production and exporting some of the resulted outputs (Hummels et al., 2001).

[2] Bussière et al. (2013) propose a new measure of aggregate demand, which is import intensity-adjusted demand, by computing a weighted average of all final demand components. They argue that each demand component has different degrees of import content, and thus, true variable to represent macroeconomic income (or activity) variable should be calculated by deducting import content.

policy implications.

In this paper, our contributions are twofold. Firstly, we estimate disaggregate import demand functions in Malaysia. Since we are unable to obtain time-series data to calculate import intensity-adjusted demand, we fill this void by estimating disaggregate import demand functions for each BEC category[3]. Each BEC is categorized as capital goods, intermediate goods, and consumption goods, and thus, we expect to arrive at different coefficients for income variable and relative price. We understand that each demand component has different degrees in import content. However, such differences may be detectable by estimating disaggregate import demand. Secondly, we discuss the effect of economic policies on trade balance in Malaysia. Currently, the Malaysian Ringgit is devaluating, and we derive implications on how this affects trade balance.

A few past studies are estimating Malaysia's import demand. Tang and Mohammad (2000) analyze Malaysia's aggregate import demand function for 1970–1998 using the error correction model (ECM) and find that there is no long-run relationship among the variable. On the contrary, Tang and Nair (2002) examine Malaysia's aggregate import demand for the same period using the bounds test proposed by Pesaran et al. (2000) and ascertain long-run relationship. Tang and Nair (2002) point out that the ECM provides unreliable estimates due to small sample sizes. The estimated long-run coefficients, concerning relative prices and income, are 1.5 and −1.3, which satisfy the Marshall–Lerner condition. Hence, relative prices play a significant role in trade flows. They also shows that Ringgit devaluation can correct trade imbalance in Malaysia. Tang (2010) analyzes

[3] See Appendix 1 for detailed classification.

import demand function in the ASEAN countries and finds long-run relationship in Malaysia and Singapore. In Malaysia, the estimated long-run coefficient for a relative price is −2.14, which is slightly higher than his previous study (Tang, 2002).

The above studies arrive at the common conclusion that the long-run import demand is elastic for the relative prices. Our study attempts to improve upon the three studies of Malaysia's aggregate import demand functions by considering disaggregate imports. The rest of the paper is organized as follows: Section 2 describes the methodology and estimation models, Section 3 reports the estimation results and discusses the implications, and Section 4 provides conclusions.

2. Estimation Method and Model Specification

Pesaran et al. (2001) develop the bounds test to examine a level relationship among variables based on VAR(p) under a conditional modeling technique that focuses on the scalar variable. Proper transformation of the underlying VAR(p) model may yield an expression of the conditional ECM. Alternatively, the derived conditional ECM can be obtained from the autoregressive distributed lag (ARDL) model of orders (p, p, ..., p), where p denotes the number of regressors[4]. The conditional ECMs can be used to examine whether there exists a stable level relationship among the variables by computing the F-statistic to test the significance of the lagged level variables.

The bounds testing procedure has two advantages compared with other

[4] In ARDL model, the lag length for each regressor can differ, and it could be expressed as (p_1, p_2, ..., p_k), where k denotes the number of regressors.

cointegration procedures. Firstly, it does not require all the underlying variables to be integrated of order 1. It can be employed without any prior knowledge about the underlying regressors being purely I(0), I(1), or mutually cointegrated. Thus, it avoids the uncertainty problem of pre-testing, which arises from classifying variables either into I(0) or I(1)[5]. Secondly, the bounds test can be applied to small sample sizes[6], whereas the conventional methods developed by Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990) suffer from small sample bias[7].

The bounds test involves two stages. In the first stage, the existence of cointegration among examined variables is investigated. In the second stage[8], the long-run and short-run coefficients are estimated using the ARDL model, given the evidence of cointegration. The following conditional unrestricted error correction model is estimated to test the cointegrating relationship:

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[5] The Phillips–Perron unit root test is conducted to confirm the order of integration, and the results are available upon request. In short, some variables are estimated to be I(0) and some to be I(1). Thus, since we have both I(0) and I(1) variables among the regressors, cointegration procedures which require all variables to be I(1) are not appropriate.

[6] Several previous studies have applied the bounds test to small sample sizes. For example, Pattichis (1999) adopted the bounds test to estimate the import demand for maize, milk powder, butter, and rice imports in Cyprus using annual time series data from 1975 to 1994 (20 observations). Mah (2000) analyzed the long-run relationship of disaggregate import demand for information technology products in Korea based on 18 annual observations.

[7] For small samples, the bounds testing approach is more desirable than the Engle and Granger test and Johansen test, since it does not push the short-run dynamics into the residual term (Pattichis, 1999).

[8] The ARDL approach can be applied regardless of whether the underlying regressors are purely I(0), I(1), or mutually cointegrated. See Pesaran and Shin (1999).

$$\Delta \ln M_t^g = a_0 + a_1 t + a_2 \ln M_{t-1}^g + a_3 \ln Y_{t-i} + a_4 \ln RP_{t-1}^g$$

$$+ \sum_{i=1}^{n} b_i \Delta M_{t-i}^g + \sum_{i=0}^{n} c_i \Delta RP_{t-i}^g + \sum_{i=0}^{n} d_i \Delta Y_{t-i} + \varepsilon_t \quad (1)$$

where ln M_t^g denotes the natural log of real imports in category g; $\ln Y_t$, the natural log of real domestic income (GDP); $\ln RP_t$, the natural log of the relative price; and $\Delta \equiv 1 - L$, the difference operator. Equation (1) includes an unrestricted intercept and trend. The optimal maximum lag is chosen based on AIC, and the null hypothesis of no cointegration (H_0:a_2=a_3=a_4=0) is tested against the alternative hypothesis of cointegration (H_1:$a_2 \neq 0$, $a_3 \neq 0$, $a_4 \neq 0$). Table 1 presents the bounds test results, and it confirms long-run relationships, except for BEC22 and BEC42. Since both goods are categorized as intermediate goods and imports of these goods may be used to produce exported goods, we estimate Equation (1), replacing the income variable by the total exports and exports of intermediate goods. However, we are unable to find the long-run relationship.

3. Empirical Results and Implications

We now move on to the second stage of the bounds test, which is to estimate Equation (1) using the ARDL specification. We expect long-run and short-run coefficients of relative prices to be negative and the domestic income variables to be positive. Table 2 presents the estimation results for each BEC category. We also report the coefficients for aggregate imports and compare them with those of past studies.

In Table 2, we find consistent results for estimates in the case of all goods. Both long-run relative price and income variable are estimated to be elastic and significant. The short-run coefficients are also consistent with those of the past studies. As Tang and Nair (2002) discusses, the results reveal that the Marshall–Lerner condition is satisfied for the period 1964–2017. Hence, it implies that the relative price plays a significant role in the determination of trade flows and devaluation of the Ringgit balances trade. From the perspective of domestic economic policy, an increase in inflation triggers a higher volume of imports. Thus, fiscal and monetary policy plays a significant role in influencing trade balance. Elastic income variable suggests that as the economy grows, it will harm trade balance, and it is important to lower imported content by developing local industries.

Now, we turn into estimated coefficients for each BEC category. As in the finding summarized by Goldsten and Kahn (1985), Table 2 presents different responses to relative price and domestic income variables across each BEC category. It reveals that argument made for all goods is not appropriate when examining coefficients for each BEC category. First, we take a look at Table 3, and we can see that trade share in intermediate goods is around 60% for both exports and imports, implying the importance of these goods in trade balance. When we pay attention to long-run coefficients for relative prices, the parts and accessories of transport equipment are estimated to be elastic and significant, but others are not.

Industrial supplies, processed (BEC22), and part and accessories for machinery and other capital equipment (BEC42) show the largest share in trade and must be given particular attention. Trade share in these two categories is half of the total trade, and we are unable to find long-run relationships. The possible explanation is that it may be related to vertical specialization. Malaysia has been involved in a sequential linkage of vertical production processes, which stretch many countries. As Figure 1 presents, the stock of foreign direct investment expands rapidly in early 2000s, and its major industries are electronics (Anazawa, 2010). As Malaysia involves vertical specialization via increased foreign direct investment, it stimulates imports of intermediate goods, and the corresponding BEC categories are BEC22 and BEC42. It suggests that the more the economy involves vertical specialization, the less responsive its trade variables become to its determinants, particularly the relative price. Such trade may be conducted by intra-firm, and Goldsbrough (1981) suggests that the price elasticities for intra-firm trade are found to be smaller than those for general international trade, because intra-firm trade is undertaken among foreign affiliates and parents. Thus, the low-price elasticities and/or insignificance may indicate a large share of intra-firm trade or intra-regional trade.

The above argument may shed light on the results that the volume of imports, income, and relative price are not moving together in these two categories. It implies that the effectiveness of devaluation may have limited influence on trade balance. We can also point out that domestic economic policies, such as fiscal and monetary policy, may not have a strong influence on trade balance as well. On the contrary, long-run income variables are only elastic and significant in the case of food and beverages, processed. It suggests that economic growth in Malaysia will not deteriorate trade balance but rather be affected by the economic conditions of the foreign countries. It calls for research to analyze the validity to use regional income instead of a single economy's income, considering the growing importance of vertical specialization[9].

It is also important to refer to the results of capital goods and consumption goods. Coefficients for both relative price and income variable are estimated to be elastic and significant in the case of machinery. As the economy expands, it tends to import more capital goods for investment. In contrast, imports of transport equipment have little impact on inflation and economic growth. As for consumption goods, coefficients for relative prices are estimated to be elastic and significant, except for food and beverages, processed. Thus, inflation will incur more imports of these goods. As for income variables, we find inelastic and/or insignificant coefficients. It suggests that economic growth may not harm trade balance in consumption goods. Since the import shares of consumption goods in Malaysia's total imports are very small, the overall effects could be small.

Referring to the short-run price elasticities, all are estimated to be inelastic, and several categories are shown to be insignificant. It means that fiscal and monetary policies will not have strong impacts on trade balance in the short run. Therefore, the effects of policies affect trade balance in the long term. For short-run income elasticities, we have elastic and significant coefficients for most categories, including intermediate goods. Hence, economic growth may deteriorate trade balance in the short term, considering elastic coefficients for BEC22 and BEC42.

4. Conclusions

This study attempts to estimate the long-run and short-run elasticities of Malaysia's disaggregate import demand for the relative prices of imports and income variable and derive some policy implications. The existence of cointegration is examined through the bounds test, and then, based on the

[9] Constantinescu, Mattoo, and Ruta (2015, 2016), Slopek (2015) and OECD (2016) use world's GDP as a proxy for domestic demand. However, here it is more important to disentangle complexity of demand for each BEC category generated by vertical specialization.

test results, the long-run and short-run coefficients are estimated using the ARDL approach.

The bounds test shows cointegration, except for industrial supplies (BEC22) and parts and accessories for machinery and other capital equipment (BEC42). Our hypothesis with regard to finding no cointegration in these two categories is that these imports may be determined by other factors, but not relative prices and Malaysia's income. It is mainly because of the deeper integration into vertical specialization. Once the economy becomes deeply involved in vertical specialization, imports will be affected by outside factors, i.e., regional (or firm) level of production and/or global demand. The relative prices of these goods may not be important determinants, because there will be no substitutes produced domestically. Thus, using the relative price to estimate import demand in these categories may not be relevant, and thus, further research is required.

We first discuss the estimation results in the case of intermediate goods since its trade share is around 60% and plays a significant role in determining trade balance. The demand for intermediate goods appears insignificant for the relative price, except for parts and accessories for transport equipment (BEC53). We hypothesize that intermediate goods imports may be associated with intra-firm trade via the expansion of FDI.

Our long-run estimates show inelastic income coefficients for most categories, except for machinery (BEC41) and food and beverages, processed (BEC121). It suggests that economic growth may not affect Malaysia's trade balance negatively; the country's integration into global production chain would not harm trade surplus. However, the export side needs to be incorporated to provide more detailed discussions about trade balance. At the same time, as economies grow, they generally incur inflation. According to our results, inflation seems unimportant for trade in intermediate goods, but it is significant for consumption goods. However, since import share of consumption goods in Malaysia's total imports is very small, the overall effects could be limited.

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Appendix 1. Commodity Classification

The UN comtrade database offers Broad Economic Categories (BEC) as well as SITC and HS. The UN provides the following transformations from BEC to each corresponding SNA class. See also UN (1971) for more details. In this study, we exclude 31 and 322 from estimations.

1．Capital Goods
- 41. Machinery and other capital equipment
- 521. Transport equipment, industrial (except passenger motor car)

2．Intermediate Goods
- 111. Food and beverages, primary, mainly for industry
- 121. Food and beverages, processed, mainly for industry
- 21. Industrial supplies, not elsewhere specified, primary
- 22. Industrial supplies, not elsewhere specified, processed
- 31. Fuels and lubricants, primary
- 322. Fuels and lubricants, processed (other than motor spirit)
- 42. Parts and accessories for machinery and other capital equipment (except transport)
- 53. Parts and accessories for transport equipment

3．Consumption goods
- 112. Food and beverages, primary, mainly for household consumption
- 122. Food and beverages, processed, mainly for household consumption
- 522. Transport equipment, non-industrial
- 61. Consumption goods not elsewhere specified, durable
- 62. Consumption goods not elsewhere specified, semi-durable
- 63. Consumption goods not elsewhere specified, non-durable

Appendix 2. Data Definitions and Sources

Trade data such as trade volume and unit price indices under BEC classification scheme used in this study are provided by the Institute of Developing Economies (IDE), Malaysia's constant GDP in US dollars and GDP deflator comes from the World Bank, and exchange rate of Ringgit to US dollar comes from International Financial Statistics reported by IMF. Price indices and GDP deflator are measured in 2010 prices.

M_t^g : Imports of the g^{th} BEC category deflated by the import unit price index at time t.

RP_t^g : Relative prices of the g^{th} category at time t given by

$$RP_t^g = \frac{PM_t^g * EXRA_t}{PD_t^g}$$

where PM_t^g is the import unit price of the g^{th} BEC commodity, $EXRA_t$ is exchange rate of Ringgit to US dollar, and PD^g is the domestic price. For the domestic price, we use GDP deflator.

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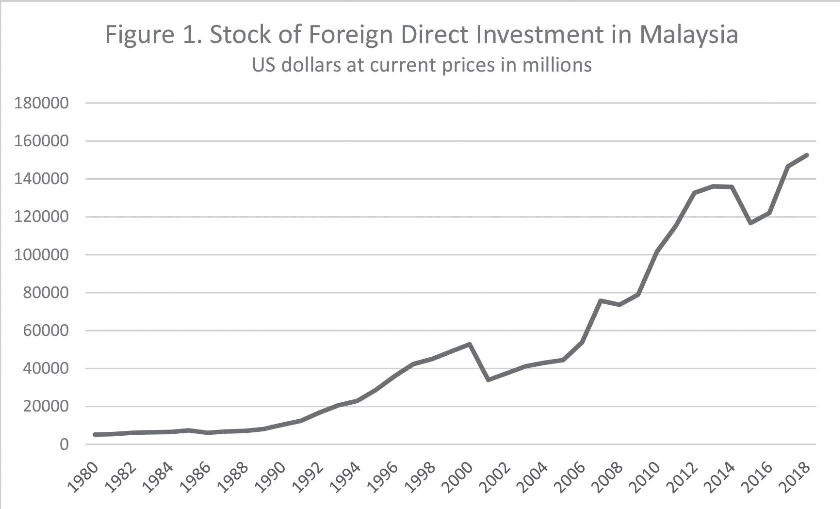

(Source) World Development Indicators, UNCTAD

Table 1. Summary of Cointegration Test

	Bec Code	Classification	Data Period	Cointegration	Lag order (imports, relative price, GDP)	Year Dummy
All Goods			1964-2017	yes	2,2,2	
Capital Goods	41	Machinery and other capital equipment	1964-2017	yes	2,2,2	
	521	Transport equipment, industrial	1979-2017	yes*	1,3,1	
Intermediate Goods	111	Food and beverages, primary, mainly for industry	1964-2017	yes	2,2,2	
	121	Food and beverages, processed, mainly for industry		yes**	1,1,1	2011-2013
	21	Industrial supplies, not elsewhere specified, primary		yes*	1,1,1	
	22	Industrial supplies, not elsewhere specified, processed		no	1,1,1	
	42	Parts and accessories for machinery and other capital equipment (except transport)			3,3,3	
	53	Parts and accessories for transport equipment		yes**	3,3,3	
Consumption Goods	112	Food and beverages, primary, mainly for household consumption		yes**	1,1,1	2003-2009
	122	Food and beverages, processed, mainly for household consumption		yes**	1,1,4	2009-2012
	522	Transport equipment, non-industrial	1979-2017	yes*	4,1,1	
	61	Consumption goods not elsewhere specified, durable	1964-2017	yes**	1,1,3	
	62	Consumption goods not elsewhere specified, semi-durable		yes	1,1,3	
	63	Consumption goods not elsewhere specified, non-durable		yes	3,3,3	

Notes:

(1) There are missing observations. For BEC 522 and BEC 42, we take an average between 1969 and 1971 for the the year of 1970, 1977 and 1979 for the year of 1978 respectively. For BEC522, we take an average between 2004 and 2006 for the year of 2005.

(2) The symbols * and ** denote significance at 0.05, and 0.01 levels, respectively. No symbols indicate significance at 10%.

(3) Year dummy is included for 121, 112 and 122 categories.

(4) F-statistics is available upon request.

Table 2. Estimated Long-run and Short-run coefficients by Autoregressive Distributed Lag model (ARDL)

			Long-Run		Short-Run			
	Bec Code	Classification	Relative Price	GDP	ΔRelative Price	ΔGDP	ECM $_{t-1}$	AdjR-squared
All Goods			-1.21**	3.22***	-0.44*	1.58***	-0.53***	0.81
Capital Goods	41	Machinery and other capital equipment	-1.02***	3.79***	-0.71***	2.51***	0.43**	0.88
	521	Transport equipment, industrial	-0.12	0.01**	-0.57**	3.95**	-0.41***	0.68
Intermediate Goods	111	Food and beverages, primary, mainly for industry	-0.89	-0.03	-0.54**	1.78*	-0.47***	0.38
	121	Food and beverages, processed, mainly for industry	-0.60	2.03*	-0.33	0.66	-0.43***	0.39
	21	Industrial supplies, not elsewhere specified, primary	2.03	1.66	-0.78***	0.84	-0.19	0.46
	22	Industrial supplies, not elsewhere specified, processed	-	-	-0.87***	3.03***	-	0.66
	42	Parts and accessories for machinery and other capital equipment (except transport)	-	-	-0.96***	1.56*	-	0.86
	53	Parts and accessories for transport equipment	-1.17***	0.85***	-0.06	3.13***	-0.80***	0.95
Consumption Goods	112	Food and beverages, primary, mainly for household consumption	-1.10***	0.58**	0.10	0.02	-1.05***	0.98
	122	Food and beverages, processed, mainly for household consumption	-0.01	2.12	-0.72***	2.04***	-0.15**	0.62
	522	Transport equipment, non-industrial	-1.53***	-3.20	-0.64***	6.77***	-0.45***	0.78
	61	Consumption goods not elsewhere specified, durable	-2.71***	-0.78	-0.21	3.71***	-0.42***	0.82
	62	Consumption goods not elsewhere specified, semi-durable	-1.77***	0.58	-0.45***	2.20***	-0.35***	0.88
	63	Consumption goods not elsewhere specified, non-durable	-1.65***	0.86**	-0.14	1.35***	-0.53***	0.86

Notes:

(1) The symbols *, ** and *** denote significance at 0.10, 0.05 amd 0.01 levels, respectively.

(2) Only short run coefficients are reported in the case of BEC22 and BEC42 due to lacking of long run relationships.

Table 3. Average Export and Import Share by BEC Categories

	Capital Goods				Intermediate Goods											
	41		521		111		121		21		22		42		53	
	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export
1980-1989	0.14	0.03	0.03	0.00	0.02	0.01	0.02	0.11	0.04	0.20	0.26	0.15	0.23	0.17	0.03	0.01
1990-1999	0.16	0.13	0.03	0.01	0.01	0.01	0.01	0.06	0.03	0.05	0.25	0.15	0.38	0.32	0.02	0.01
2000-2009	0.13	0.18	0.02	0.00	0.01	0.00	0.01	0.05	0.02	0.02	0.22	0.16	0.36	0.28	0.03	0.01
2010-2017	0.12	0.12	0.02	0.00	0.01	0.00	0.02	0.09	0.04	0.02	0.25	0.20	0.25	0.24	0.03	0.01

	Consumption Goods											
	112		122		522		61		62		63	
	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export
1980-1989	0.02	0.01	0.04	0.01	0.00	0.00	0.02	0.03	0.02	0.02	0.02	0.02
1990-1999	0.01	0.01	0.02	0.01	0.00	0.00	0.01	0.10	0.02	0.03	0.02	0.03
2000-2009	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.06	0.01	0.02	0.02	0.02
2010-2017	0.01	0.00	0.03	0.03	0.00	0.00	0.01	0.05	0.02	0.02	0.02	0.03

Source: Calculated by author.