

An Assessment of Trade Integration Focusing on Export-Led Growth Strategy for Sarawak: An Economic Geography Perspective

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Abstract

In an attempt to mitigate domestic supply and increasing local needs and wants for goods and services, international trade is the solution. This paper aims to investigate the development of trade integration focusing on Sarawak as a state in the Federation of Malaysia. The paper employed the gravity model in the context of international trade for Sarawak. Data from selected countries were used covering a period of 10 years. The paper contributes to the gravity model focusing on international trade and economic growth in a state in Malaysia. The findings revealed that Sarawak geographic remoteness contributed to better performance in terms of adding value to its current exports. In the desire to make Sarawak an export led-growth economy, the government has established a Ministry responsible for coordinating and supporting both industrial development and international trade.

Keywords: Gravity Model, Sarawak, Export, Remoteness.

Introduction

The main reason given for the poor state of development in developing countries and their continuing poverty is the lack of investments. This can be linked to the basic Harrod-Domar model which states that the relationship of a country's output to its stock of capital and expressed as the capital-output ratio. This theory has also been used to study both developed and developing countries in the context of international trade. To stimulate growth in developing countries, both exports and imports have been identified as important macroeconomic indicators that can boost economic growth. These sectors are seen as one of the most effective methods to foster economic development without relying on domestic consumption, local demand and supply conditions. Dodaro (1993) stated that effectiveness of export led growth can be an indicator as well as a strategy for economic development. This further illustrates into the interaction between economic center at the national level with growing trade between countries. Wagner's Law (1883) stated that the size of government and its expenditure tends to increase as a country becomes wealthier through

industrialisation. Chenaf-Nicet and Rougier (2016) stated that foreign investment is critical to developing economies contributing to technological advancement and trade expansion.

Bhagwati (1978); Krueger (1978) provided a priori reasoning that favor export expansion policies providing argument that maintain the notion of export expansion would contributes to economic growth. The expansion of export will increase the rate of capital formation and enhance the factor productivity growth, which in turn, contributes to economic growth. Export-led growth is a development strategy aimed at growing productive capacity and is becoming part of a new consensus among economists of the benefits of economic openness (Palley, 2011a). The growth of exports has a stimulating effect on the economy by providing increased efficiency, promoting innovation and specialization that allows the exploitation of economies of scale (Marin, 1992). Meanwhile, Grossman and Helpman (1991) claimed that trade encourage technology diffusion and knowledge spillovers that contribute to faster productive growth. The arguments as presented by past literature on the benefits of open trade reflected the crucial role one should undertake in advancing the new agenda of economic integration.

Sarawak is one of the member state in the Federation of Malaysia. The state's development and revenue have owed much to international trade. Table 1 shows the amount of export and import for Sarawak since 1995 until 2020. The volume of export and import have been increasing year by year. However, the trend was reversed in 2020 due to the Covid-19 pandemic. The government was force to implement a total lockdown and this impacted Sarawak's international trade. Export volume decreased from RM100,592.00 million (2019) to RM77,203.40 million (2020). The import for Sarawak also decreased from RM44,583.00 million in 2019 to RM40,872.50 in 2020. The supply chain shock due to the closing of borders and the increase of trade costs as a result of the containment measures taken, causing massive decline of global exports. Hence, it is not surprising to find the pattern of the data effectively demonstrated the negative economic impacts of the pandemic on the global trade.

Table 1

Sarawak Export, Import and Gross Domestic Product Per Capita 1995-2020

Year	GDP per capita (RM) in Current prices	Export (RM Million)	Import (RM Million)
1995	10,486.00	15,659.20	10,971.20
2000	14,865.00	31,152.00	13,887.40
2005	22,416.00	51,464.20	22,208.30
2010	33,307.00	76,175.00	26,151.00
2015	44,089.00	87,671.00	35,557.00
2020	48,657.00	77,203.40	40,872.50

Source: Department of Statistic Sarawak, Various years.

Many developing countries have tried to implement export-led growth as a strategy for growth. Furuoka (2011); Okposin et al (1999) stated that Sarawak has adopted and practiced an export-led growth strategy since 1981. This strategy focused on increasing the volume of export and import for the state and Malaysia. Exports can provide foreign exchange that allows for more imports of intermediate goods which raises capital formation and thus, stimulates output growth in developing countries (Dash, 2009). Support also came from the Federal Government who introduced cabotage policies in 1980. Ruslan et al (2019) stated that Malaysia introduced cabotage policies to strengthen and boost its participation in the shipping industry. Carbaugh (2007) observed that the country became an open economy and

promoted international trade by enhancing trade openness, technology transfer, labour mobility, international banking hence improving capital mobility.

Nevertheless, such policy impacts on areas such as ownership control, shipbuilding repair activities and additionally the need to take into account their socio-economic repercussions (Casaca and Lyridis, 2020). States in Malaysia play an important role in the country's trade. The current cabotage policy regulates and limits foreign ships in Malaysian waters, permitting only Malaysian-owned shipping companies with vessels flying Malaysian flags to trade between ports in Malaysia. Sarawak is one of the state that is undergoing rapid growth in Malaysia whilst at the same time shifting its trade orientation. The state is focusing on trade strategies as a way to boost economic growth utilizing its current natural resources with commitment from the state government. This research aims to examine the trade integration in Sarawak based on an export-led growth strategy with special reference to trade openness and government policies to enhance economic performance. This paper contributes to the literature by applying the gravity model which is a common method of analyzing international trade between nations. Analysis on individual states has its own merits as this can show the potential validity of certain economic policies at the state level.

Literature Review

Isaac Newton introduced the law of gravity to describe the interaction and behaviour of different masses generating certain force of attraction to each other. Economics as a social science have adapted this model for international trade to predict bilateral trade flows. Tinbergen (1962) was the first to introduce this model to international economic policy. Neo-classical theory stated that trade between nations are based on comparative advantage resulting from technological differences. However, new trade theory points to countries engaging in trade to enhance welfare even when there is no comparative advantage. Hubler (2016) stated that both economic policies and shocks will likely impact on a country's economy. Davis et al (2002) stated that the state of bilateral trade balances can be a major source of tension in international trade relations, and it is critical to understand their causes. The subject of trade balances have been seen as an indicator of fairness in international trade.

There are numerous research on the association between trade liberalisation and growth in developing nations from the firms' perspective including (Serlenga and Shin, 2007; Bombarda et al., 2021; Chandran and Munusamy, 2009). Undoubtedly resource mobility in international trade is critical for economic growth and levelling the state of economic well-being between countries. Bas et al (2021) stated that globalisation has had a significant impact on labour markets, particularly in terms of how foreign demand shocks affect the volatility of employment for employees of all skill levels. Chandran and Munusamy (2009) found that Malaysia stands out to be one of the beneficiaries from international trade in relations to the manufacturing sectors.

A few empirical findings has focused on Malaysia against examining the export-led growth hypothesis. Empirical evidence from Doraisami (1996) demonstrated strong support on the positive long run relationship between exports and economic growth in Malaysia. Similarly, Ghatak *et al* (1997) presented robust support to the validity of export-led growth hypothesis in Malaysia. Studies by Al-Yousif (1999); Baharumshah and Rashid (1999) also provided supportive evidence for the export-led hypothesis. Their findings further implied manufactured exports seems relatively more significant than traditional exports as main driver of Malaysia's economic growth. In a more recent research by Khalafalla and Webb (2001), co-integration finding indicated a long-run (steady-state) relationship between trade

and economic growth. However, it is necessary to caution that the positive relationship between trade expansion and economy growth may depend on other aspects such as the competitive conditions on the domestic market, etc.

Song and Lee (2022) study of South Korea found that certain components of the Logistic Performance Index (LPI) as being significantly relevant to international trade. Additionally, others factor like national government policies and income level of exporter countries also contributed to social and economic globalization besides logistic capabilities (Mena et al., 2022). However, according to neo-classical trade theory, the first rule of international trade is driven by geography. In contrast to this, Avetisyan and Hertel (2021) stated that increasing LPI in the world's poorest countries lowers the overall cost of transportation including the services necessary to deliver a given product along a given route by a given mode. Their study employed the Global Trade Analysis Project (GTAP) model of global trade, which include modal choice, taking into account the impact of enhanced global logistics and trade facilitation on transport mode choice in international trade globally.

Benefits from trade includes enhancing economic strength and increasing the volume of domestic products to be exported to international markets. Tadesse and White (2008) showed that both cultural differences between trading partners and their socio-economic characteristics may serve to facilitate or inhibit trade flows. Abidin et al (2013) employed the gravity model for Malaysian exports to OIC countries and found that size effect, openness, inflation and exchange rate determine export trade from Malaysia. Furthermore, the far distances also had negative and significant impact on trade volumes between China and Kazakhstan in line with the gravity model (Choi et al., 2019). It can be implied that trade liberalisation benefits developing countries, by increasing export volume leading to economic growth for both nations. Raimondi and Olper (2011) studied international trade in agricultural products, especially food, and found that high income and emerging countries have absolute advantage over developing countries resulting in lost of market share. However it remain a government's choice whether to liberalise or protect its economy (Casaca and Lyridis, 2020; Hashim et al., 2015). Marsila et al (2019) opined that trade liberalisation with some restrictions especially cabotage policies as a non-tariff trade barrier do not affect export prices in the context of causing high prices between Peninsular Malaysia and Sabah and Sarawak.

In the past, gravity models has been extensively applied to examine the trade policy implications. According to Kepaptsoglou *et al* (2010), the gravity model has been extensively used in international trade research due to its considerable empirical robustness and explanatory power. Filipinni and Molini (2003) claimed that gravity model is popular for practical applications for its consistency with facts. This model is widely employed to analyze bilateral trade flows. Bilateral exports from origin to destination are explained by economic masses proxied by traders' income and geographical distance (Kabir *et al.*, 2017). The large empirical success of application of the gravity model in accessing the bilateral international flows motivated this study to revisit this model in the context of international trade in Sarawak. Therefore, the contribution of this study are threefold in filling the literature gap. First, this study provide a re-visitation of the gravity theory to be made more suited for a localized study in the context of the state Sarawak. Second, the outcome of the research assist in advancing the knowledge in relation with trade expansion and improvement of the future trade performance. Third, the finding of this study will contribute in providing policy implications exploring the untapped trade potential at state level, particularly, at Sarawak.

Methodology

Neo-classical theory states that trade flows between nations is based on comparative advantage. However, a new trade theory introduced by Krugman (1980) stated that countries engage in welfare enhancing trade. Brenard et al (2007) stated that trade liberalisation is more important than comparative advantage. Brakman et al (2001) pointed to a missing component in the new trade theory namely that the volume of trade also depends significantly on distance. Hence, for Sarawak, one has to combine the new trade theory with distance and remoteness as an indicator for economic change in the context of trade liberalisation.

The most common spatial interaction method originating from Newton's Law is the Gravity Model. Serlenga and Shin (2007) stated that the gravity model serves as a baseline model for estimating trade distortions. Egger (2000) and Jagdambe and Kannan (2020) meanwhile stated that a panel approach can be used to disentangle the time invariant country-specific effects. The basic gravity model;

$$X_{ij} = \frac{\alpha Y_i Y_j}{D_{ij}} \quad (1)$$

Where the X represents value of trade between country and Y represents the income of countries. Meanwhile D represents for distance. Equation (1) is converted into linear form using logarithms. The data covered a period of 10 years 2010-2020. The estimation model can be written as

$$\log X_{ij} = \beta_0 + \beta_1 \log(GDP_i) + \beta_2 \log(GDP_j) + \beta_3 \log(P_j) - \beta_4 \log(D_{ij}) + \beta_5 \log(FTA_{ij}) + \beta_6 \log(REMOTE_{ij}) + \varepsilon_{ij} \quad (2)$$

Where X_{ij} is the log of Sarawak with i export to country j in year t , with β is the constant. The gravity model is extended as proposed by Frankel (1997) where GDP represents Gross Domestic Product per-capita for countries j and P represent the population of countries j for the year. Battersby and Ewing (2005) suggested a new indicator for the gravity model which included remoteness. This indicator captures distance and gross domestic product for the two trading countries.

Battersby and Ewing (2005) suggested that the closeness of each countries is determined by both the distance between respective trading countries and also their remoteness from world trade. Meanwhile, in Malaysia, international trade flows from Port Klang as the container hub port in Malaysia before transport to to others port as outlined in the cabotage policy. This paper assumed that distance measured for each country includes for the whole of Malaysia. For this purpose, remoteness is an inverse distance-weighted and distance as gravity measure to refer indicator variable for a common border (Davis, Weinstein, and David, 2002). To measure bilateral accessibility, a dummy variable is used for FTA if the country has this agreement in place.

Table 2

Description and expected sign of the variables

Variable	Description		Expected sign
LgM _j (Dependent Variable)	Log of Export Value of Sarawak to Country j		
	Independent Variable		
Macroeconomic stability	lnGDP _i	Log of Gross Domestic Product Per Capita of Sarawak	+
	lnGDP _j	Log of Gross Domestic Product Per Capita of the country j	+
	lnPOP _j	Log of population of the country j	+ / -
Gravity measure	lnDOM _{ij}	Log of distance from country i to j	-
Proximity measure	FTA	Dummy variable = 1 if Sarawak (Malaysia) and country j both are both members of the same FTA; 0 otherwise	+ / -
	FTA0	Dummy variable = 1 if Sarawak (Malaysia) a FTA member but country j is not ; 0 otherwise	+ / -
Remoteness	Remote	Distance + GDP _j / GDP _i	-

Table 2 shows the gravity model for Sarawak. Economic size is represented by Gross Domestic Product and population. Jagdambe and Kannan (2020) suggested that the sign of this indicator is expected to be positive since the higher the income of a country the more goods it has for trade. Similarly, the sign also is positive for the partner country's GDP. The study used geographic distance to Sarawak for all export market as proxy for transport cost. For distance, the study used an equation based on Egger (2000); Schumacher (1997) in the measurement below;

$$D_{ij} = r \cdot \arccos \{ \sin(\varphi_i) \cdot \sin(\varphi_j) + \cos(\varphi_i) \cdot \cos(\gamma_j - \gamma_i) \} \quad (3)$$

Where the value of 'r' represented earth radius in miles, φ_j and φ_i represented radian measures of the parallel of latitude for both nation. The study chose Kuala Lumpur as city of the Malaysia to represent the nation. This is reflective of Malaysia's trade policies especially its cabotage policies. The different in meridians for two nation is $\gamma_j - \gamma_i$. Egger (2000) pointed out the advantages of using panel framework over cross section analysis.

The standard practice of log-linear from equation (2) and estimating β by ordinary least square is inappropriate because X_{ij} can be 0, and the value of log-linearized error depending on covariates (Santos and Tenreyro, 2006). Nevertheless, the non-linear model should be estimated to reduce the problem the parameters may not permit identification. This paper employed the Poisson Pseudo-Maximum Likelihood (PPML, hereafter) estimator technique as

suggested by McCullagh and Nelder (1989) to reduce the problem from non-linear least square without using nonparametric regression. Manning and Mullahy (2001) proposed the Generalized Linear Models and provided estimates of the $\ln(E(y|x))$ and $E(y|x)$ directly without retransformation assuming that the variance is proportional to the mean.

$$\sum_{i=1}^n [y_i - \exp(x_i\tilde{\beta})]x_i = 0 \quad (4)$$

PPML estimator in equation (4) under the assumption $E[y_i|x] \propto V[y_i|x]$ with all observation have some information on the parameter (Santos and Tenreyro, 2006). To analyse the time effect two dummy variables were applied to the equation as per Table 2. These dummy variables are used to control volatility in trade (Jagdambe and Kannan, 2020) with log-linear form. The advantage of using panel data is to reduce the multicollinearity problem. Table 3 shows the results of the analysis with no multicollinearity problem since $VIF < 10$. The value of p-value was less than 0.05, hence, H_0 can be rejected.

Table 3

Results of Gravity Model: OLS and PPML Estimation

Variables	Pooled OLS	Random Effect	Fixed Effect	PPML Estimation
Constant	-22.84 (-3.78)*	-4.11 (-0.76)	33.366 (2.85)*	-3.241 (-3.14)*
GDP _j	4.107 (5.05)*	-0.158 (-0.15)	-1.744 (-1.52)	0.714 (5.42)*
GDP _i	0.862 (0.78)	2.737 (3.60)*	4.879 (5.42)	0.148 (0.76)
POP _j	0.638 (10.09)*	0.351 (1.97)**	-5.614 (-3.54)*	0.110 (8.5)*
DOM _{ij}	-2.919 (-7.28)*	-1.042 (-1.55)	(omitted)	-0.501 (-6.91)*
FTAD	0.034 (0.35)	0.020 (0.07)	(omitted)	0.002 (0.15)
REMOTE	6.575 (4.28)*	-0.492 (-0.24)	-0.986 (-0.47)	-3.241 (-3.14)*
R-squared	0.391			0.366
Prob	0.000	0.00	0.00	
No. Observation	227	227	227	227

*and ** indicates the respective 5% and 1% level

Table 3 presents the estimated gravity model for different methods using OLS, Fixed Effect Model and Random Fixed Model. Moon (1997) stated that the export sector can push economic growth and development. The findings showed that there is no significant relationship between Sarawak's GDP and its export volume. Furuoka (2011) used co-integration and discovered that economic development in Sarawak may have been caused by various and complex internal and external factors besides export led growth. However, Furuoka also pointed out that export had a significant effect on the state's economic performance in the long run. Suffian et al (2014) stated that at the policy level, the effect of the cabotage policy may limit market access and may create a monopoly in the shipping

industry. This is in contrast to trade liberalisation with attempts to reduce tariff and remove or relax non-tariff barriers, and reduce state intervention. The results for fixed effect model showed that the independent variable distance (DOM) and dummy variable for Free Trade Agreement (FTA) can't be estimated and quantified. The reason for this is that these variables are fixed or do not vary over time compared to the random effect model. The random fixed model have advantages over the fixed model because this method can be estimated to vary over time for independent variables.

The results for PPML estimation were slightly different from OLS, FE and RE model. Effect for independent variable for population was significant and positive. As expected for distance as an independent variable, it was statistically significant for all models, and the signs were negative. Tadesse and White (2008) stated that given the persistently detrimental impact of distance on working out international trade agreements, policymakers may desire to investigate strategies that increase the development of trust and commitment. One of the goals of an export-led growth open economy is to implement economic and trade policies aimed at hastening a country's industrialisation by exporting commodities in which a country has comparative advantage. The study showed that the indicator **REMOTENESS** of two countries was significant with negative sign. The results is as expected where distance, D_{ij} , captures the remoteness of the two trading partners from each other and is expected to have a negative coefficient. Battersby and Ewing (2005) stated that location and economic size determined a country's trade as these factors affect import costs and transport costs. These results were similar to the OLS model with a negative sign and significant.

Krugman and Venables (1995) suggested that mobility of labor across space can be use to measure and differentiate between international economies and regional economies. Palley (2011b) showed that numerous studies have discussed the benefits from export-led growth based on the principle of comparative advantage focusing on developing countries with external focus. This study found that GDP_j was significant with a positive sign. This indicator is a key economic indicator in this study. Egger (2000) pointed out that the higher the volume of interindustry (and overall) trade, the lower will be the share of intra-industry trade. Mamun et al (2017); Hatemi (2002) studies of Japan revisited the subject of export-led growth and found unidirectional growth between export and output growth. The findings from this study are important to policymakers in their efforts to boost economic growth. From the analysis, an increase in export of 1 percent for Sarawak leads to an increase of 7.14 percent in GDP for the importing country.

Table 4

Hausman test results

	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V _b -V _B)) S.E.
GDP _j	-1.745	-0.159	-1.586	0.516
GDP _i	4.879	2.737	2.142	0.558
POP _j	-5.614	0.351	-5.965	1.653
REMOTE	-0.986	-0.492	-0.494	0.928

b- consistent under H₀ and H_aB- inconsistent under H_a, efficient under H₀

Test Ho: difference in coefficients not systematic
 $\chi^2(4) = \frac{(b-B)'[(V_b - V_B)^{-1}](b-B)}{23.15}$

Prob>chi2 = 0.0001

H₀ = RE model is appropriateH_a = FE model is appropriate

The Hausman test is employed to analyse whether the fixed effect or the random effect model is the most appropriate model to use. This test tries to determine the consistency for both model assuming there is no correlation between μ_i and β_{ij} . The Hausman test differentiates between fixed and random effect model in terms of consistency and efficiency (Chenaf-Nicet and Rougier, 2016). Table 4 shows the results for the Hausman test with preference given to the fixed effect model over the random effect model.

Conclusion

Sarawak is located on the island of Borneo in East Malaysia and plays a significant role in Malaysia's economy. This is not surprising since the state has vast land resources, oil reserves and sizeable human capital with high productivity. These may serve to transform it into a more competitive market in the future towards becoming a high income state in Malaysia. Sarawak has experienced tremendous export growth since it embarked on an export led growth strategy since 1981 (Furuoka, 2011). These are the main findings of this study employing the gravity model and other models that offered some valuable insights. Interestingly, Sarawak's export does not influence GDP as part of the state's industrialization process. This may be related to the current cabotage policies because it limits market access. This is in spite of the increasing volume of export for Sarawak despite all the uncertainties in international trade. Choi et al (2019) observed that other factors may significantly affect trade volumes, particularly the structure and availability of free trade zones. This study revisited the gravity model, and reworked this model to enhance its consistency and efficiency in relations to remoteness between nations and GDP. Using this model, this study found that distance and remoteness of an importer country from Sarawak had a negative relationship with the increase in Sarawak's volume of export. Chakravarty and Chakrabarty (2014) stated that the direction of trade between India and ASEAN is influenced more by distance than the size of the economy or the trading partner. Nevertheless, the export sector remains an engine of economic development and growth, and due emphasis should be put on it by every state or country that wants to go forward.

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Annex 1

Sample of countries included for analysis

Italy	Netherlands	United Kingdom
Turkey	Sabah	Jordan
Spain	Singapore	Oman
Saudi Arabia	Brunei	Indonesia
United Arab Emirates	Thailand	China
Yemen, Republic of	Philippines	Japan
Australia	Hong Kong	South Korea
United States	Taiwan	