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Long-Term And Short-Term Estimations On Indonesian Coal Exports

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Abstract

The problem in this study is that Indonesia's trade balance experienced a deficit due to a shrinking surplus in the non-oil and gas sector from coal commodities. Thus, this study aims to estimate the long-term and short-term exports of Indonesian coal commodities within a gravity framework. This research method uses a panel vector error correction exogenity model (PVECMX) with Eviews 10. The long-term test results show that Indonesia's GDP affects Indonesia's coal exports in the long term. That is, an increase in Indonesia's GDP through equal distribution of people's income is the main factor in the large volume of exports of Indonesian coal commodities. The negative long-term effect of the destination country's GDP is related to the export volume of Indonesian coal commodities. The results of this study prove that there is a long-term negative effect between the population of the destination country on the volume of Indonesian coal exports. Distance in the short term has a negative effect on Indonesia's coal exports. This research suggests that the Government of Indonesia is expected not to ban coal exports anymore in the future and focus on renewable energy to be able to meet demand for coal exports by estimating policy transformation through integration between the government and coal entrepreneurs. This study recommends short-term solutions to increase production costs and optimally and more intensively utilize production factors. In the long term, it is now possible to increase the number of goods supplied.

Keywords: Coal, Gravity Model, Indonesia's Export, Panel Vector Error Correction Model Exogenity

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Introduction

Exports make an important contribution to a country's economic growth, because the greater the income elasticity of export demand, the stronger the role of exports in the country's growth (Romdhon & Sukiyono, 2006). So that the study of export demand is quite important because it has an impact on a country's trade policy. Therefore, trade policy must have a positive impact to avoid a trade balance deficit. However, Indonesia's trade balance faced losses in 2018 and 2019. This condition was due to the oil and gas sector in the last five years experiencing a widening deficit, and in that year the non-oil and gas sector experienced a surplus value of US$3.99 billion and US$3.99 billion respectively. $6.5 billion (Kementerian Keuangan, 2020). The trigger for Indonesia's trade balance deficit was the stagnation in the economic development of Indonesia's main coal export destination country, trade war sentiment, and the policies of OPEC countries to significantly streamline oil production which caused the prices of key commodities including palm oil, coal, rubber, and copper to weaken (Mutia, 2019). Therefore, Indonesia's trade balance confirms that the non-oil and gas sector is doing better than the oil and gas sector.

Broadly speaking, the development of non-oil and gas exports so far has relied more on fifteen main commodities. All main commodities accounted for around 59.86% of the non-oil and gas export sector. The commodities that played a dominant role in the non-oil and gas export sector were palm oil and coal commodities which were shown at 13.01% and 12.10% respectively. However, given the size of exports and the role played by these two commodities, only coal has experienced a better and more consistent change. When measured by the size of the exports of each main commodity, the changes made from time to time and the contribution to the non-oil and gas sector, the coal commodity provides the best consistency compared to other main commodities (Badan Pusat Statistik, 2022). Starting from that, this research discusses the problem of exporting coal commodities.

This study identified gaps in prior research and literature. First, based on a review of previous research, it appears that there are empirical gaps in previous research, namely there are contradictions in the results of inconsistent research findings. The inconsistency of the results of this study is a gap for further research, by expressing solutions in the form of variables in the gravity model. This is due to the lack of rigorous research in the previous literature. The gravity model seems important and worthy of investigation in the context of coal exports. An empirical investigation of these issues is important because in export issues there are supply and demand problems as well as trade barriers.

In the issue of Indonesian coal exports to destination countries, researchers identified methodological gaps in prior research. There is an indication that the method used previously was considered inappropriate for designing a gravity model study. Based on the research that the researchers tried to apply from a quantitative research design, the researchers found weaknesses in previous research that only focused on the gravity model approach using panel data and paid little attention to the complex problems of global economic phenomena. In this study, the researcher attempted to construct a new investigation using the Panel Vector Error Correction Model Exogenity (PVECMX) approach. Researchers are trying to find solutions to the problem of non-stationary time series variables and spurious regression by overcoming the gravity model gap in the research methodology using PVECMX which suggests there are indications of a reciprocal relationship between variables.

Further, the researchers identified clear research evidence gaps in previous gravity model studies. Previous studies have discussed several aspects of the gravity model: (1) PDBi and PDBj (Allayarov dkk., 2018; Castillo dkk., 2016; Elshehawy dkk., 2014; Guan & Ip Ping Sheong, 2020; Shah Zainal Abidin dkk., 2016; Soraya, 2013; Tansey & Touray, 2010; Zhou & Zhou, 2022), (2) Population (Allayarov dkk., 2018; Elshehawy dkk., 2014; Guan & Ip Ping Sheong, 2020; Soraya, 2013), (3) Distance (Allyarov dkk., 2018; Castillo dkk., 2016; Quang dkk., 2022; Shah Zainal Abidin dkk., 2016; Soraya, 2013; Wycliffe Oparanya dkk., 2019; Zhou & Zhou, 2022). However, previous studies have not addressed some of the contradictions in the findings regarding previous studies. Researchers have identified gaps in evidence in previous studies that contradict those findings.

This study aims to estimate the demand function for Indonesia's coal exports using time series data. While the determinants of demand for Indonesian coal exports such as the GDP of the destination country and the population of the destination country can be observed, the supply of Indonesian coal exports cannot be observed. However, the hypothesis that the supply and demand for Indonesian coal exports are in equilibrium allows us to use Indonesia's GDP as a proxy for the supply of Indonesian coal exports. In this sense, the regression equation for Indonesian coal export demand and Indonesian coal export supply represents the long-run equilibrium, and the random error (ε_t) involved in the regression equation represents the imbalance. An imbalance characterizes a nation that contains the seeds of its destruction. Long-run equilibrium relations require systematic co-movement among economic variables, and these variables will be cointegrated. So that the statistical concept of balance is centered on stationary processes. Therefore, we must ensure that all

variables follow a first-order I(1) integration process before examining the cointegration relationship between these variables and the non-stationarity panel data approach. According to recent literature, many unit root panel tests provide reference information for determining nonstationary characteristics. The distance variable is an inhibiting factor in international trade. The nature of distance is not included as a variable of demand and supply for exports of Indonesian coal commodities in the gravity framework, so the distance variable is positioned as an exogenous variable. This is also by previous research which has never positioned the distance variable as an endogenous variable. Therefore, the distance variable is exogenous in this study.

Based on the description that has been presented, this study uses the gravity framework designed by Tinbergan and Linnemann to evaluate the strategic concept in determining Indonesia's coal commodity exports for a panel dataset of Indonesian coal export destination countries for the 2013-2021 decade. This is because the gravity framework fulfills the requirements for the variables of demand, supply, and inhibiting factors for the export of coal commodities. Therefore, this study aims to estimate the relationship between several gravitational variables that contribute to each other, such as the variable GDP of Indonesia, the GDP of the destination country, the population of the destination country, and the distance between Indonesia and the country of export destination for Indonesian coal commodities using the Panel Vector Error Correction Model Exogenity (PVECMX) approach.

Methods

This research was conducted using a quantitative research method conducted from 2013 to 2021 in Indonesia. The sampling technique used is purposive sampling using judgment sampling with the number of samples to be taken based on an assessment of the characteristics of the sample members according to the following research purposes, namely Indonesia's coal trading partner countries with the largest demand for coal, the consistency of trading partner countries for export requests Indonesian coal from 2013 to 2021 and completeness of research data. Based on predetermined criteria, nineteen main export destinations for Indonesian coal commodities were obtained, namely India, Cambodia, China, Vietnam, the Philippines, Pakistan, Japan, Bangladesh, Malaysia, Sri Lanka, Hongkong, United Arab Emirates, South Korea, New Zealand, Taiwan, United States, Thailand, Slovenia, and Singapore.

Considering that the model in this study is a causality model for several destination countries, panel data is used to test the hypothesis. Panel data is a combination of time series data and cross-sectional data. The use of panel data can use the Vector Autoregression (VAR) test tool (Lubis, 2020). According to Sims, the VAR model originates from the macroeconomic literature as an alternative to the multivariate simultaneous equation model (Sims, 1980). All variables in a VAR system are usually treated as endogenous variables, although identification limits are based on theoretical models or statistical procedures that can describe the impact of exogenous shocks on the application system (Holtz-Eakin dkk., 1988). Therefore, with the introduction of VAR in panel data settings, this VAR (PVAR) panel model can be used in various fields in various applications (Abrigo & Love, 2016). This study briefly reviews the selection of the PVECMX model using the Eviews 10 program. Instrumental tests are used to analyze the data. Instrumental tests were conducted to find out which gravity model variables can be used with the Panel Vector Error Correction Model Exogenity (PVECMX) approach.

The research hypothesis is as follows:

H_{a1}: There is a long-term influence between Indonesia's GDP, the destination country's GDP, and the destination country's population to Indonesia's coal commodity exports.

H_{a2}: There is a short-term influence between Indonesia's GDP, the destination country's GDP, the population of the destination country, and the distance to Indonesia's coal commodity exports.

Result and Discussion

Result

The Panel Vector Error Correction Model Exogenity (PVECMX) is a development of the Panel Vector Error Correction Model (PVECM). Long-term relationship analysis on cointegration purchases can also be complemented by causality analysis in which there is a short-term analysis. In the long-term and short-term analysis, it can capture the relationship between the two variables along with their direction.

By the results of the stationarity and cointegration tests of the data, the model estimation was carried out using the Restricted Vector Error Correction Model (VECM). Based on the cointegration test results, one-time cointegration occurs. By sorting the variables from EXPORT, the cointegration agreement formed is an agreement with the endogenous variable EXPORT. The next step is to determine VECMX sales with information on the

three cointegrating variables. The following is a long-term agreement formed from the results of cointegration.

Table 1

Long-Term Estimation of PVECMX

Endogenous	Exogenous	Coefficient	S.E	T stat
Export	GDPi	28,20751	8,80495	3,20360
	GDPj	-23,05387	9,63989	-2,39151
	POPj	-6,084321	2,75233	-2,21060

Source: EVIEWS 10

The long-term test results show that Indonesia's GDP affects Indonesia's coal exports in the long term. That is, an increase in Indonesia's GDP through equal distribution of people's income is the main factor in the large volume of exports of Indonesian coal commodities. This is to the results of research tests conducted by Bariyah & Lau (2019), Raswatie (2014), and Sumiyati (2020). The negative long-term effect of the destination country's GDP is related to the export volume of Indonesian coal commodities as research conducted by Adi (2017) and Siahaan & Rusiadi (2018). The results of this study prove that there is a long-term negative effect between the population of the destination country on the volume of Indonesian coal exports. This research is in line with research conducted by Siahaan & Rusiadi (2018) which proves that there is no relationship between the population of the destination country and export volume. This study is not in line with research conducted by Allayarov dkk. (2018), Elshehawy dkk. (2014), Guan & Ip Ping Sheong (2020), and Soraya (2013). The long-term analysis in the equation model formed is:

$$\text{Export} = 28{,}21\ \text{GDPi} - 23{,}05\ \text{GDPj} - 6{,}08\ \text{POPj} + u_i + \varepsilon_{it}$$

The coefficient value of Indonesia's GDP, in the long run, is positive with a value of 28.21. This indicates that for every 1% increase in Indonesia's GDP, in the long term, Indonesia's coal exports will increase by 28.21%. Then, the GDP coefficient value of the destination country is negative with a value of 23.05. This indicates that for every 1% increase in the destination country's GDP, in the long term, Indonesia's coal exports will decrease by 23.05%. Finally, the population coefficient value of the destination country is negative with a value of 6.08. This indicates that for every 1% increase in the population of the destination country, in the long term, Indonesia's coal exports will decrease by 6.08%.

The following is the short-term estimation results in this study:

Table 2

Short-Term Estimation of PVECMX

Endogenous	Exogenous	Coefficient	S.E	T stat
Export	EXP	-0,095896	0,08896	-1,07801
	GDPi	0,109998	0,20688	0,53171
	GDPj	0,744875	0,41849	1,77993
	POPj	-0,128224	1,01623	-0,12618
	DIST	-0,044423	0,01495	-2,97170

Source: EVIEWS 10

The short-term estimation results obtained on Indonesian coal exports, namely distance in the short term hurts Indonesia's coal exports. Several research results have proven that there is a relationship between distance and export value. In general, the results of research examining the relationship between distance and export value conclude that distance has a relationship with export value, such as research conducted by Allayarov dkk. (2018), Castillo dkk., (2016), Quang dkk. (2022), Shah Zainal Abidin dkk. (2016), Soraya (2013), Wycliffe Oparanya dkk. (2019), Zhou & Zhou (2022), and Lahrech dkk. (2019). This is by Duarte, et al. who stated that traditional geography played a key role as a driver of bilateral trade flows. Yuniarti (2007) stated that the distance variable is a proxy for transportation costs which can cause a negative relationship to bilateral trade. The short-term analysis in the equation model formed is

$$\text{Export} = 0{,}000777 - 0{,}09\ \text{EXP} + 0{,}11\ \text{GDPi} + 0{,}74\ \text{GDPj} - 0{,}13\ \text{POPj} - 0{,}04\ \text{DIST} + u_i + \varepsilon_{it}$$

Based on the short-term equation, exports can be interpreted as that the value of the export regression coefficient being negative with a value of 0.09. This indicates that for every 1% increase in exports, in the short term, Indonesia's coal exports will decrease by 0.09%. Second, the regression coefficient value of Indonesia's GDP is positive with a value of 0.11. This indicates that for every 1% increase in Indonesia's GDP, in the short term, Indonesia's coal exports will increase by 0.11%. Third, the value of the GDP regression coefficient of the destination country is positive with a value of 0.74. This indicates that for every 1% increase in the destination country's GDP, in the short term, Indonesia's coal exports will increase by 0.74%. Fourth, the value of the population regression coefficient of the destination country is negative with a value of 0.13. This indicates that for every 1% increase in the destination country's population, in the short term, Indonesia's coal exports will decrease by 0.13%. Finally, the value of the regression coefficient of economic distance is negative with a value of 0.04. This indicates that for every 1% increase in economic distance, in the short term, Indonesia's coal exports will decrease by 0.04%.

Discussion

The causal influence between Indonesia's GDP and Indonesia's coal commodity exports has a significant and positive influence. If we reflect on the problems that occur in the export of coal commodities, it can be concluded that Indonesia's economic growth is an important factor in the supply of Indonesian coal commodity exports. When Indonesia's GDP increases at the time of export supply, the compensation for labor and capital will increase so that it will activate the productivity of labor and capital. Increased productivity triggers an increase in coal production so that national output will increase, then export supply will also increase (Gautama, 2019; Imsar dkk., 2022).

The long-term test results show that Indonesia's GDP affects Indonesia's coal exports in the long term. That is, an increase in Indonesia's GDP through equal distribution of people's income is the main factor in the large volume of exports of Indonesian coal commodities. This is to the results of research tests conducted by Bariyah & Lau (2019), Raswatie (2014), and Sumiyati (2020).

In essence, the function of provision in Islam reflects the development of ownership, so that it is limited to what is permitted by Allah SWT as mentioned in QS. Al-Baqarah Verse 275, the prohibition of kanzul mal as mentioned in QS. At-Taubah Verse 34, as well as the prohibition of prohibited goods and services as mentioned in QS. Al-Baqarah Verse 173 and QS. Al-Maidah verses 90-91. Therefore, trading in Indonesian coal commodities depends on God's provisions for humans in processing nature by carrying out production. The government always maintains the sustainability of its surroundings by not destroying the environment. Because Islam has regulated production issues comprehensively.

Islamic production is not only aimed at individual welfare but also for the benefit of society. The use of production factors also takes place by the provisions of Islamic law and prospers the earth without destroying the environment. Rationalizing the resources required by an Islamic economy cannot be achieved if producers produce when marginal production is at its peak (Lubis dkk., 2023). Therefore, the target of coal production planning in Indonesia must be guided by the general benefit, this is the principle of fair production where wealth is obtained without exploiting other individuals or destroying benefits.

Then do not damage the environment by limiting pollution, maintaining harmony, and access to the availability of good natural resources. In these ways, coal production can be overcome and production planning targets can be achieved. Therefore, the government must be able to minimize this uncertainty through national coal production modeling to determine the amount of achievement of coal production targets that can be achieved amid a national

economic recovery that meets current and future demand standards so that efficiency can continue to be increased and economic sustainability and socially maintained.

The results of research conducted by Nasirin & Pane (2021) show that coal production will still fluctuate until 2025. This is due to the lack of new investment in the energy sector. If this condition continues, it is estimated that Indonesia will face obstacles to increasing its production level and remaining an oil importer in the future. Especially now that the renewable energy sector is developing, so to maintain the volume of Indonesia's coal exports to continue it is expected to increase the distribution of people's income to increase Indonesia's GDP per capita. This means that to maintain the sustainability of Indonesia's coal exports, it is necessary to take into account population growth accompanied by changes in Indonesia's economic fundamentals and the distribution of income for the population so that in the end it will encourage economic growth in the long term.

Furthermore, an increase in the destination country's GDP should increase the demand for Indonesian coal exports. While Indonesia's GDP has increased but has had a successive impact on Indonesia's coal exports in the long term. When the supply and demand for Indonesian coal exports are in balance with full employment, this will reduce the supply of Indonesian coal exports in the short term. Therefore, the destination country's GDP does not affect Indonesia's coal exports in the short term. The negative long-term effect of the destination country's GDP is related to the export volume of Indonesian coal commodities as research conducted by Adi (2017) and Siahaan & Rusiadi (2018)

In essence, the demand function in Islam depends on public spending, namely by avoiding israf and tabdzir acts as mentioned in QS. Al-A'raf Verses 31-32, and it is recommended to spend in the way of Allah as mentioned in QS. Al-Hadid Verse 7. In addition, any form of transaction involving future results is not permissible because it is a form of speculation and it is prohibited to practice dumping in making transactions. This aims to avoid harm in transactions carried out by exporting and importing countries.

Coal exports are from an Islamic economic perspective even though the destination country is not a country with a majority Muslim population. This is shown by the trade agreements that have been agreed upon by the two countries, namely environmentally friendly and anti-dumping laws. Therefore, trade in Indonesian coal commodities depends on the business characteristics of entrepreneurs, the government, and the rules accompanying the export of coal commodities.

Subsequent findings are due to the fact that the use of coal commodities is not directly related to the population of the community, but coal commodities support the economic activities of the community where the use of coal is mostly used by industry, not households and small businesses. Therefore, demand for Indonesian coal exports is not related to the population of the destination country.

The results of this study prove that there is a long-term negative effect between the population of the destination country on the volume of Indonesian coal exports. This research is in line with research conducted by Siahaan & Rusiadi (2018) which proves that there is no relationship between the population of the destination country and export volume. This study is not in line with research conducted by Allayarov dkk. (2018), Elshehawy dkk. (2014), Guan & Ip Ping Sheong (2020), and Soraya (2013).

Finally, the short-term estimation results obtained on Indonesian coal exports, namely distance in the short term hurts Indonesia's coal exports. Several research results have proven that there is a relationship between distance and export value. In general, the results of research examining the relationship between distance and export value conclude that distance has a relationship with export value, such as research conducted by Allayarov dkk. (2018), Castillo dkk., (2016), Quang dkk. (2022), Shah Zainal Abidin dkk. (2016), Soraya (2013), Wycliffe Oparanya dkk. (2019), Zhou & Zhou (2022), and Lahrech dkk. (2019). This is by Duarte, et al. who stated that traditional geography played a key role as a driver of bilateral trade flows. Yuniarti (2007) stated that the distance variable is a proxy for transportation costs which can cause a negative relationship to bilateral trade.

Conclusion

The long-term test results show that Indonesia's GDP affects Indonesia's coal exports in the long term. That is, an increase in Indonesia's GDP through equal distribution of people's income is the main factor in the large volume of exports of Indonesian coal commodities. The negative long-term effect of the destination country's GDP is related to the export volume of Indonesian coal commodities. The results of this study prove that there is a long-term negative effect between the population of the destination country on the volume of Indonesian coal exports. So, it can be concluded that there is a long-term influence between Indonesia's GDP, the destination country's GDP, and the population of the destination country on Indonesia's coal commodity exports.

Based on the short-term equation for Indonesia's coal exports, the result is that exports in the short term do not affect Indonesian coal exports. Indonesia's GDP in the short term does not affect Indonesia's coal exports. The GDP of the destination country in the short term does not affect Indonesia's coal exports. The population of the destination country in the short term does not affect Indonesia's coal exports. Distance in the short term has a negative effect on Indonesia's coal exports. So, it can be concluded that there is no short-term effect between Indonesia's GDP, the destination country's GDP, the destination country's population, and exports of Indonesian coal commodities. however, there is a negative effect of distance on Indonesia's coal commodity exports in the short term.

This research suggests that the Government of Indonesia is expected not to ban coal exports anymore in the future and focus on renewable energy to be able to meet demand for coal exports by estimating policy transformation through integration between the government and coal entrepreneurs. One way is to specialization by specializing only to serve certain market segments, focusing on a chain of production and distribution lines, and being able to distribute coal by the needs of domestic consumption. In addition, the target of planning coal production in Indonesia must be guided by the public good. This study recommends short-term solutions to increase production costs and optimally and more intensively utilize production factors. In the long term, it is now possible to increase the number of goods supplied.

References

Abrigo, M. R. M., & Love, I. (2016). Estimation of Panel Vector Autoregression in Stata. *The Stata Journal: Promoting Communications on Statistics and Stata*, *16*(3), 778–804. https://doi.org/10.1177/1536867X1601600314

Adi, L. (2017). Pengaruh Exchange Rate dan GDP Terhadap Ekspor dan Impor Indonesia. *Develop*, *1*(1). https://doi.org/10.25139/dev.v1i1.69

Allayarov, P., Mehmed, B., Arefin, S., & Nurmatov, N. (2018). The Factors Affecting Kyrgyzstan's Bilateral Trade: A Gravity-model Approach. *The Journal of Asian Finance, Economics and Business*, *5*(4), 95–100. https://doi.org/10.13106/JAFEB.2018.VOL5.NO4.95

Badan Pusat Statistik. (2022). *Buletin Statistik Perdagangan Luar Negeri Menurut Kelompok Komoditi dan Negara Desember 2021*. Badan Pusat Statistik.

Bariyah, N., & Lau, E. (2019). West Kalimantan-Sarawak border trade: Gravity model. *Kasetsart Journal of Social Sciences*. https://doi.org/10.34044/j.kjss.2019.40.3.05

Castillo, J. S., Villanueva, E. C., & García-Cortijo, M. C. (2016). The International Wine Trade and Its New Export Dynamics (1988-2012): A Gravity Model Approach: The International Wine Trade And Its New Export Dynamics. *Agribusiness*, *32*(4), 466–481. https://doi.org/10.1002/agr.21463

Elshehawy, M. A., Shen, H., & Ahmed, R. A. (2014). The Factors Affecting Egypt's Exports: Evidence from the Gravity Model Analysis. *Journal of Social Sciences*, *02*(11), 138–148. https://doi.org/10.4236/jss.2014.211020

Gautama, B. H. (2019). Dampak Penerapan Kebijakan Bea Keluar Terhadap Ekspor Kakao Indonesia Tahun 2001-2017 Dampak Penerapan Kebijakan Bea Keluar Terhadap Ekspor Kakao Indonesia. *Jurnal Perspektif Bea Dan CukaI*, *3*(1). https://doi.org/10.31092/jpbc.v3i1.432

Guan, Z., & Ip Ping Sheong, J. K. F. (2020). Determinants of bilateral trade between China and Africa: A gravity model approach. *Journal of Economic Studies*, *47*(5), 1015–1038. https://doi.org/10.1108/JES-12-2018-0461

Holtz-Eakin, D., Newey, W., & Rosen, H. S. (1988). Estimating Vector Autoregressions with Panel Data. *Econometrica*, *56*(6), 1371. https://doi.org/10.2307/1913103

Imsar, I., Tambunan, K., Silviani, R., & Harahap, M. I. (2022). The Effect of Export, Islamic Mutual Fund, and Labor Force on Economic Growth in Indonesia. *At-tijaroh Jurnal Ilmu Manajemen dan Bisnis Islam*, *8*(1). https://doi.org/10.24952/tijaroh.v8i1.4580

Kementerian Keuangan. (2020). Defisit Neraca Perdagangan Indonesia di Desember 2019 Turun [Https://www.kemenkeu.go.id/publikasi/berita/defisit-neraca-perdagangan-indonesia-di-desember-2019-turun/]. *Kementerian Keuangan Republik Indonesia*.

Lahrech, A., Faribi, A., Al-Malkawi, H.-A. N., & Sylwester, K. (2019). The impact of the global financial crisis on Moroccan exports: A gravity model approach. *African Journal of Economic and Management Studies*, *10*(1), 102–115. https://doi.org/10.1108/AJEMS-03-2018-0075

Lubis, R. (2020). Analysis Relationship of Economic Growth, Fiscal Policies and Demographic to Islamic Human Development Index in Indonesia (Granger Causality Approach). *FITRAH:Jurnal Kajian Ilmu-ilmu Keislaman*, *6*(1), 31–46. https://doi.org/10.24952/fitrah.v6i1.2490

Lubis, R., Khairun Nasirin, W., & Nasution, A. A. (2023). Nexus Between Foreign Direct Investment, Islamic Financial Performance and Economic Growth with Economic Freedom as Moderating Variable. *International Journal of Islamic Business and Economics (IJIBEC)*, *7*(1), 49–63. https://doi.org/10.28918/ijibec.v7i1.6920

Mutia, F. (2019). Defisit Neraca Perdagangan Jeblok di 2018, Bagaimana 2019? *Ekonomi Kompas*. https://ekonomi.kompas.com/read/2019/01/16/123100826/defisit-neraca-perdagangan-jeblok-di-2018-bagaimana-2019-?page=all

Nasirin, W. K., & Pane, M. H. (2021). Coal 2021: Model and Forcasts to 2025 in Indonesia. *Al-Bay': Journal of Sharia Economic and Business*, *1*(1). https://doi.org/10.24952/bay.v1i1.5781

Quang, P. T., Rasoulinezhad, E., Linh, N. N., & Thao, D. P. (2022). Investigating the determining factors of sustainable FDI in Vietnam. *China Finance Review International*. https://doi.org/10.1108/CFRI-10-2021-0207

Raswatie, F. D. (2014). Hubungan Ekspor—Produk Domestik Bruto (PDB) di Sektor Pertanian Indonesia. *Journal of Agriculture, Resource and Environmental Economics*, *1*(1), 28–42. https://doi.org/10.29244/jaree.v1i1.11288

Romdhon, M. M., & Sukiyono, K. (2006). Estimasi Permintaan dan Penawaran Kopi Indonesia. *Jurnal Agribisnis dan Industri Pertanian*, *52*. http://repository.unib.ac.id/378/

Shah Zainal Abidin, I., Haseeb, M., Wen Chiat, L., & Rabiul Islam, M. (2016). Determinants of Malaysia – BRICS trade linkages: Gravity model approach. *Investment Management and Financial Innovations*, *13*(2), 389–398. https://doi.org/10.21511/imfi.13(2-2).2016.14

Siahaan, A. P. U. & Rusiadi. (2018). *Gravity Model Approach using Vector Autoregression in Indonesian Plywood Exports* [Preprint]. INA-Rxiv. https://osf.io/nhxyg

Sims, C. A. (1980). Macroeconomics and Reality. *Econometrica*, *48*(1), 1. https://doi.org/10.2307/1912017

Soraya, B. (2013). *Analisis Determinan Ekspor Karet Indonesia Dengan Pendekatan Gravity Model* [Tesis]. Universitas Sumatera Utara.

Sumiyati, E. E. (2020). Factors Affecting Manufacturing Exports. *Journal of Economics, Business, & Accountancy Ventura*, *23*(2). https://doi.org/10.14414/jebav.v23i2.2303

Tansey, M. M., & Touray, A. (2010). The Gravity Model Of Trade Applied To Africa. *International Business & Economics Research Journal (IBER)*, *9*(3). https://doi.org/10.19030/iber.v9i3.543

Wycliffe Oparanya, A., Mdadila, K. P., & Rutasitara, L. K. (2019). The Determinant of Bilateral Trade in the East African Community: Application of the Gravity Model. *International Journal of Economics and Finance*, *11*(4), 1. https://doi.org/10.5539/ijef.v11n4p1

Yuniarti, D. (2007). Analisis Determinan Perdagangan Bilateral Indonesia Pendekatan Gravity Model. *Jurnal Ekonomi Pembangunan*, *12*(2).

Zhou, J., & Zhou, Z. (2022). The influences of cultural values on the cultural product trade: Evidence from China, Japan and Korea. *Nankai Business Review International*. https://doi.org/10.1108/NBRI-07-2020-0035