A Supply-Demand Analysis on Global Copper Price Fluctuations

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Ernanto
School of Business and Management, Institut Teknologi Bandung, Indonesia

Sudarso Kaderi Wiryono
School of Business and Management, Institut Teknologi Bandung, Indonesia

Taufik Faturohman*
School of Business and Management, Institut Teknologi Bandung, Indonesia

ABSTRACT

The aims of this study are to identify and analyze the key determinants of copper price movements. The study was a literature review study. The size of the global market for refined copper is over U$150 billion every year. The U.S. Geological Survey (USGS) estimates that the global land-based copper resources in 2013 were over 3.1 billion tons, and 690 million tons of them were listed as reserves. These estimates have more than doubled since 1970 because the annual world-mined copper production has increased. As an added benefit, reprocessing contributes significantly to the available amount of refined copper ranging from 20-30% of annual refined copper production. The result shows that the increase in copper price is influenced by supply, demand, hedging, inventories, GDP, the consumer price index, the commodity price index, the U.S. dollar index, and the Euro/U.S. dollar exchange rate. Copper supply and demand variables can simultaneously affect copper prices.

Keywords: copper prices, supply and demand, hedging, stockpiles.

1. INTRODUCTION

Copper is one of the essential raw materials in the contemporary world. The Global copper market is one of the largest metals behind iron and aluminum. Copper production is significant for a nation because the right resource management of copper can cover the lack of other resources; such a phenomenon occurs in Chile (Havro & Santiso, 2008; Toshniwal & Gupta, 2017). The management of natural resources, such as copper, should be considered carefully to maintain state financial stability because this management can bring many benefits and minimize the possibility of adverse effects from international trade in the short and long terms (Mammadova, 2019). The size of the global market for refined copper is over U$150 billion every year. The U.S. Geological Survey (USGS) estimates that global land-based copper resources in 2013 were over 3.1 billion tons, and 690 million tons of them were listed as reserves. These estimates have more than doubled since 1970 as the annual world-mined copper production has increased. As an added benefit, reprocessing contributes significantly to the available amount of refined copper ranging from 20-30% of annual refined copper production.

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Several variables determine the growth of copper price, one of which is demand. Demand for copper rises faster than it can be recovered from secondary sources, including e.g. industrial and consumer waste, such as pipes, brass, and old electrical appliances. As a result, reliance on primary copper, which must be mined, increases. Despite demand, price is also a crucial factor in copper. The price of copper increased more than three times in 2000-2008 and reached 6963 dollars per ton. However, at the end of 2008 and the beginning of 2009, the price of copper fell dramatically. One negative macroeconomic influence governing future price direction is declining global economic growth (Kwofie & Ansah, 2018).

Numerous studies have dealt with factors associated with copper prices. Some of them propose that macroeconomic factors influencing copper prices are a country's GDP, USD index, commodity market, and Europe and Dollar Exchange (Adams et al., 2020; Al-Abdallah & Aljarayes, 2017; Alesina et al., 2019; Ali et al., 2019). Moreover, several studies show that a country's GDP impacts copper prices because they have a dynamic relationship; when a global country's GDP experiences weakness, the demand for copper is likely to go down (Al-Abdallah & Aljarayesh, 2017; Alesina et al., 2019; Ali et al., 2019; Su et al., 2020; Han et al., 2017; Mo et al., 2018). Some researchers focus only on the microeconomic side Microeconomic factors consist of supply, demand, hedging, and stockpiles; these factors impact copper prices. Since copper demands continuously grow. A systematic understanding of copper stocks and flows throughout the anthroposphere has become increasingly crucial. Elshakaki et al. (2016) add demands, supply, and energy implications for copper production and use from 2010 to 2050 to create a well-regarded international scenario, namely UNEP's GEO-4. This is the first comprehensive metal supply and demand scenario to develop. They find that copper demand increases by 275%-350% by 2050, depending on the scenario. The scenario with the highest prospective demand is not Market-First (a "business as usual" vision), but Equitability-First (a scenario of transition to a world and institutions with more equitable values. Soulier et al. (2018) study the relationship between supply and copper prices and have discovered that a larger share of domestic supply may considerably reduce the reliance on imported raw copper material and decrease the demand for copper in the international market. The law of supply and demand postulates that when the demand for a product decreases, the price and the supply decrease. In contrast, when the demand for a product increases, the price and the supply increase (Antolin-Diaz et al., 2017; Wang et al., 2020; Aminrostamkolaee et al., 2017). However, the researchers fail to address the determination of both effects on the copper price. The effect of macro and microeconomy on copper prices has not been studied. Therefore, this current research investigates this phenomenon. In addition, this current research examines how macro and microeconomic factors could predict future prices of copper, the needed production of copper, and the risk of this production.

2. LITERATURE REVIEW

Demand

One of the most significant factors affecting the price of copper is demand (Dong et al., 2018; Ye et al., 2016; Schipper et al., 2018). Copper is a material used in many applications, including new construction and remodeling. When the economy grows, the demand for new construction and more copper grows (Black, 2015). General economics defines demands as

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an individual's (consumer) desire or need for certain goods (Subawa et al., 2020). Demands can refer to products or services; a product or service with economic values, certain limitations, and a certain amount within a specific time will be bought by consumers (Cranfield, 2020; Loxton et al., 2020; Kuipers et al., 2018; Elshkaki et al., 2016; Dong et al., 2019). This demand is more accurately referred to as market demand, where specific goods are available at a certain price (Subawa et al., 2020).

World copper consumption grew from an estimated 50,000 mt per year in the mid-19 century to a half million mt in 1900. It grew at an average annual rate of 4.5% to 8.5 million mt in 1973-1974. This growth refers to products of the electrical age. However, the volumes and patterns of copper consumption have significantly been affected by changes in the industrial output composition. Technological changes involve technological use in particular industries and competition from substitutes, such as aluminum and plastics. Per capita consumption of copper in the United States rose by 47% in 1920-1929 and by 30% in 1929-1950. The percentage declined again in 1950-1960. However, the percentage rose in 1960-1970 by 30%. The average annual per capita of copper consumption in the U.S. in 1960-1964 was 17.1 pounds, but the average annual copper consumption in 1970-1974 was 20.8 pounds. Britain's and Germany's per capita of copper consumption in the 1960s was higher than that of the United States. However, Japan's per capita consumption in 1963 was half as little as that of America’s consumption. However, Japan's per capita consumption rose to an annual average per capita of 20.5 pounds in 1972-1974.

Supply

Supply may increase or decrease over time. The trend shows an overall decrease in the amount of mined copper. Supply is defined as goods, products, or commodities available in the market and ready to sell to consumers who need them (Naik & Suresh, 2018). Supply can also be interpreted as goods, services, or commodities available in the market at a specific price and at a particular time. Some economists interpret supply as a number of economic goods available in the market to sell at a certain price. Meanwhile, an offer can also be interpreted as a variety of goods or products offered for sale at different prices in the market.

Hedging

The increase in various hedge funds with an entire or partial focus on commodities affects copper prices. Hedge funds refer to an investment of a company that invests its clients' money by putting it in a pool of assets. The expected return on this investment is higher than that of the stock market. However, there is no generally accepted or legal definition of a hedge fund. The term is primarily a collective name for many investment funds that are different from each other (Buchanan et al., 2020). Price hedging for copper ensures that the agreed price for a certain quantity of copper remains stable even if the material is needed much later. Moreover, price hedging enables copper processors to reliably calculate order transactions. Even if the current copper price changes fluctuate in the stock market, this situation will not impact the ordered quantity and the "hedged" copper price. Price hedging is an elementary component of what is usually referred to as risk management.

Stockpiles

Stockpiles offset some of those pressures on copper prices, which may be used more regularly. Using existing copper stockpiles is a short-term solution to pricing pressures. Building a stockpile to guard against supply interruptions or stabilize prices can bring political significance (Savary et al., 2020; Sheu & Kuo, 2020). Exporting and importing

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nations can be affected by these significances. Many organizations will internally and politically support or oppose the creation of stockpiles (Murphy, 2019).

Country's GDP

According to Tim Callen (2017, as cited in Shi et al., 2018), the gross domestic product, often known as GDP, estimates the monetary value of final products and services purchased by the ultimate consumers and generated in a country within a certain period. GDP is a crucial indicator of economic progress. It counts all of the output generated within the borders of a country. Gross Domestic Product (GDP) is one of the most widely used measures of an economy's output or production. It is defined as the total value of goods and services produced within a country's borders in a specific period—monthly, quarterly, or annually. GDP is an accurate indicator of the size of an economy, and the GDP growth rate is probably the single best indicator of economic growth. In contrast, GDP per capita closely correlates with the trend in living standards over time (Antolin-Diaz, 2017).

Consumer Price Index

The consumer price index (CPI) is a measure that examines the weighted average prices of goods or services, such as transportation, food, and medical care (Rantini et al., 2018). CPI is calculated by taking price changes for each item in the predetermined basket of goods and by averaging them.

Commodity Price Index

A commodity price index is a fixed-weight or (weighted) average of selected commodity prices, which may be based on spot or futures prices. A commodity price index represents the broad commodity asset class or a specific subset of commodities, such as energy or metals. Moreover, the commodity price index tracks a basket of commodities to measure their performance. The expansion of global demand mainly drives the surge in commodity prices. The financialization of international commodities has become increasingly prominent and directly impacts the commodity pricing mechanisms and market operation (Staritz et al., 2018; Adams et al., 2020). A significant feature of the international commodity market in recent years is the co-movement of commodity prices, indicating that some common factors are driving the prices of all commodities to a certain extent. However, the literature on metal commodity price volatility has overlooked uncertainty as a potential factor.

The price of copper increased more than three times in 2000-2008 and reached 6963 dollars per ton. At the end of 2008 and the beginning of 2009, the price of copper fell dramatically. One negative macroeconomic influence governing the future price direction is the decline in global economic growth (Kwofie & Ansah, 2018). ABC News (2017) explains that the price of copper in 2009 rose due to China's consumption stimulated by its economic growth. Thus, China's economy is the main reason for the decline in copper prices by 7% in 2013. Copper was one of the commodities with the worst performance from 2013 until the end of 2016 when copper experienced a sudden spike; however, chopper commodities showed the best performance in 2017 (Su et al., 2020). The rally, which began with Donald Trump's winning the U.S. presidential election, is partly based on speculation about the impact of the Presidential election's $500-billion infrastructure plans on the demand for the metal (Kwofie & Ansah, 2018).

The U.S. Dollar Index

The prices of commodities have tended to drop when the dollar strengthens over other major currencies. When the dollar value weakens below other major currencies, commodities'

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prices generally increase. The U.S. currency is the reserve currency of the world. The US dollar tends to be the most stable foreign exchange instrument so that most nations hold dollars as their reserve assets. The U.S. dollar index (USDX) is a measure of the value of the U.S. dollars, which is relative to the value of a basket of currencies of the most significant trading partners in the U.S. This index is similar to other trade-weighted indexes, which use exchange rates from the same major currencies. As one of the most important industrial metals, copper is traded on the stock market and is subject to constant price fluctuations. For many companies, the ups and downs of copper prices pose a serious calculation risk. Medium-sized companies should particularly adhere to long-term delivery contracts because fluctuating raw material prices can become a problem. One of the methods to calculate the fluctuation of copper price is price hedging.

Euro/U.S. Dollar Exchange Rate

Exchange rates are determined by supply and demand based on information disseminated to the market. When information is available to the market, market users interpret the information, and the equilibrium price changes according to the interpretation of the information. Exchange rates can be different in the same country. Some countries have restricted currencies to limit their exchange within the countries' borders. In some cases, there is an onshore rate and an offshore rate. Generally, a more favorable exchange rate can be frequently found within and outside a country's borders. Moreover, a local currency can have its value set by the government. The exchange rate is an exchange between two currencies in each different country. The exchange compares the value or price of a country's currency to another (Su et al., 2020). The effect of changing the exchange rate on firms differs depending on the tendency of exporting or importing activities. For an importer company, the domestic exchange rate that depreciates will result in a lower income than usual; such a condition can directly affect the company's stock prices (Singer, 2017).

3. RESEARCH METHOD

This research employed a descriptive quantitative approach. According to Sarstedt et al. (2020), descriptive research observes the current state of an observed subject. This study collected data using questionnaires. The collected data were then tested to prove a hypothesis or answer a question. This descriptive research explains the current situation under investigation.

This study employed two types of data: primary and secondary data. The primary data are collected in the first stage while the secondary data are collected by previous work; in other words, the secondary data are already available (Ajayi, 2017). The primary data are original while the secondary data are the results of analyzing and interpreting primary data. The primary data sources are the results of surveys, observations, experiments, interviews, or questionnaires. On the other hand, the secondary data sources are government publications, websites, books, journals, etc. This study employed the secondary data collected from the website of Wood Mackenzie (https://www.woodmac.com). This study collected data for the period of 1992-2021.

Data Analysis

Regression analysis is a reliable method to identify the impact of a topic of interest. The process of performing a regression allows you to confidently determine which factors have

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the strongest influence, which factors can be ignored, and how these factors influence each other. This research aims to form a multi-line regression model of the effect of determinants of supply and demand on the movement of copper prices. This model can be represented by the following expression.

$$Y = \alpha+\beta\_1\ x\_1+\beta\_2\ x\_2+\varepsilon$$

Description:

Y: Market copper prices
α: Model constants
β_1, β_2: Regression coefficients with independent variables
x_1: Regressors, independent variables (copper supply)
x_2: Regressors, independent variables (copper demand)
ε: Residuals of model

Research Results

To analyze the data, it is necessary to test them before testing the hypothesis of the classical assumption. If the data pass the classical assumptions, the test can be carried out to the next stage, namely hypothesis testing.

A normality test is a test carried out to investigate whether the data distribution from the research sample is normally distributed. in this research, the data normality test was carried out using the Kolmogorov-Smirnov (K-S) test. If the significance or the probability value is > 0.05, the distribution is considered normal.

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		38
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	1370.64808193
Most Extreme Differences	Absolute	.090
	Positive	.057
	Negative	-.090
Statistical Test		.090
Asymp. Sig. (2-tailed)		.200[c,d]

a. Normal test distribution
b. Calculated from data
c. Lilliefors significance correction
d. A lower bound of the true significance

This study has revealed the relationship between copper supply and global prices with a normal distribution and a sig value of > 0.05.

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Heteroscedasticity Test

The heteroscedasticity test aims to test the inequality of variance from the residual of one observation to another observation in the regression model. The heteroscedasticity is examined by using the Glejser test to discover regression with absolute residual regression (absRes) on other independent variables. The results of the Glajser test in this study are shown in the following table.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	1809.950	512.488		3.532	.001
Copper Supply	-.033	.048	-.186	-.678	.502
Demand	-.014	.049	-.078	-.283	.779

Dependent Variable: Abs_Res

The results of the Glasjer test signify no heteroscedasticity symptoms in the regression analysis as indicated by significant values of the copper supply variable of 0.502 and the demand variable of 0.779. These values are greater than 0.05.

Autocorrelation

The autocorrelation assumption test aims to test whether a linear regression model correlates with the confounding error in a t period and the confounding error in a t-1 period (Santoso, 2016). To diagnose the autocorrelation in a regression model, the Durbin-Watson test value (Dw test) was tested.

Model	Durbin-Watson
	1.548

The above output shows the Durbin Watson (DW) value of 1.465. This value is greater than DU (1.4894) but smaller than 4-DU (2,5106). the DW value is obtained by a value of 1.548. These results conclude that there is no autocorrelation.

Multicollinearity Test

According to Ghozali (2016), the multicollinearity test aims to determine a correlation between the independent variables in the regression model. A good regression model should not correlate with the independent variables. Multicollinearity can be preserved from the tolerance value and the variance inflation factor (VIF) if the tolerance value is greater than 0.1 and the VIF value is less than 10.

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	Collinearity Statistics	
	Tolerance	VIF
(Constant)		
Copper Supply	.356	2.807
Demand	.356	2.807

The above table presents that the copper supply and demand variables have a tolerance of 0.356 and a VIF value of 2.807. The tolerance value is more than 0.1, and the VIF value is less than 10. These findings conclude that multicollinearity does not occur in the copper supply and demand variables do not.

Simultaneous Test (F-test)

The calculated F-test determined whether all independent variables included in the regression model had simultaneous effects on the dependent variable.

ANOVA

	Sum of Squares	df	Mean Square	F	Sig.
Regression	169656077.308	2	84828038.654	42.712	.000[b]
Residual	69511018.087	35	1986029.088		
Total	239167095.395	37			

Dependent Variable: Copper Prices

b. Predictors: (Constant), Demand, Copper Supply

The above table shows that the f-calculated value is 42.712 with a sig value of 0.000. These results conclude that the copper supply and demand variables can simultaneously affect copper prices.

Coefficient of Determination Test (R^2)

The coefficient of determination basically measures a model's ability to explain the variation of a dependent variable. A small R^2 value means that the independent variables have a very limited ability to explain the variation of the dependent variable. A value-close-to-one means that the independent variables provide almost all of the required information to predict the variation of the dependent variable.

Model Summary

R	R-Square	Adjusted R-Square	Std. Errors of the Estimate	Durbin-Watson
.842[a]	.709	.693	1409.265	1.548

Predictors: Constant, Demand, Copper Supply

Dependent Variable: Copper Prices

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The above table shows that copper prices, which are influenced by copper supply and demand have an r-square value of 0.709 and influence values of 70.9% and 29.1% influenced by other variables.

T-Test

The t-statistic test is intended to examine the effect of an independent variable on explaining the variation of a dependent variable. In addition to testing the effect, this test can determine the sign of the regression coefficient of each independent variable. Therefore, the effect of each independent variable on the dependent variable can be determined.

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	-1548.880	851.766		-1.818	.078
Copper Supply	.238	.080	.455	2.981	.005
Demand	.232	.082	.432	2.830	.008

Dependent Variable: Global prices

The Effect of Copper Supply on Global Prices

The coefficient table denotes that the copper supply variable has a significance value (Sig.) of 0.005 with a degree of significance of 0.05. Thus, 0.005 is smaller than 0.05, and the t-count value is greater than the t-table, namely 2.981 > 1.81246. These findings denote that copper supply significantly and positively affects global prices.

The Effect of Demand on Global Prices

Furthermore, the coefficient table denotes that the demand for the copper variable has a significance value (Sig.) of 0.008 with a degree of significance of 0.05. Thus, 0.008 is smaller than 0.05, and the t-count value is greater than the t-table, namely 2.830 > 1.81246. This means that the demand significantly and positively affects global prices.

4. DISCUSSION

The coefficient table denotes that the copper supply has a significance value (Sig.) of 0.005 with a degree of significance of 0.05. Thus, 0.005 is greater than 0.05, and the t-count value is greater than the t table, namely 2.981 > 1.81246. These findings indicate that copper supply significantly and positively affects global prices.

The coefficient table shows that the demand for copper has a significance value (Sig.) of 0.008 with a degree of significance of 0.05. Thus, 0.008 is smaller than 0.05, and the t-count value is greater than the t-table, namely 2.830 > 1.81246. These findings mean that the demand significantly and positively affects global prices.

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Copper prices which are influenced by copper supply and demand have an influence value of 70.9%. Meanwhile, the copper supply and demand variables simultaneously affect copper prices because the f-count is 42.712 and a sig value of 0.000.

Copper price can be influenced by variables, such as demand, supply, hedging, stockpiles, national GDP, consumer price index, commodity price index, US dollar index, and Euro/US dollar exchange rates. The most common variables that affect copper prices are supply and demand. The past century has witnessed increased copper demand, primarily, due to global population growth (Golding & Golding, 2017). Increases in copper consumption per capita are mainly attributed to mass urbanization and the widespread availability of copper-intensive information technologies (Binder et al., 2006). Longer-term analyses of future copper markets differently estimate total supply and demand scenarios, but they assume that all identified resources will, ultimately, move into production (Elshkaki et al., 2016; Singer, 2017).

A fundamental economic principle states that prices fall when supply exceeds demand for a good or service. When the demand exceeds supply, prices tend to rise. The supply and price of goods and services show an inverse relationship when the demand does not change. If the supply of goods and services increases while the demand remains the same, the equilibrium price will be lower and the equilibrium number of goods and services will be higher (Dewi et al., 2019). If the supply of goods and services decreases while the demand remains the same, the equilibrium price will be higher and the quantity of goods and services will be lower.

The same inverse relationship holds for the demand for goods and services. However, when demand increases and supply remain the same, the higher demand leads to a higher equilibrium price and vice versa. Supply and demand rise and fall until an equilibrium price is reached (Echchabi & Azouzi, 2017). For example, a luxury car company sets the price of its new car model at US$200,000. The initial demand for this new product may be high so that the company is excited and creates buzz for the car. Unfortunately, most consumers unwillingly spend US$200,000 for an auto. As a result, the sales of the new model quickly fall, creating an oversupply and driving down demand for the car. In response, the company reduces the car price to $150,000 to balance the supply and the demand for the car to reach an equilibrium price ultimately.

Increased prices typically result in lower demand, and increased demands generally lead to increased supply. However, the supply of different products responds to demand differently. Some demands for a product are less sensitive to prices than those for another. Economists describe this sensitivity as price elasticity of demand. Products with sensitive pricing to demand are considered price elastic. Inelastic pricing indicates an influence of weak prices on demand. The law of demand still applies, but pricing is less forceful; as a result, the pricing impact on supply is weaker. Product price inelasticity may be caused by the existence of a more affordable alternative in the market or customers' consideration of nonessential products (Simshauser, 2018). Rising prices will reduce demand if consumers can find a substitution that has less impact on demand when an alternative is unavailable. Health care services, for example, have few substitutions so that the demand remains strong even though the prices increase.

Additionally, hedging can affect copper prices in a certain way. Producers and consumers of commodities use futures markets to protect against adverse price movements that could

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result in significant financial losses. A commodity producer is at risk of lower prices while a commodity consumer is at risk of higher prices. All of the aforementioned perspectives assert that hedging is an essential tool to run a business. A hedge will guarantee the commodity supply at a set price for consumers and a known price of the commodity output for producers.

The supply and demand for commodities fluctuate, and so does the price. Producers or consumers who do not hedge assume a price risk. Meanwhile, producers and consumers who use futures markets to hedge transfer their price risk. If someone holds the physical commodity, he assumes price risks and costs held by the commodity, including insurance and storage costs. The commodity price for future delivery reflects these costs. Thus, the price in a stock market in the deferred futures is higher than that in the nearby futures.

The values of the US dollar and commodities prices have an inverse relationship (Putra & Robiyanto, 2019). Historically, the prices of commodities tend to drop when US dollars strengthen over other major currencies. When US dollars weaken under other major currencies, commodities' prices generally increase. It is a general rule. Although the correlation is not perfect, a significant inverse relationship exists over time. Since the bulk commodity in international trade is priced in US dollars, the change in the US dollar index will significantly affect the copper price from the historical trend of the comparison diagram between the US dollar index and copper futures prices (Umar et al., 2021).

The value of US dollars influences commodity prices because the US dollar is a benchmark pricing mechanism for most commodities. Moreover, the US currency is the world's reserve currency (Chikalipah, 2019). The US dollar is the most stable foreign exchange instrument so that most nations hold dollars as their reserve assets. The international trade for raw materials uses US dollars as an exchange mechanism in many or most cases. When the value of the US dollar drops, buying commodities will cost a lot. In contrast, when the value of the US dollar is lower, buying commodities will cost less.

Commodities are considered tangible assets. Prices are determined by the demand for production inputs, commodity suppliers' extraction, and mining capacity. A long position in a commodity futures contract could raise prices that are disconnected from the physical world. The large majority of commodity futures close before maturity so that future trading does not affect the price of physical commodities. This is the traditional view of the future segmented commodity and spot markets (Adams et al., 2020).

Other commodity prices would likely affect copper prices, such as oil prices. Kaulu (2021) employs the VAR model and analyzes the effects of crude oil prices on copper prices. To bring a price aspect, the primary demand and supply theory can be used with the above theories. For instance, the symmetric theory of economic growth postulates that higher oil prices would lead to lower production of copper and maize. Moreover, the demand and supply theory postulates that lower copper and maize output would lead to higher prices of these commodities. Therefore, higher oil prices will theoretically lead to higher copper prices and maize prices.

The main objective of this work is to identify relevant variables to form copper prices in the international market. Thus, this research selected candidate variables and conducted several tests and analyses to verify each of these variables' relevance or statistical significance. It is important to note that not all of the variables that affect copper prices in the international market can be analyzed in the study, especially the aspect of national regulations. This is

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because policies and regulations may impact the national market, which, in turn, can impact the industrial processes that include copper prices. It is also necessary to examine copper prices from various perspectives, such as the environmental standpoints because the study of sustainability is currently getting widespread attention.

5. CONCLUSION AND RECOMMENDATION

Copper is currently one of the essential raw materials worldwide. Moreover, copper is one of the most widely traded metals in the world and is second only to iron and aluminum. The global market for refined copper is worth more than US$150 billion per year. The US Geological Survey (USGS) estimates that global land-based copper resources were more than 3.1 billion tons in 2013, and 690 million tons of them were classed as reserves. The annual world-mined copper production has expanded since 1970, and the estimation has more than doubled. Copper prices can be influenced by several variables, such as demand, supply, hedging, stockpiles, national GDP, consumer price index, commodity price index, US dollar index, and Euro/US dollar exchange rates. The most common variables that affect metal prices are supply and demand. However, the supply of different products responds to demand differently because the demands of some products are less sensitive to prices. Additionally, hedging can affect copper prices in a certain way. Producers and consumers of commodities use future markets to protect against adverse price movements that could result in significant financial losses. Another commodity price that could affect copper prices is the oil price.

This study has revealed that copper demand and supply significantly and positively affect global prices. Moreover, the copper supply and demand variables can simultaneously influence copper prices. This study has revealed that the r-square value of 0.709 or 70.9%. This finding means that fluctuation in copper price is influenced by 70.9% of supply and demand, and the rest (29.1%) is influenced by other variables not discussed in this study.

This study recommends that further studies investigate factors that influence changes in copper prices in addition to supply and demand. As a result, the comprehensiveness of research on copper price fluctuations can be improved.

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