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INTERNATIONAL TRADE IN MUSLIM-MAJORITY COUNTRIES AND VOLATILITY OF THE DOLLAR EXCHANGE RATE

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Abstract

The problems faced by states within the fundamentals of this economy can in turn affect macroeconomic stability. One of the most sensitive macroeconomic indicators of external economic disruption is the currency exchange rate. In international trade, the exchange rate serves as a barometer of international competitiveness, so the volatility of exchange rates should be a good consideration for investors, companies, and consumers in a country. Porpose of this study was to examine the relationship between the volatility of the dollar exchange rate on international trade variables, namely exports and imports, in 3 Muslim-majority countries. The method used is the Autoregressive Distributed Lag and Error Correction Model (ARDL-ECM) to analyze the short-term and long-term relationship between the volatility of the dollar exchange rate against international trade in Indonesia, Pakistan, and Turkey. And to see the causality relationship between variables, the Granger-Causality method is used. The data used are monthly data for the period January 2006 to December 2021. From this research, it can be seen that in the long term there is no relationship between exchange rate volatility and export performance except in Turkey. Meanwhile, there is a relationship between exchange rate volatility and import performance in Pakistan and Turkey. In the short term in the export dependent model, Turkey is the country that takes the longest to respond to shocks to international trade, while in the import dependent model, Indonesia takes the longest to respond to shocks and Pakistan is the fastest country.

Keywords: Dollar exchange rate; internasional trade; exchange rate volatility

INTRODUCTION

Trade in goods, services, and capital is becoming more and more easy to cross the borders of a country's territory. Inter-country integration into a free market becomes inevitable. With each country's desire to make the best use of the free market, exchange rates have become an important instrument because they not only influence trade flows but are also closely related to national output. On the other hand, the globalization that is taking place now has consequences for the fundamental economic conditions of each country. The problems faced by states within the fundamentals of this economy can in turn affect macroeconomic stability. One of the most sensitive macroeconomic indicators of external economic disruption is the currency exchange rate. In international trade, the exchange rate serves as a barometer of international competitiveness, so the volatility of exchange rates should be a good consideration for investors, companies, and consumers in a country.

International market conditions are undergoing major changes in the form of excessive volatility in exchange rates as well as capital mobility that is becoming increasingly unstoppable as a result of speculative behavior accompanied by a series of financial crises around the world over the last four decades. This is in line with Ozkan & Erden (2015), who say fluctuations in exchange rates will have a direct impact on price stability, financial stability, and trade balances.

According to the IMF, between 1970 and 2010, at least 208 countries had experienced monetary crises, of which 145 countries had suffered from a monetary crisis and 72 had experienced a debt crisis. Even in 2007-2008, there was a massive banking crisis in 23 countries at the same time, including those in the US, the UK, and Germany (Laevan & Valencia, 2010). This chain of crises began with the devaluation of the dollar a few years before 1971, which caused the world's foreign exchange markets to become unstable. In 1987, there was a stock market crisis in the U.S., which was followed by an explosion of the stock market bubble in Japan in the late 1990s. The foreign exchange markets in Europe were also affected in 1992–1993, followed by the Asian crisis in 1997, the Russian crisis in 1998, the security crisis in the US in 1998, and the exchange rate crisis in Brazil in 1999 (Chapra, 2007).

It cannot be denied that the Bretton Woods collapse of the dollar made it the only currency that dominated the world's payment systems because it was a war-winning nation and the largest gold reserve country in the world. It is estimated that more than 50% of the world's gold reserves are held by the United States and some of its European allies. While the remaining 3–5% are scattered in other countries (Kamola, Adam, & Ahamed Kameel Meera, 2018).

In its role as the national currency, changes in interest rates and exchange rates in the dollar will affect the American domestic economy itself and the world as a whole. But in its role as an international currency, any change in the dollar will affect the relative price of every commodity and trade industry around the world. This has caused the rate of inflation and deflation around the world to be heavily influenced by the dollar policy in the United States that eventually makes the dollar's exchange rate very fluctuating above all the existing currencies in the world (Schulmeister, 2000).

On the other hand, this dollar instability has a huge impact on the international economy. For example, the oil crisis that struck the world in 1973–1975 Dollar fluctuations have caused the exchange rates of oil-exporting countries to become unstable and threaten their economies. The oil-exporting countries responded by raising oil prices alongside the currency depression they experienced to compensate for net exports. As a result, oil producers raised the price of oil more than three times the average in 1973.

Due to the volatility of the dollar's exchange rate, the issue of exchange rate volatility in each country becomes an important topic of discussion. There is even the general assumption that exchange rate volatility has a negative impact on the economy. (Obstfeld & Ken, 1998). This volatility has consequences for macro variables and also for sectors such as households, corporations, financial institutions, and governments. (MacDonald & Taylor, 1994; Reinhart & Smith, 2002; Adusei & Gyapong, 2017). Research by Andersen & Sorensen (1988) suggests that exchange rate volatility can lead to unemployment due to excessive wage increases. Almost similarly, Belke & Kaas (2004) stated that when labor market rigidity increases employee affordability and increases wage expectations, the more volatile the exchange rate, the more companies will tend to delay job creation.

Developing countries are the most disadvantaged by worldwide exchange-rate fluctuations caused by the dollar as they are more vulnerable to internal and external disturbances. The impact of exchange-rate volatility in developing countries is two to three times greater than in developed countries (Devereux & Lane, 2003; Hausmann, Panizza, & Rigobon, 2006; Aghion, Bachetta & Rogoff, 2009; Ganguly & Breuer, 2010). It's because the developing world has a financial sector that's not as deep as the developed world. Besides, it's because the majority of trade transactions and capital flows around the world are in the form of foreign currencies, not the currencies of the developing countries themselves. So any fluctuation that happens in foreign currencies will have a huge impact on their economies (Jun, Yingli, & Qi, 2014).

Hossain (2016) surveyed nine Muslim-majority developing countries (Bahrain, Bangladesh, Egypt, Indonesia, Iran, Malaysia, Pakistan, Saudi Arabia, and Turkey) that have implemented Islamic banking. It's all running on a dual monetary system, except for Iran. The exchange rate volatility in these nine countries has affected savings, investment, trade, and capital flows, as well as economic growth. The SVAR approach is used to explain the macroeconomic relationship between the data between 1970 and 2014. The research finds that inflation caused by volatile exchange rates directly affects real interest rates and exchange rates, which in turn affect the decline in real growth rates.

To suppress the volatility of global exchange rates that could increase the risk of international trade, the European Union then established a currency unit that applies to the entire country in Europe called the Euro. A currency unit in a region is an attempt or mitigation to minimize exchange rate risk. (Fratzscher, 2002; Bartram & Karolyi, 2006). It is in line with Giannellis & Papadopoulos (2011), who mentioned that a country would tend to merge into a monetary unit in the same region to stabilize its currency volatility in the future.

Exchange rates have become highly fluctuating for various countries due to non-real-sector factors, including those experienced by Muslim-majority countries. In his efforts to develop the prosperity of a Muslim country in the midst of economic liberalization, one of his efforts was to form an organization of Islamic cooperation (OKI).

Muslim countries are still unable to maximize their potential. Almost the entire Muslim country is a developing country, and there is a very clear disparity even between the groups of Muslim countries themselves. According to the UNDP report in 2016, only seven countries (six from the Middle East and one from East Asia) were categorized as countries with the highest per capita income, while there are 15 countries among the lowest-income countries. Seven of them are oil exporters. The state of Qatar has the highest income with $129,916, while the state of Somalia has the lowest with $294. In 2015, the variation in the human development index in Muslim countries was also very modest, starting from the lowest in Niger with 0.353 to the highest in Brunei Darussalam with 0.865 (UNDP Human Development Report, 2016).

This condition reflects the low level of economic integration among Muslim countries. Alpay, Atlamaz, & Bakimli (2011) reinforce this hypothesis, as OKI's efforts to enhance cooperation among OKI members are far from expected. In 2009, OKI's intra-trade ratio was only around 17%. This figure is disappointing because most of the OKI member states are in geographical proximity to each other, so there should be a lot of trade potential in areas such as natural resources, agriculture, and manufacturing products. According to WTO data, the majority of Muslim countries still rely on the United States, China, and the European Union as their largest trading partners. This explains the low economic integration of the Muslim country itself. Thus, any economic turmoil that

occurs in the three largest trading partners can affect trade activity in Muslim countries, one of which is caused by sharp and persistent exchange rate fluctuations.

The study will specifically look at the impact of fluctuations or dollar exchange rate volatility on the international trade volumes of Muslim-majority countries represented by Indonesia, Pakistan, and Turkey. High exchange rate volatility is expected to reduce domestic export volumes due to price uncertainty and incomes for exporters. Thus, the author has a long-term hypothesis that if the volatility of both nominal and real exchange rates occurs persistently, then these conditions can eventually have a negative impact and have a causal relationship to the performance of international trade in each country.

RESEARCH METHODS

This research specifically has two purposes. First, how does the volatility of the dollar's exchange rate relate to international trade? It will reveal the causal interaction relationship between the volatility of dollar exchange rates. The second goal is to investigate whether the volatility of the dollar's exchange rate can hinder a country's economy. Some studies state that the depression of exchange rates can accelerate economic growth (Gala, 2008; Berg & Miao, 2010; Rajan & Subramanian, 2011). This fact proves that exchange-rate volatility will create uncertainty in the economy so that it will ultimately affect real-sector performance and domestic price stability. Islam sees the stability of currency values as an important and fundamental goal of the Islamic economic system.

The autoregressive distributed lag (ARDL) model (Visa, Shin, & Smith (2001)) is used to explain the variable of exchange rate volatility against trade for three reasons. First, it can combine I(1) and is also a stationary variable, so it does not require unit-root testing. Second, this model is strongly used for small sample sizes. Third, this model can produce estimates of short-term and long-term coefficients in a single equation. Long-term coefficients can also be used to test co-integration relationships between variables (Bahmani-Oskooee, Hegerty, & Hosny, 2015).

Before making an estimate of the ARDL model, there are a series of estimate techniques in the framework of ARDL models to answer the research questions. Some of the steps taken include the estimates of ARIMA, ARCH, and GARCH, as well as ARDL-ECM and Granger-Causality, to analyze the results of the study. The samples of three Muslim countries are Indonesia, Pakistan, and Turkey. It's because three Muslim countries have a fairly active trade relationship with the United States.

RESULT AND DISCUSSION

ARDL-ECM Long-Term Estimates

Significant volatility measures are co-integrated so the next step is a long-term estimate using the ARDL-ECM model. The results of the long-term estimates will be given in table 2 for each model as follows:

Table 1 Long-term estimate model 1 (dependent: export)

State	V^{real}_{it}	lY^{*}_{it}	lp^{x}_{it}

Indonesia[a]	–0.003	0.616*	–2.519**
(2,0,3,3)	(0.714)	(0.035)	(0.000)
Pakistan[a]	0.045	0.225	–1.025
(3,1,0,1)	(0.341)	(0.438)	(0.071)
Turki[b]	–0.283	6.050	0.835
(3,0,2,4)	(0.071)	(0.068)	(0.713)

Notes: (a) the curtain mark is the p value; (b) the above result is the coefficient value

[a] enter a drift term; [b] enter *drift and trend term*

** significant at a rate of 1%; * significant at a rate of 5%

Table 2 Long-term estimate model 2 (dependent: export)

State	$V^{nom}{}_{it}$	$lY^{*}{}_{it}$	$lp^{x}{}_{it}$
Indonesia[a]	–0.002	0.333	–2.793**
(2,0,0,3)	(0.458)	(0.164)	(0.000)
Pakistan[a]	–0.258*	0.542	–1.635
(3,1,0,0)	(0.020)	(0.087)	(0.069)

Notes: (a) the curtain mark is the p value; (b) the above result is the coefficient value

[a] enter a drift term; [b] enter *drift and trend term*

** significant at a rate of 1%; * significant at a rate of 5%

Turkey, as seen in the overall variable regression results, shows exactly the opposite results compared to other countries: the highest volatility coefficient, the world's highest income, and the lowest export prices. Although the volatility variable cannot explain the export significantly, it can actually be subjectively said to be significant at a rate of = 10%. Thus, it can be confirmed that the volatility of the exchange rate affects the volume of exports to the Turkish country. The high volatility coefficient in the Turkish country also shows that the effects of real exchange rate volatility play a significant role in suppressing export volumes. In the long run, if export volumes continue to be under pressure due to increasing exchange-rate volatility, then economic growth can be hampered as a result of export deficits. In model 2, the differential variable is only the volatility of the nominal effective exchange rate, while the dependent variable remains the export volume. The only significant variable influencing this is the export price in Indonesia. Interestingly, the volatility variable has a significant impact on exports to the Pakistani country. This condition is also confirmed by Pakistan's high nominal exchange rate volatility coefficient compared to other countries. The Turkish state is not valued because there is no co-integration relationship. The Indonesian country's exchange rate volatility coefficient does not differ much in both real and nominal terms. Meanwhile, for the Pakistani country, the exchange rate volatility is below the nominal level. The change in the coefficient indicates that the difference reaches 6x (1.548/0.158). The high nominal exchange-rate volatility coefficient in the Pakistani country may be explained by the very high effective exchange rate of the Pakistan rupee compared to the currencies of the other three countries.

Table 3 Long-term estimate model 3 (dependent: import)

Negara	V^{real}_{it}	lY_{it}	lp^{m}_{it}
Indonesia[b]	–0.031	–9.62	–2.455*
(2,2,1,0)	(0.130)	(0.071)	(0.011)
Pakistan[a]	0.045	0.949*	–0.318
(2,3,3,4)	(0.110)	(0.024)	(0.146)
Turki[b]	–0.083*	3.215**	3.418**
(4,2,2,4)	(0.017)	(0.000)	(0.000)

Notes: (a) the curtain mark is the p value; (b) the above result is the coefficient value

[a] enter a drift term; [b] enter *drift and trend term*

** significant at a rate of 1%; * significant at a rate of 5%

Table 4 Long-term estimate model 4 (dependent: import)

Negara	V^{nom}_{it}	lY_{it}	lp^{m}_{it}
Indonesia[b]	–0.014	–9.73	–2.485**
	(0.135)	(0.057)	(0.010)
(2,2,1,0)			
Pakistan[a]	–0.074**	2.054**	–0.610*
(2,0,3,0)	(0.007)	(0.000)	(0.028)
Turki[b]	–0.029	3.478**	2.975*
(4,2,2,1)	(0.203)	(0.004)	(0.027)

Notes: (a) the curtain mark is the p value; (b) the above result is the coefficient value

[a] enter a drift term; [b] enter *drift and trend term*

** significant at a rate of 1%; * significant at a rate of 5%

Increasing import price increases are clearly detrimental when there is an increase in import volumes as a result of a decrease in exchange rate volatility. Excessive imports will burden the economy by lowering domestic income. It is also supported by three variables that are able to explain import variables significantly. For Indonesia, the three variables indicate a relationship that has a negative influence on the volume of imports. In theory, the rise in a country's income will increase its demand for imports as its purchasing power increases. But in the case of Indonesia, this is exactly the opposite. Besides, the domestic income coefficient shows a very high figure compared to other countries. This may be explained by Indonesia's still high import dependence. Most of the goods imported are mostly imported commodities, so whatever happens to the exchange rate, whether it strengthens or weakens, Indonesia will still import. High imports will reduce the country's income because, on the other hand, Indonesia's exports are still underdeveloped and heavily dependent on world price levels. In addition, the high import price coefficient indicates that the import price is expensive, which in turn will lower domestic income. Meanwhile, for Pakistani countries, the real exchange rate volatility variable shows a positive relationship, unlike other countries that show a

negative relationship. Significance is also found on domestic income variables, where coefficients show inelasticity while other countries are elastic, though close to 1. Thus, in the long term, Pakistan's domestic income is not too large under the measurement of real exchange rate volatility.

In model 4, the variable differentiates only on the volatility of the nominal effective exchange rate, while the dependent variable is fixed on the volume of imports. The only variable that positively affects the volume of imports in Pakistan for Model 4 is domestic income. Two other variables indicate a negative relationship. Besides, there are interesting results for the Pakistani country, as the three variables can contribute significantly to the volume of imports. Thus, for every increase in the volume of imports that increases domestic income, an increase in nominal exchange rate volatility will decrease the volume and price of the imports. The results are in line with the existing theory. This phenomenon may be explained by the ECT results showing that the duration to return to balance on the Pakistani country's import model is the shortest compared to the other three countries.

The lower the exchange rate volatility that occurs, the faster the economy will repair itself. For the Indonesian country, the estimates showed that the three variables again had a negative impact on the volume of imports, as in Model 3. Statistically significant variables are also only import prices in both models 3 and 4. These results show that neither real nor nominal exchange rate volatility has much influence on imports. The size of the coefficient between real and nominal exchange rate volatility is also small, 0.031 and 0.014, respectively. This condition depicts that Indonesia's import activity does not change much from year to year, and on the other hand, changes in nominal exchange rates are not very sharp. Meanwhile, for the Turkish country, it's almost the same as Model 3, and almost the entire variable shows significance to imports. But what makes the difference is that the variable of exchange rate volatility this time is not significant; these results show Turkey's import performance as opposed to its export performance. This phenomenon may be explained by the high volatility of Turkey's exchange rate in recent years, which can be seen in the descriptive statistical appendix, where the Turkish exchange rate deviation standard is the highest compared to other countries.

ARDL-ECM Short-Term Estimates

Co-integration relationships can be justified through error correction terms (ECT). ECTs can be found in the ARDL-ECM short-term estimates. To save space, in table 6 below only ECT results are shown on each model for each country.

Table 6 ECT's Results

State	Model 1	Model 2	Model 3	Model 4
Indonesia	–0.167	–0.143	–0.075	–0.066
	(0.000)	(0.000)	(0.000)	(0.000)
Pakistan	–0.158	–0.136	–0.375	–0.316
	(0.000)	(0.000)	(0.000)	(0.000)

Turki	–0.063	–	–0.172	–0.134
	(0.000)		(0.000)	(0.000)

Notes: (a) curfew is the p value; (b) the above results only record error correction terms

The phenomenon of Turkey being the longest country to strike a balance on its export-dependent model can be explained by the poor trade relations between Turkey and the United States over the past decade. Each country imposes high import tariffs on the other to restrict certain commodities from entering the domestic market. This has a pretty bad impact on Turkey, as the US is among Turkey's five largest trading partners. One of the most significant impacts was the depreciation of the lira against the dollar, which previously equaled 1 dollar to 2 lira to 6 lira. This depression is the biggest in the last decade of the Turkish state. According to the WITS report for 2017, Turkey's economic growth was only 0.05 percent. The gap is very thin compared to the world economy's growth of 0.04 percent. It proves that a trade war with the US has an impact on the Turkish economy.

Meanwhile, the phenomenon of Pakistan becoming the fastest country to respond to the imbalanced deviation from the import-dependent model is a logical one. This can be explained by Pakistan's superior export commodity, which is not a raw material of natural resources derived from extraction, such as petroleum, but rather a more raw material like rice and wool. Besides, the United States is not Palestine's largest import partner, but China. Where the percentage of import activities with China reached 26.78 percent, far enough when compared to the US, which was only 4.95 percent. (WITS). This condition makes Palestinians not so dependent on US commodities that the volatility of the dollar's exchange rate will not have a significant impact on their economies. Moreover, Indonesia’s dependence on commodity exports is very large, at 24.99 percent. Commodities like Indonesian commodity exports are heavily influenced by prices in global markets, so the impact on trade activity is even greater. Indonesia's phenomenon of responding slowly to deviations from import-dependent models is one of the reasons Indonesia is still heavily dependent on imports to produce export commodities. That's why the movement of exports and imports in Indonesia has never been significantly different.

CONCLUSION

The aim of this study was to test four models to see the impact of exchange rate volatility on export and import demand for three Muslim-majority countries in the period 2006–2021, using monthly data. The research used both nominal and real exchange rate volatility. The GARCH model is used to proxy against exchange rate volatility. Further, to identify long-term and short-term relationships between variables, we used the bounds test in the ARDL-ECM model as well as the Granger-causality test to see the causality relationship between the variables. In general, the empirical results of the research showed that there was a long-term relationship between the variables in the countries of

Indonesia and Pakistan for the four models, while there was no long-term relationship in the country of Turkey only in model 2. These results have also been justified using error correction terms. There is a causal relationship between exchange rate volatility and exports and imports in Indonesia, Pakistan, and Turkey. Thus, policymakers should be able to create policies that can stabilize exchange rates to benefit the trade sector and, in time, boost economic growth. In the short term, this study found that for the export-dependent model, Turkey was the country that took the longest to respond to the shock of international trade.

On the other hand, for the import-dependent model, the fastest country to respond to the deviation or shock is Pakistan, while the longest is Indonesia. It is influenced by the commodity structure of each country's own exports and imports. Besides, domestic political conditions are also very influential, as in the case of a Turkish state that is engaged in a trade war with the United States. In the long run, the effects of exchange-rate volatility on international trade were only found in Turkish countries with export-dependent models. Meanwhile, import-dependent models are found in Turkey and Pakistan. This confirms the short-term outcome, where Turkey is the country that takes the longest time to re-establish the economic deviation. Nevertheless, the estimated parameters indicate that the exchange rate volatility coefficient is small and does not have much impact on international trade activity. Thus, exchange-rate volatility should not hinder the economy in the long term.

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