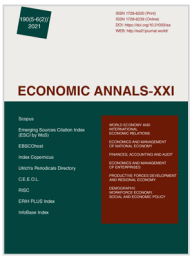

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Exchange rate impacts on international trade

Abstract
As international trade activities are increased, there are more regulative practices which might be barriers to trade. One of such hindrances is exchange rate volatility that affects trade activities both directly and indirectly. Exchange rate volatility of currencies can affect the trade engagements and as well as the trade balance of a country. One of the implications of the study is that the impacts of monetary policy changes on trade activities can be noticed significantly in the long-term. While impacts on export levels are usually immediate, import levels are changed in long-run. The research analyzes the correlation between inflation and devaluation and clearly states their impacts on trade balance. The case study about devaluation of the currency of Azerbaijan elaborates the impacts of currency volatility on exports which is illustrated and analyzed in this research. Moreover, inflation and devaluation correlations and their impacts on import level of a country are studied through correlation and multiple regression analyses based on the data exported from OECD and World Bank. The results conclude that exchange rate volatility significantly impacts the trade balance in terms of imports and exports. Given the results, exchange rate is a non-trade barrier and affects foreign trade.

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1. Introduction

Nowadays international trade is influenced by many factors, such as tariffs and different trade policies and actions set by governmental authorities to stimulate national investments and trades. Economic unions such as European Union are made to better improve international trade by liberating capital flow between countries and reducing restrictions and taxations. However, exchange rate of capital has also a significant effect on this matter. Exchange rate is strongly correlated with competing financial markets and therefore with international trade. It can have negative and positive effects, but it is crucial to create circumstances that sustain this competitiveness (Toderascu & Firtescu, 2018).

Existence of foreign exchange control system in a country is crucial for trade activity modeling. However, such a control might end up being a trade hindrance, too. It can be a non-tariff barrier through leading to artificial currency fluctuations. In addition to the measures that are related to the flow of goods, policies on the currency which are required for the import of foreign goods may be implemented. Governments, for instance, want to protect their exports or domestic production from external competition can keep their exchange rates artificially high. Moreover, they can devaluate local currency artificially. Accordingly, foreign goods in the domestic market will be more expensive and domestic goods will appear cheaper in the foreign market. Thus, the domestic producers will be supported as closed and tax will be imposed on the domestic consumers. However, this policy is very difficult to be sustainable. In order to keep the exchange rate high, central banks should do certain actions which might affect the trade balance and many other sectors. The stock of foreign currency reserves is important while having a fixed rate and keeping exchange rate high. In addition, in reverse scenario which devaluation of local currency, it might lead to inflation in the local market. For instance, devaluation happened in Azerbaijan in 2015 led to change in trade balance and inflation. Azerbaijan is an oil exporting country and decrease in the oil prices resulted in devaluation in the country. Similar economy countries are Algeria, Venezuela, Kuwait. The devaluation impacts are studied through the case about Azerbaijan widely in the analysis part of the paper below.

2. Brief Literature Review

Monetary Policy

Economic theory suggests that an economy's openness to international trade reduces the ability of monetary policy to affect output (Karras, 2001). Furthermore, it also suggests that if an economy joins a monetary union, it can increase the net benefits. The potency of monetary policy is depending on to what extent an economy is open for foreign trades. In open economies, the effect of money on output is supposedly weaker. Considering the effects of a specific monetary expansion in two different economies: one that is open to foreign trades, and one that is relatively closed, the outcomes will be different. Even if in both economies the aggregate-demand is similar, the aggregate-supply will not be. Because of the expected consequent devaluation in open economy, the wage demand will grow, and the monetary expansion will be reflected on prices and less on the output. Looking at the other economy, the opposite will happen. Central banks actions are responsive to money in circulation. Monetary policy transmission to bank lending is determined by income gap and interest rate risk of banks' exposures. Such cash flow exposures lead to more robust and transparent responses by central banks (Gomez, Landier, Sraer, & Thesmar, 2021)

Flexible exchange rate

Flexible Exchange rate proponents stress out that it gives more freedom in terms of trading compared to fixed exchange rates. Flexible exchange rates are assessed as caring of balance of payments equilibrium which is based on policy of domestic objectives and without the affection of external additional factors. Flexible exchange rates heavily rely on the purchasing power parity (PPP) which is the phenomena contributing to equilibrium of foreign trade. However, it should not be always relied upon contributing to reduce the PPP gaps.

Inflation and Devaluation

Hypothesis 1 (H1). *Inflation over consumer prices has a direct significant impact on devaluation of a currency.*

From a theoretical perspective, in the international trade the unstable and continuous changes of exchange rate can be seen as a risk since it increases the uncertainty of transactions. On the other hand, this risk can have a positive effect on exports, meaning that traders, who are very risk averse might be concerned with the worst possible outcomes, therefore when the risk increases, they are likely to export more in order to avoid the likelihood of a drastic decrease of their revenues. In this sense, countries with a lower income are more risk averse, and because of that they might want to export more. Less risk averse individuals in countries with higher incomes have less dependency on such extreme outcomes, thus, when exchange rate risk increases, the volume of their exports is likely to get decreased. Increase in exchange risk can

have substitution and income effects. The substitution effect is that when risk arises the risky activities become less attractive for some traders, and it results in less exports. On the contrary, the income effect can have a positive impact on exports. When the risk increases, the anticipated utility of export revenue decreases, and this can be balanced by increasing exports. However, the long- and short-term relationships between foreign trade and exchange rate volatility can be an empirical issue, as it can intensify or diminish through changes in foreign income volatility.

Inflation comes in two ways, through demand-pull and cost-push. Table 1 lists the factors which play roles to cause inflation for each type.

Table 1:
Factors of inflation

Demand-pull inflation	Cost-push inflation
Cut in interest rates	Higher wages
Increased money supply	Devaluation
Higher wages	Increase in VAT
	Inflation expectations

Source: The American Economic Review (1960)

As shown above, devaluation contributes to cost-pull inflation. Since the prices are likely to go up in case of devaluation, inflation is yet to happen. At the same time, inflation is an indicator of devaluation and these two terms are positively correlated. This statement in H1 is analyzed and proven in analyses section.

There are two types of currency devaluations. One of them is the gradual, which happens gradually and credibly, and the other is the big bang, which is a massive, extraordinary devaluation.

Gradual devaluation seemingly has better outcomes. After a gradual devaluation happens, the trade balance of the affected economies tends to improve, as the economies will have to handle only slowly developing changes in relative prices. In the long-run, possible further exchange rate adjustments might be expected. However, the outcome of any gradual devaluation is also depending on the earliest conditions of a country (Nguyen & Geiger, 2018).

In comparison with the previous, the big bang devaluation is shocking the economy and several challenges are coming alongside with it causing long term effects. What happens is that while the trade balance of an economy is improving the exports do not increase. It can also be connected to the drop of GDP and investments, as during bad economic periods countries are forced to deliver a large level of exchange rate adjustments. It interrupts international trade as exported products become cheaper unexpectedly, while the price of imports suddenly increases (Segal, 2020). Moreover, a rapid and sharp devaluation will increase the value of foreign debts, especially if it is counted in US dollar. On condition that a domestic bank is dollar-based, then this can also possibly lead to banking crisis that can end up in rejecting further investments. A key advantage for big-bang devaluation is that it does not reinforce expectations for further rounds of depreciations.

Devaluation leads to a decrease in the value of a currency hence it is likely to contribute to inflation. Devaluation makes importing more expensive and therefore causes an increased competitiveness and higher demand in exporting (Pettinger, 2017). As the price level drops, interest rates fall, domestic investment in foreign countries increases, the real exchange rate depreciates, net exports increase, and aggregate demand increases. Devaluation of a currency increases inflation, and for this reason imports become more expensive. It leads to more competitive exports, and as exports increase it causes demand-pull inflation. Devaluation of a currency makes exports more competitive, and at the same time makes imports more expensive. A higher demand for exports boosts an economy's growth, as more pricey imports will encourage inhabitants to find local alternatives instead of imported products. Moreover, if devaluation happens in a country, it decreases the costs of the economy's exports and increases the costs of imports. Therefore, locals are less likely to purchase imported products, which further strengthens domestic businesses.

On the other hand, inflation affects the cost of living in a country, as well as making businesses, government bond yields, money borrowing, mortgages, and many other facets of an economy. Inflation can be both beneficial and might have negative impacts (Davis, 2019). If consumer

spending grows to a point when demand exceeds supply, inflation may occur. The higher the interest rates in an economy, the more attractive it becomes for foreign investors, which is likely to increase the need for the country's national currency. Inflation benefits borrowers in terms of allowing them to pay lenders back with money with less value than it had when borrowed. On the other hand, when inflation results higher prices, the demand for credit grows, it benefits lenders (Segal, 2020).

As mentioned above, devaluation increases the prices of import products and boosts the domestic demand, and it may be driven due to several reasons. One of them is demand-pull inflation: the aggregate demand increases faster than the aggregate supply. On the other hand, there is cost-push inflation: It happens, for instance, higher oil prices feeding through into higher costs.

When a government wants to increase its balance in trade, they can decrease the relative value of their national currency by adjusting the exchange rate of its currency in opposition to that of another country. The economy's exports become more attractive for foreign traders, as they get cheaper. A higher demand for exports results in an improvement in the current account deficit, and moreover, it leads to a higher rate of economic growth (Vásáry et al., 2013; Pettinger, 2019; Cubillos et al., 2021).

Exchange Rate Implications and Foreign Trade

Hypothesis 2 (H2). *Export level (trade balance) impacts exchange rate of a currency.*

To better understand the effects of exchange rate on international trade and trade policy, many researches have been established. However, despite the increasing number of studies, this topic still remains an open question.

Exchange rate volatility is one of the many aspects of the relation between exchange rates and trade that this research examines. An increase in exchange rate volatility would cause less interest in international trade, as there are various risks, such as transaction costs, that have to be taken into consideration. The relationship between these two is mostly driven by emphasizing long-term policy credibility rather than the short-term conditions. Although, as nowadays there are many different financial instruments available such as forward contract and currency options, the risks associated with exchange rate volatility can easily be mitigated. In this case, volatility is not always a critical issue for international trade, moreover, trade flow can stabilize exchange rate fluctuations, thus reducing volatility (Broda and Romalis, 2010). Furthermore, in modern international transactions traders are more likely to offset the risks of any adverse price movements, or as part of their export strategy, bear with the costs coming along with possible exchange rate fluctuations.

Another aspect of the relationship between exchange rate and international trade is currency misalignment, which is mainly driven by its effect on relative import prices. Relative prices mean that in a short term they respond to the movement of exchange rate. If a national currency is depreciated, it increases the competitiveness of the export sectors. In this sense the impacts of currency misalignments on prices are similar to the effects of export subsidy and import tax. Yet, there is another issue that largely complicate the relationship between international trade and exchange rate misalignment (Nicita, 2013). It is that usually part of the fluctuation of exchange rate is absorbed by international traders that do not wish to fully adjust their prices in the destination country. Also, the sunken costs of entry highly motivate firms to stay in the trade market even if there is significant undervaluation of the importer currency.

The other issue on the relationship between exchange rates and international trade is the effect of exchange rate misalignments on trade policy. Exchange rate may indirectly impact governments' decisions regarding international trade policies. For instance, based on recent studies, if exchange rates are overvalued for a long period, it increases the use of protectionist trade policies. However, domestic firms that have lost competitiveness due to the appreciation of real exchange rates may turn to restrictive trade policies. Thus, disputes over exchange rate policies among international traders can increase domestic political pressures. In general, countries might use trade policy as a proxy for exchange rate overvaluation, so as to deal with persistent unbalance in the trade balance (UN, 2013).

Exchange rate misalignments cannot give a full explanation for global imbalances, however, they do have a considerable effects on international trade flow. While currency depreciation promotes exports and restricts imports, currency appreciation causes the opposite (Hayes, 2019).

Furthermore, even though exchange rate volatility is not a major concern in trade policy, some countries can use trade policy to recompense some of the consequences of an overvalued currency. However, policymakers should pay attention to exchange rates of their own countries and also those of other countries. They should monitor their exchange rates relative not only to that of their trading partners, but also to that of their competitors (UN, 2013).

To conclude, exchange rate adjustments must be accompanied by other trading policy actions for global rebalancing, and strategies should

Volatility Impacts

Hypothesis 3 (H3). *Exchange rate of a currency has significant impact on the trade balance of the country.*

The economic crisis had an impact on the world economies, affected the trading system and changed economic trade patterns. It created a low employment in countries, and depreciation came along with it, which caused the exports to become cheaper and imports to become more costly. For this reason, it pushed policymakers to stimulate their exports in the hope of improving their trade and account balances. Policymakers with such interests had to have a better look at the fluctuation of the exchange rate. However, what must be taken into consideration is that exported products also contain a large proportion of imported components, and are not always substitutable with domestic products.

Furthermore, exchange rate levels have an important impact on investment flows. When a country's currency is depreciated, it is in favor of foreign investors, as capital investments become cheaper for them, which is particularly important for large economies.

Exchange rate volatility affects firms differently in a country. Firms have to deal with numerous economic and commercial risks when engaging in international trade. There are risk management tools available for firms to mitigate the impacts of the risks. However, these complex tools may not be available for all firms, as using them have a significant cost, plus they might not cover all financial and commercial functionings (OECD, 2011).

Many papers have analysed the impacts of exchange rate volatility on international trade, but so far no consensus has been reached regarding this topic. Although, there is a common understanding as to the direction of effect of the exchange rate on bilateral flows (imports and exports).

There have been many models and theoretical studies made in literature about how exchange rate volatility may affect international trade. One of the most mentioned negative relationship between exchange rate volatility and trade is coming from transaction costs. It is shown that the conversion costs from one currency to another and the risk associated with probable exchange rate changes are both having a reducing effect on trade flows. To clarify, if exchange rate risk is increasing, then the volume of trade will decrease, if the traders are risk averse.

On the other hand, some studies are questioning the negative effects of exchange rate variability on trade. According to De Grauwe (1988), depending on how risk averse traders are, exchange rate volatility may have either a negative or positive impact. It suggests that there are two opposing effects that shape the impact of exchange rate volatility: the substitution effect or income effect. By substitution effect the uncertainty of firms towards exchange rate risks reduces the trade flows. On the other hand, by income effect companies will increase international trades in order to offset a decline in total expected utility.

Other studies indicate that more risk averse firms are more likely to hedge against future exchange rate changes. Thus, they will apply a risk premium to cover the costs of exchange rate volatility. However, hedging involves high costs and some limitations such as complexity for firms to predict the volume and timing of their transactions (Kharroubi, 2011).

Studies look more into the reach of the traders, national and multinational companies. They assume that multinational firms that are producing in foreign countries and selling products abroad have monopoly power in the international market and are facing exchange rate uncertainty. If exchange rate risk is not hedged, then productions will decrease in the foreign country.

To sum up, the impacts of exchange rate volatility on trade is ambiguous: they can be both positive or negative, and are strongly depending on transaction delays, and also on the behaviour of traders facing increased risks.

In agriculture many production decisions are taken well in advance, and there is a general uncertainty regarding the final pricing of the products. Therefore, price volatility is one of the main risks

in this sector. Exchange rate volatility also has a significant impact in this matter, as it can affect the transmission from world prices to domestic prices. For instance, indicate that most of the world's grain trade is denominated in US dollars, which may introduce an additional transaction cost if both exporter and importer are located outside the United States but the goods are denominated in US dollars (OECD, 2011).

In the last decades numerous empirical studies have been made, and based on varied fundamental assumptions the researches show that there are positive, negative or no effect of exchange rate volatility on the volume of international trade. The studies also analyze the effect of both the level and volatility of exchange rate on trade, in a single equation or in a set of equations. Results vary, depending on the time period taken into consideration, whether short-, or long-term effects are examined, the measure of variability, and also whether or not effects are analyzed at an aggregate, sectoral or at a product level. Furthermore, some researches that study the impacts in different sectors find that trade in some products responds to exchange rate movements positively, and in some other cases negatively, which demonstrates that the net effect is strongly depending on the composition of exported and imported goods.

Exchange rate volatility is directly affected by monetary policy as well as government actions. Recent proof of it is that as a result of COVID-19 pandemic, government interventions on several economic and social fields have been increased. The more confirmed cases, the stricter various responses adopted by governments. Confirmed cases have significant impacts on exchange rate volatility. On the other hand, the economic policies actioned by governments during the pandemic, including fiscal measures, income support and aid have a restraining effect on exchange rate volatility (Feng, Yang, Gong, & Chang, 2021)

To conclude, in the literature regarding this topic, vast amount of the studies find negative impacts of exchange rate fluctuations on trade, while some others do not find any crucial effect. In the long run, some industries such as agriculture exports are greatly impacted by the exchange rate negatively. In addition, in the short run exchange rate is found to have significant impacts on both exports and imports. All in all, the effect of exchange rate volatility impacts may vary across industries and different business sectors, as they can have different trade policies and concentrations levels in different industries.

3. Methodology

In order to prove the hypotheses empirically, two different ways are approached. One is related to devaluation and dependency of an economy based on a real life case study about Azerbaijan. The study clearly indicates the impacts of a devaluation on foreign trade and trade balance in the recent history - 2015. This case study mainly shows the impacts of devaluation on export level of Azerbaijan. The historical data for Azerbaijan imports and exports, retrieved from UN database is used to elaborate the case study. Through the study, the reactions of Central Bank of Azerbaijan and other authorities and consequently changes in trade balance are clearly indicated and illustrated.

The other analysis method run in this research is correlation and multiple regression. Inflation and devaluation relations and their impacts on trade balance are discussed and illustrated. Inflation affects devaluation and consequently long term impacts of this are clearly indicated. Data for a set of countries is retrieved from OECD and World Bank databases. Total imports, exports, inflation rates for 2019 and exchange rates against USD for 2018 and 2019 are gathered. Through the Microsoft Office tool - Excel, with using formulas on average exchange rates for countries devaluation in percentage terms for each country for 2019 is identified. The formula used for devaluation rates is below:

$$(xr^{2} - xr^{1}) / xr^{2}, \quad (1)$$

where:
xr^{1} is average exchange rate in 2018;
xr^{2} is average exchange rate in 2019.

Once inflation and devaluation data clarified, the data is imported on SPSS to run regression and correlation analyses. To find out if inflation significantly predicts devaluation, the regression analyses between these two variables is run. Then, correlations between inflation, devaluation. and import levels of countries are identified.

Analyses

The analysis part of the study is encouraged by the above discussed literature and even though there have been many papers about exchange rates and foreign trade, this study shows different aspects of foreign trade. In the literature, monetary policy, exchange rate volatility, inflation, devaluation are discussed. Hypothesises are elaborated through the literature and proven through below case study and statistical and economic equations.

The Case of Azerbaijan

In February 2015, the Azerbaijani national currency deflated against US dollar for the first time since 2006. The exchange rate from dollar to manat which is national currency of the country was 33.86% higher compared to the rate set prior to the depreciation process.

Since oil prices in the world market dropped in 2014, the Central Bank of Azerbaijan had been in dilemma whether to go for a gradual or for a sharp devaluation of manat. Indeed, what happened one year later undermined the reputation of the Central Bank and the whole banking system, as the government promised a gradual devaluation to slowly reach goals which they had laid out. It would increase the Bank's costs to take action, plus the budget revenues in manat. However, as long as the crude oil's price was low, a less than 30.0% devaluation would not be enough to cover the state budget's shortage, and for this reason the Central Bank decided to have a sharp devaluation of the national currency (CESD, 2015).

Some of the main reasons why the government decided next to a sharp and deep devaluation:

Fiscal reason

In 2015, 65.0% of the total income of Azerbaijan was generated by SOFAZ (State Oil Fund of Azerbaijan). Although the monthly oil exports had not been reduced, but when the oil prices dropped in the world market, the income of exports had dramatically decreased. This had a negative effect on the economy, as the state was heavily dependent on oil and natural gas exports. Still, the government could take advantage of the devaluation, as with the previous exchange rate the state had to transfer USD 2.91 billion to the total budget in oil money, while after devaluation of their national currency this amount decreased to USD 2.15 billion. In this case only from direct oil income the government was able to save USD 760 million (CESD, 2015).

Saving the money of SOFAZ

An important fact is that while the revenue of SOFAZ is in US dollars, the costs and spendings are in manat. Therefore, devaluation of exchange rate helped the government to save billions of US dollars in 2015, and that SOFAZ was able to reach its fiscal targets for that year.

Lowering the decrease of Central Bank's savings

After the Central Bank's announcement about the future devaluation the demand for US dollar in the country dramatically increased. It caused the investors to withdraw their deposits from the bank and the share of manat deposits decreased from 63.0% to 45.0%. To further postpone the devaluation would had resulted in losing all of the Central Bank's reserves within a few months.

Promoting other export possibilities instead of oil

The share of non-oil products in total exports has been very low with the rate of 5.0%. Government decided that in a long-term period the main priority should be an economic diversification. Besides, Azerbaijan's main trade partners' currencies had also been devaluated, therefore exporting non-oil products to those countries became more expensive in US dollar terms.

Increasing the GDP in manat (AZN) terms

The devaluation of Azerbaijanian currency against US dollar increased the GDP in manat terms. However, the growth of exports of some non-oil products did not bring a real economic improvement for the country in the short-term. Thus, there has been more focus on agriculture, specifically on cotton. Government supports farmers with aids and incentives to encourage the growth and exports (Huseynov, Jafarov, Vermeer, & Gaplaev, 2021). Long-term impacts of export diversification have been more robust and lead to increase of export level of non-oil sectors.

Boosting the inflation rate

According to Economic and Social Development Center, Import prices had also grown which resulted in the increase in inflation. The Central Bank of Azerbaijan had been pushing the inflation rate to promote local and foreign investments to the state's economy.

The other important reason that Azerbaijan faced vast currency devaluation in 2015 was related to gradual economic decline since 2011. Azerbaijan economy was facing gradual decline since 2011 even though the oil prices was stable and even slightly increased. The huge share of Azerbaijan's economy is dependent on oil as the country is opulent with natural resources including crude oil. In 2015, the oil prices significantly decreased with an average decrease of 48% in price in comparison to prices in 2014. This was the main reason of economic downturn as the economy is dependent on oil exports mainly. Central Bank of Azerbaijan took regulatory action to sustain and improve economic stability in the country. Thus, the currency was devaluated. There were impacts on many economic fields, however, the foremost impact was on international trade activities. Table 2 shows the total exports and imports of goods for the years of 2008-2020.

Table 2:
Total exports and imports of goods for the years of 2008-2020 in Azerbaijan

Year	Total exports of goods (USD)	Total imports of goods (USD)
2008	47,756,229,362.00	7,161,847,499.00
2009	14,688,727,691.00	6,119,060,204.00
2010	21,278,419,980.00	6,596,796,766.00
2011	26,480,188,838.00	9,732,869,048.00
2012	23,827,186,078.00	9,641,723,771.00
2013	23,904,108,012.00	10,763,391,507.00
2014	21,751,737,145.00	9,178,588,183.00
2015	11,326,841,102.00	9,211,125,764.00
2016	13,380,818,566.00	8,472,499,915.00
2017	15,306,018,304.00	8,767,799,111.00
2018	19,489,068,203.00	11,460,337,555.00
2019	19,635,580,248.00	13,649,268,582.00
2020	13,740,567,629.00	10,729,787,219.00

Source: UN Comtrade, TrendEconomy (2021)

As shown on above table, the total exports of goods amount was decreased to USD 11.3 billion in 2015 which is more than 2 times less in comparison to previous years. Similar scenario happened in 2009 which was due to decrease of oil prices, too. No regulatory action was taken by Central Bank at that time; however, some fiscal actions were taken by the government. In the following year after the decline, the oil prices increased which resulted in increase in exports.

The exporters were encouraged through the action of devaluation by Central Bank to engage in more trade activities. Furthermore, there was a focus by government on some other industries such as agriculture and tourism apart from oil industry. Subsidies were provided to infant and less developed industries by the government. Consequently, the number of exporting products and businesses increased as they could generate more local currency. If we look at the import level of the country after devaluation, there is no significant change. The imports got decreased right after devaluation slightly as products became more expensive in local currency. However, in upcoming years, imports are increased again. This can be explained by economic and expansion and inflation. Both monetary (devaluation) and fiscal (focus on non-oil industries) regulatory actions prevented economic decline and improved international trade activities of Azerbaijan. Based on UN Comtrade (2021) data, in 2020, trade balance - both imports and exports of the country has been decreased due to global pandemic.

4.2. Inflation & Devaluation Analysis

In order to find out if inflation significantly predicts devaluation, regression analysis can be approached. Using SPSS software, multiple regression analysis was run. Devaluation rate is taken as dependent variable while inflation rate as independent variables. The number of the countries with valid data is 130.

The data is exported from of World Bank and OECD database. 182 countries are reflected and the data is for the year of 2019. Using the SPSS software, binary regression and correlation analyses were used to build various models to ascertain their predictive values.

The analysis finds out that the value of our model (p value) is 0.000 (0.000037). The confidence level in the analysis is 95%. The model is statistically significant since the p value is less than 0.05. So, the null hypothesis is rejected. In other words, inflation rate predicts devaluation rate. Significance model is reported as below:

$$F(1,128) = 139.799, p = 0.000 . \quad (2)$$

Moreover, in the analysis, the model summary indicates the adjusted R square value is 0.518 meaning that 51% of the variance in devaluation rate can be explained by inflation rate. The model summary that illustrates mentioned above is given in Table 3.

Table 3:
Model summary

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics	
					R Square Change	F Change
1	.723[a]	.522	.518	4.621	.522	139.799

Source: Calculated by authors by using SPSS

In the model, slope coefficient is 0.625. The equation of line for using inflation rate to predict devaluation rate is as below:

$$y = m\,x + b . \quad (3)$$

Here, m is the slope and b is constant. y indicates dependent variable (devaluation rate) while x is independent variable (inflation rate). Thus, the mathematical equations of our model are as follows:

$$Y = 0.625\,X + 2.670 . \quad (4)$$

Correlations

The correlation coefficient is determined by dividing the covariance by the product of the two variables' standard deviations. Standard deviation is a measure of the dispersion of data from its average (Ganti, 2020). Correlation coefficients are used to measure the strength and direction of a linear relationship between two variables.

The model to find out the correlation coefficient is as follows:

$$\rho xy = Cov\,(x,y) / \sigma x\,\sigma y , \quad (5)$$

where:
ρxy is Pearson product-moment correlation coefficient;
$Cov\,(x,y)$ is covariance of variables x and y;
σx is standard deviation of x;
σy is standard deviation of y.

After running the analysis, we can conclude that inflation rate has positive correlation with devaluation rate (Table 4). The Pearson Correlation coefficient between inflation and devaluation rates is 0.723 which is higher than 0.5 and very close to 0.75, therefore it can be considered as high degree of correlation. Below is the correlations table exported from SPSS.

Moreover, on the same data, correlation analysis was run to identify the relationship of inflation with imports. The correlation coefficients between inflation rate-imports and devaluation rate-imports are -0.085 and -0.057 respectively. The analysis concludes that there are no correlations between these variables. However, if we ran the same analysis for the same set of data for different (further) years, we get different results. For instance, analyzing inflation and devaluation rates for 2018 and import rate change from 2018 to 2019, resulted in different coefficients. The correlation coefficients between inflation rate and imports; devaluation rate and imports are

Table 4:
Correlation between inflation and devaluation

Correlations			
		Devaluation (percentage)	**Inflation, consumer prices (annual %)**
Devaluation (percentage)	Pearson Correlation	1	.723**
	Sig. (2-tailed)		.000
	N	157	130
Inflation, consumer prices (annual %)	Pearson Correlation	.723**	1
	Sig. (2-tailed)	.000	
	N	130	146

Source: Calculated by authors by using SPSS

-0.218 and -0.201, respectively. These correlations are not considered significant, however, it differs significantly than same year data analysis. The reasonable explanation for such relation is that inflation and devaluation in a country affects trade activities in the following years, in other words, in long-term. The implication is that the impact of monetary policy changes on trade activities can be noticed in the long-run. There might be impacts in the same year, however, the main effects will be visible in the future. The reason is that a monetary policy is applied based on the current situations with the aim of long term adjustments and predictions.

5. Results

The empirical results of the study prove that the exchange rate significantly impacts international trade. In this regard, companies as well as governments can formulate trade activities by keeping in view that exchange rate volatility affect on overseas trading.

The practical implication of the study suggests that the strength of a currency is strongly dependent on the export level which was discussed through hypothesis 2 and 3 (H2; H3). Thus, a country's export level should not be dependent on one industry but should be diversified and invested in broad range of industries in order to avoid the risk of collapse of the currency in downturn of that only industry. Hence, governments should get involved in monitoring and encouraging the investors in different fields that have potential growth.

The hypothesis 1 (H1) questioned that consumer price inflation leads to devaluation. The statement is proven through empirical results. The implication is that in order to keep the exchange rate volatility in balance, the inflation should be kept in the loop. Central Banks are the main role players to monitor this. In case inflation goes up, in the long run devaluation is undeniable. Consequently, such a process leads to change of trade balance.

6. Conclusion

Foreign exchange control is an important factor in a country to its trade activities. Considering the analyzed impacts, it can be considered one of the most important factors in international trade activities. Exchange rate issue is a non-tariff barrier. Because it might affect the trade indirectly, it is considered non-trade barrier in some sense. To sum up, the impacts of exchange rates on international trade is ambiguous: they can be both positive or negative, and are strongly depending on transaction terms, and also on the behaviour of trading countries. Even though exchange rate applications are introduced with different objectives by Central Banks, certainly, it will have indirect effects on international trade activities and balance. All in all, I consider in any type of currency applications, the trade balance should be taken into consideration and prioritized.

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