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# EXPLORING THE IMPACT OF INFLATION AND EXCHANGE RATES ON ALBANIAN EXPORTS

# ISTRAŽIVANJE UTJECAJA INFLACIJE I TEČAJEVA NA ALBANSKI IZVOZ

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***Abstract:*** *This paper aims at explaining how exports, inflation, and exchange rates interact during the period between January 2016 to March 2024 using a robust methodology and data extracted from Trading Economics. The paper will use a complex dataset with monthly indicators of exports, inflation rates, and Euro-Albanian Leke exchange rates. This will be done to gain a very clear understanding of the interaction between the variables in time. This article will, therefore, be capable of deducing hidden forces that may impact export performance by using multiple linear regression. From the findings, it will be seen that exports are positively related to independent variables since, in the case of inflation, it is affected positively by this variable, whereas the effect of exchange rates is adverse. However, it is statistically strong and makes the model valid in explaining export variability. This study will thus provide critical insights into the complex nexus of economic variables, which will equip policymakers and stakeholders with critical information in navigating the complexities of global trade and monetary dynamics.*

***Keywords****: exchange rates, exports,inflation, multiple linear regression.*

***Sažetak:*** *Ovaj rad ima za cilj objasniti interakciju izvoza, inflacije i deviznih tečajeva tijekom razdoblja između siječnja 2016. i ožujka 2024. koristeći robusnu metodologiju i podatke izdvojene iz Trading Economics. Rad će koristiti složeni skup podataka s mjesečnim pokazateljima izvoza, stopa inflacije i euro-albanskog tečaja Leke. To će biti učinjeno kako bi se dobilo vrlo jasno razumijevanje interakcije između varijabli u vremenu. Stoga će ovaj članak moći zaključiti skrivene sile koje mogu utjecati na izvedbu izvoza pomoću višestruke linearne regresije. Iz nalaza će se vidjeti da je izvoz pozitivno povezan s nezavisnim varijablama budući da u slučaju inflacije ova varijabla pozitivno utječe na njega, dok je učinak tečaja nepovoljan. Međutim, on je statistički snažan i čini model valjanim u objašnjenju varijabilnosti izvoza. Ova će studija stoga pružiti kritične uvide u složeni neksus ekonomskih varijabli, što će kreatore politike i dionike opskrbiti ključnim informacijama za snalaženje u složenosti globalne trgovine i monetarne dinamike.*

***Ključne riječi:*** *devizni tečajevi, izvoz, inflacija, višestruka linearna regresija.*

## 1. Introduction

Exports play a central role in the economic prosperity of any nation, standing as the indispensable push for growth, creation of jobs, and development in general. However, their importance is inextricably linked to quite a number of external factors like inflation and changes in the exchange rate, in particular. The change in these variables, therefore, powerfully influences the export performance of a country and, thus, its balance of trade, economic stability, and competitiveness in the international market. Understanding, therefore, the relationship between exports, inflation, and changes in the exchange rate is a task of great importance for the policymaker, economist, and businessman alike.

This paper attempts to explore this complex relationship, including an explanation of the underlying mechanisms of the impact of inflation and changes in the exchange rate on exports, an assessment of the current state of knowledge, and recommendations on reducing the negative effects of such changes. Empirical analysis and theoretical frameworks are combined in the research to elucidate the dynamics in play, thus contributing to the formulation of effective policies and strategies to strengthen export competitiveness and resilience in the face of the challenges posed by inflation and changes in the exchange rate. Based on this hypothesis, the main research goals therefore include a thorough analysis of the relationship of inflation and the change in exchange rates to exports, as well as an analysis of measures and policies to strengthen the competitiveness and resilience of export-oriented economies in an increasingly dynamic global economic environment.

## 2. Theoretical and conceptual background/framework

The study conducted by Firdaus & Septiani (2022, p. 32) examines the economy-influencing forces of economic growth in the nation. Data between the years of 1990 and 2020 are used by the study as it finds that inflation, exports, and imports impact the economic growth of Indonesia. ECM has been used by the research to solve several problems and finds that inflation has a negative impact on economic growth over the long-term. On the other hand, exports have a negative effect of a short-term nature on the economic growth of Indonesia. The results show that regulating export and import activities can be the key to consistent economic growth with the elimination of fluctuating inflation levels that drive economic strength.

The research by Akalpler (2014, p. 122) therefore, studies the degree of how inflation and the deteriorated exchange rate would affect exports as well as trade capacity. It also further explores the theoretical and practical evidence that both inflation and the deteriorated exchange rate can play a critical role in enhancing export capacity. However, in the case of the Turkish market, during the periods of 1970 to 2000 and 2000 to 2010, neither the high inflation rates nor the low inflation rates have had any significant impact on trade capacity. However, Turkish producers have had regular increases in trade capacity between 1980 and 2010. The research, therefore, further explores the debate, which still remains related to the impact that inflation has on export capacity, using both qualitative and quantitative research approaches to assess its impact. It also looks at the measures and policies to enhance trade capacity and further evaluates the role of the exchange rate regime to such capacity. Devaluation of domestic currency affects myriad economic parameters; however, the advantage of cost-efficient manufacturing techniques, resource advantages, innovations, and economic convergence have played a decisive role in the Turkish trade regime.

The works of Ali & Li (2016, p. 39) indicate that changes in currency and devaluations historically limited the process of foreign trade, and nations had to employ a custom duty and tariff in an attempt to protect. The thoughts developed here provided the basis for international trade policies and regulations in the later years. So far, nations in the world have come up and embraced the liberalization of economies and free trade zones that allow the exchange of commodities and services in zero import and export tax. Their work, which used the ARDL Approach during the period of 1972-2015, sought to establish the role that imports, exports, and their determinants played in foreign trade in Pakistan. The results indicate that economies that have well-defined competitiveness and comparative advantages accrue the benefits of export policies. While Pakistan gained independence many decades ago, the nation has never sought to diversify its trade partners. The West, especially the Western developed nations, have remained its primary trading partner.

Genc & Artar (2014, pp. 128-141) discussed the continuing debate related to the best foreign exchange rate policies, a debate that has been going on for many decades. The authors believe that markets

function best, and for maximum welfare, markets should be free from any distortions. The study aims at two major objectives: to analyze how the exchange rates impact the import and export of an economically developing country. The paper strongly focuses on the question of whether there is cointegration between effective exchange rates in selected developing nations. To date, many literature reviews have emphasized the significant impact of the exchange rate policy on international trade of a country. This study employed panel cointegration methodology to test data ranging from 1985 to 2012 from the World Bank database. Results from the research showed that effective exchange rates with imports/exports were cointegrated in the long run of developing nations.

Ghauri, et al. (2020, pp. 291-301) research tries to analyze the rank of two econometric models to predict imports and exports for the financial year 2020. Based on the annual data of exports and imports of Pakistan from FY2002 to FY2019, two econometrics models, Box Jenkins (ARIMA) and Auto-Regressive (AR) with seasonal dummies, were used and their results are compared. The study has used the methods of mean absolute error and root mean square error methods to evaluate the accuracy of forecasting. The study presented that the ARIMA or Box Jenkins model does better in the prediction of exports than the AR model with dummies. However, the AR model is seen to be better in the prediction of imports than the Box Jenkins model. The projections show a growth of 1.87% in the exports and a negative difference of -1.61% in the variation of imports for the FY2020. It is recommended to the Pakistani policymakers to implement measures for increasing the exports, for mitigating the trade deficits, for incentivizing the exporters, and for reducing the business costs so that, as against the neighboring economies such as India, Bangladesh, and China, Pakistani exports become competitive.

The paper by Kukaj & Nimani (2022, pp. 279-292) explores the inter-dependence of export, import, and inflation in Kosovo, which is an emerging market country. Time-series data collected from the Kosovo Agency of Statistics on monthly data between January 2010 to December 2020 is used in the research. By using the Toda and Yamamoto methodology of Granger causality, the paper explores the effect of exports and imports on the harmonized consumer price index, which symbolizes inflation. From the results, the paper points out that although import impacts export and export impacts import, there is no direct causation between export and inflation but only import causes inflation and inflation causes import. The study also resorts to Impulse Response Function and variance decomposition to discuss the dynamics between variables in a vector autoregressive model and to assess the degree of variability in the dependent variable. Overall, the results indicate the significant role that imports play in the economic development of Kosovo; hence the paper reaches the conclusion that whatever action the government takes now has to be directed towards reducing the effect of imports on hikes in consumer prices.

The article by Chen et al. (2023, pp. 371-400) analyses the possibility of circumventing currency appreciation as a country's export portfolio matures. The article will assess whether changes in the exchange rate vary their effects on China's exports depending on the level of sophistication, measured by the Product Complexity Index (PCI). The article will use detailed trade data from 1995 to 2018 and covering 1242 export categories. The article finds that exchange rate fluctuations negatively reduce China's export values. Higher sophistication exporters are affected to a lesser extent. Such a trend continues even after controlling for tariffs. Furthermore, as China has been gradually upgrading its export mix, the effects of exchange rates on exports have decreased. In addition, policies that target the exchange rate are having diminishing effects on export values, especially for those in China's more sophisticated exports.

The paper examines the effect of exchange rate volatility with empirical investigation by Subanti et al. (2019). It states that while it's impossible to predict exchange rates, interest in them is still

alive, especially in international economists. This is simply because the existence of exchange rate volatility entails an atmosphere of uncertainty that might be concerning regarding possible profits, and the said can erode the profits to be realized from international trade. Besides that, the research informs that empirical findings from previous studies are inconsistent, where some have found that exchange rate volatility positively increases exports while others have found otherwise. The paper presents empirical evidence from panel data for five ASEAN countries from 2000 to 2016 using panel data methods of pooled least squares, fixed effects, and random effects. Therefore, the research is able to establish that evidence of negative effects of exchange rate volatility on exports is found. The authors asserts that central banks should adopt sound and stable exchange rate policies to create enhanced stability that would increase real export growth.

Suri & Hayati (2022, pp. 42-52) aimed to study the joint effect of the inflation rate, import-export activities, and interest rates on the fluctuations in the rupiah exchange rate against the US dollar from the period of 2010 to 2019. The VAR/VECM methodology was used in the Eviews analysis tool by the research work. The short- and long-term effect of those variables on one another was considered. Results indicated consistent positive effects on the rupiah exchange rate against the US dollar according to hypothesized relationships and theories applied. However, the export activity variable did not behave in the way expected, mainly because of the influence of import on raw material ingredients for the export goods. The interest rate variable was also updated and modified as the interest rate parity theory, which assumes a balance between international and domestic interest rates with a cost to trade off and causes movement of capital.

Malau (2016, pp. 45-56) asserts that relevant information guides the decisions of international traders, especially on key factors such as international prices, exchange rates, and inflation, which dramatically affect the decisions on import and export activities. By developing the Indonesian-China trade scenario before and after the ASEAN-China Free Trade Agreement in a regression study, the study reveals that significant changes in inflation and exchange rates play a dominant role in affecting the import and export activities. After the free trade agreement was established, there is a noticeable diminution in inflation rates coupled with a marked increase in the exchange rates, with the latter taking over a dominant role in shaping the import-export dynamics. This represents an increased sensitivity of the business environment to the exchange rates after free trade, which has significant implications on the competitive frontier of the importers and exporters. The study also reveals a noticeable increase in exports from Indonesia to China after the free trade agreement, showing an upward trend in export volumes and increased bilateral trade between the two countries, which underscores a positive trend. Indeed, the results of the research show sensitive dynamics of the import and export trends vis-à-vis free trade agreements, which clearly proves the importance of a continuous monitoring and analysis of the macroeconomic factors that underlie strategic trade decisions amid the increasingly globalized marketplace.

Jacob, et al. (2021, pp. 1-13) study tries to find the changing significance of exports in the Indian economy since liberalization. The paper tries to extract the variables influencing exports in India, especially focusing on inflation and the exchange rate given the increased importance of exports. The datasets used for this study are available on the RBI Database from 1995 to 2020. The research uses econometric tools, including the Augmented Dickey Fuller (ADF) Test, Johansen's Co-integration Maximum Likelihood Test, and Vector Error Correction Model (VECM), to check the stationary property, long-run relationship between macroeconomic variables and the export variable, and dynamic interrelationship between the variables in the model. The findings in the study have shown the statistical significance of all the variables in affecting the export performance, and both exchange rates and inflation have a positive effect on India's export performance. The policy implication is

crucial here because managing inflation and the exchange rate system may contribute to the export growth and contribute to the wide economic expansion.

The article by Ahmed et al. (2018, pp. 117-130) investigates the effects of inflation and exports/imports in the economy of Pakistan. This article uses monthly data from July 2001 to June 2017 on the Consumer Price Index, imports, and exports. The research uses an error correction model for short-term analysis and the Johansen cointegration for the long-run analysis, while also determining causal directions using the Granger causality analysis. The paper finds that, in the long run, a one percent increase in exports and imports is associated with a 0.63 percent and 0.57 percent increase in CPI, respectively. Further, about 1.18 percent of the inflation rate deviation from the long-term equilibrium is adjusted each year. Variance decomposition analysis shows that exports were found to be innovatively important in the CPI inflation framework. An example is that neither the Granger causality nor the Toda Yamamoto causality tests confirm the hypothesis that monthly fluctuations in exports and imports cause corresponding monthly fluctuations in inflation within the Pakistani economy.

In this paper, Sugiharti (2020) analyses the impact of exchange rate volatility on Indonesia's primary export commodities to its five largest export markets of China, India, Japan, South Korea, and the US. Using a GARCH model and monthly data for the years of 2006 to 2018, the study calculates the volatility of the exchange rates. The study uses the ARDL model to look into the short and long-run impacts of the volatility of the exchange rates on exports to these destinations by applying linear (ardL) and NARDL models of aggregate exports for the corresponding models of nonlinear autoregressive distributed lag models. The paper finds various significant impacts of the exchange rate volatility on the commodity-specific export commodities such as ores, chemicals, rubber, and pulp paper on exports to India, Japan, South Korea, and the US, with plastic goods showing the strongest impacts on exports to China. The author finds robust impacts of IIP on exports to Asian destinations. The paper also points out a mixed relationship between the exchange rate volatility and the Indonesian exports, which exhibit both negative and positive impacts at commodity and destination levels.

Ilmas, et al. (2022, pp. 121-132) argues that international trade encourages economic cooperation between several countries, with direct gains. Since no country can meet all its domestic needs, international trade facilitates international resource sharing, with the global aim of regulating the global availability of resources. This research is based on panel data analysis of five ASEAN countries: Indonesia, Singapore, Thailand, Malaysia, and the Philippines, for 11 years from 2010 to 2020. For this research, two independent variables are used, namely inflation and exchange rates, and their influence on exports. The application of panel data regression analysis has, therefore, given the significant fact that there is a significant negative relationship between inflation, exchange rates, and exports for the ASEAN countries. In particular, an increase in inflation or exchange rates is associated with decreasing exports, putting a mark on the fact that consideration of macroeconomics in international trade practices is crucial.

## 3. Methodology

This research work will undertake a strong methodology to find the connection between exports, inflation, and exchange rates between January 2016 and March 2024. The information used for the research is from Trading Economics, which is a very reliable source of financial information. The data used for the study includes export indicators, inflation indicators, and the exchange rates of the Euro to the Albanian Leke within the said period. Exports are in billion Leke, inflation rates are in percentage points, and the exchange rates indicate the Euro against the Albanian Leke.

The set of data collected is exhaustive and covers the period from January 2016 to March 2024, capturing the significant metrics such as exports, inflation, and exchange rates. This time frame has been chosen with care so that all complex relationships among the variables will be captured completely. Data points captured on a monthly basis allow subtle fluctuations to be captured, thereby giving an analysis of how patterns change in time. Such a quality of data will contribute towards a deeper understanding of the foundation on which decisions are made or strategies are designed to make them. The economic model used to analyze the relationship between exports, inflation, and exchange rates is multiple linear regression. In this model, exports are determined to depend on both inflation and exchange rates. Mathematically, the model is,

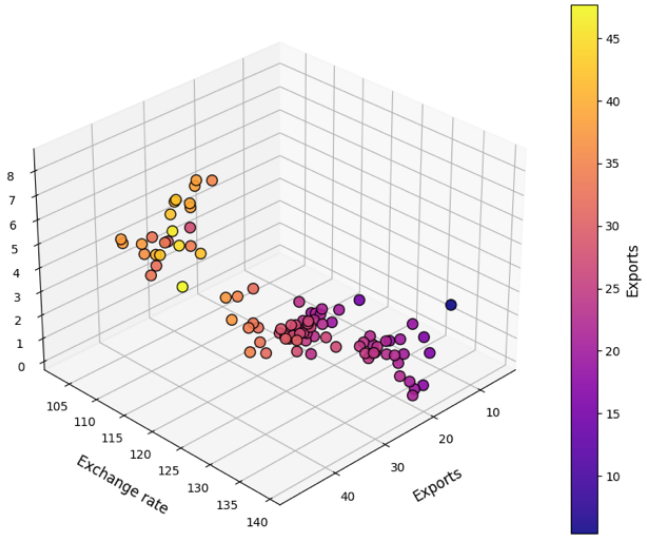
$$\text{Exports} = \beta_0 + \beta_1 \times \text{Inflation} + \beta_2 \times \text{Exchange Rate} + \varepsilon$$

Taking the above-mentioned approach in this interaction between exports, inflation, and exchange rates over the period, we will seek to examine the complex interplay between the three and attempt to uncover underlying forces that affect the performance of exports to enrich our understanding of the economic complexities within this specified framework. We are striving for a comprehensive analysis to not only show the interrelationship between these variables but also to provide important insights that will be acquired in understanding the intricacies of global trade and monetary dynamics to policymakers and stakeholders.

## 4. Results

This section of our analysis goes into a detailed description of the descriptive statistics, correlation patterns, and the underpinnings of our econometric model. Figure 1 gives a graphical representation of the dataset, giving an overview of our research findings.

**Fig 1. Data Visualization**




*Source: Author's calculation*

The data set is 99 observations for exports, inflation, and exchange rates. The average for exports is 28.07 units, which is considered a moderate level of trade activities. Inflation averaged at 2.74% which translates to rather stable but fluctuating economic environment. Exchange rates averaged to 123.89 units, depicting the prevailing monetary value within the context. The respective standard deviations are 7.79 for exports, 1.98 for inflation, and 9.27 for exchange rates, which means the

variables have quite noticeable variability and evidences of different economic conditions. The minimum values are comprised by 5.4 for exports, 0.22% for inflation, and 103 units for exchange rates. This is the minimum value of their respective metrics, while the quartiles give an idea of the spread of the middle 50% of the data. The respective ranges are from 22.6 to 33.45 for exports, from 1.5 to 3.55 for inflation, and from 121 to 133 units for exchange rates. All such data means a comprehensive snapshot of the economic landscape under consideration.

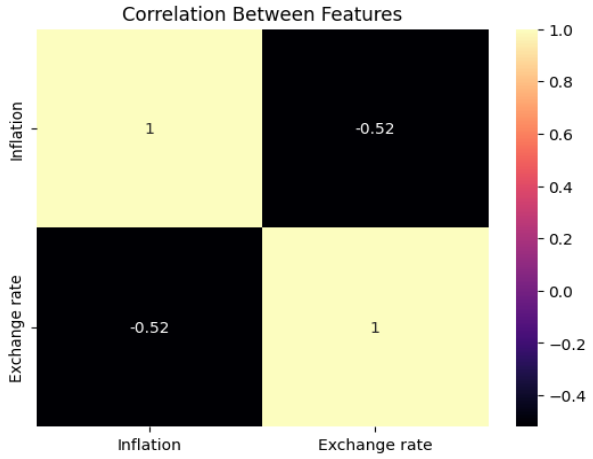
**Table 1. Descriptive Statistics**

| | count | mean | std | min | 25% | 50% | 75% | max |
|---|---|---|---|---|---|---|---|---|
| Exports | 99,00 | 28,07 | 7,79 | 5,40 | 22,60 | 26,70 | 33,45 | 47,70 |
| Inflation | 99,00 | 2,74 | 1,98 | 0,22 | 1,50 | 2,00 | 3,55 | 8,30 |
| Exchange rate | 99,00 | 123,89 | 9,27 | 103,00 | 121,00 | 124,00 | 133,00 | 139,00 |

*Source: Author's calculation*

The correlation matrix shows the relationships between inflation and exchange rates. The value of the correlation coefficient between inflation and exchange rates, -0.51984, is interpreted herein to describe the relationship as moderately negative, which implies the fact that an increase in inflation tends to lead to a decrease in the exchange rate and vice versa. This type of relationship may reflect some sort of economic relationship between inflation and exchange rates and may also showcase a way in which an alteration in one variable might influence the other.

**Fig 2. Correlation Between Features**




*Source: Author's calculation*

Regression analysis in Table 2 reports that the independent and dependent variables are in strong relation with a multiple R of 0.836, which means that there is a positive correlation with the dependent variable. The coefficient of determination, R Square, stands at 0.698, meaning that almost 69.83% of the variance in the dependent variable is explained by the independent variable(s). The adjusted R Square, considering the number of predictors and sample size, is a bit lower, 0.692, though it is still massive explanatory power. The standard error of 4.32 is the mean standard deviation of the dependent variable from the regression line, which gives an indication of the model's fit. With 99 observations, all these statistics point to a well-fit regression model whose predictions of the dependent variable can be reliably made by the independent variable(s).

**Table 2. Model Results**

| Regression Statistics | |
|---|---|
| Multiple R | 0,83566746 |
| R Square | 0,6983401 |
| Adjusted R Square | 0,69205552 |
| Standard Error | 4,3234224 |
| Observations | 99 |

*Source: Author's calculation*

The ANOVA findings in Table 3 supports that the regression model fits well and explains a significant amount of variation in the dependent variable based on the high F-value of 111.12 ($p < 0.001$) that indicates a large amount of variance is explained by the model. In other words, the model accounts for a large part of the total variation, since it has 2 degrees of freedom for the regression. The model explains a lot of the total variation in the dependent variable as the SS of 4154.09. Furthermore, the SS of 1794.43 in the residual sum of squares obtained by using 96 degrees of freedom shows that still a lot of variance has not been explained by the model. So, overall, a large part of 5948.52 of the total variance can be explained by the regression model and the residual and indicates that the model is very important in explaining the variability in the dependent variable.

**Table 3. ANOVA Results**

| | df | SS | MS | F | Significance F |
|---|---|---|---|---|---|
| Regression | 2 | 4154,09061 | 2077,04531 | 111,119591 | 1,0395E-25 |
| Residual | 96 | 1794,4302 | 18,6919812 | | |
| Total | 98 | 5948,52081 | | | |

*Source: Author's calculation*

It has been determined from the findings in Table 4 that both inflation and exchange rate have a significant impact on the dependent variable. The coefficient value of inflation is 2.38 with t-statistics of 9.23; meaning if inflation increases by 1%, then the dependent variable will also rise by about 2.38 units. Conversely, an exchange rate causes negative effects where its coefficient is -0.29 and t-statistics are -5.21; implying that for every 1% increment in exchange rates, this will lead to a decrease in dependent variables by approximately 0.29 units. These associations are statistically significant at very low p-values (6.7994E-15 for inflation and 1.0986E-06 for exchange rate) which shows they didn't occur by chance. The constant coefficient value, i.e., intercept or the value when all independent variables equal zero is given as 57.13 while standard error measures variability of estimated values confidence intervals (Lower 95%, Upper 95%) indicate ranges around which true population parameters fall with about 95% probability.

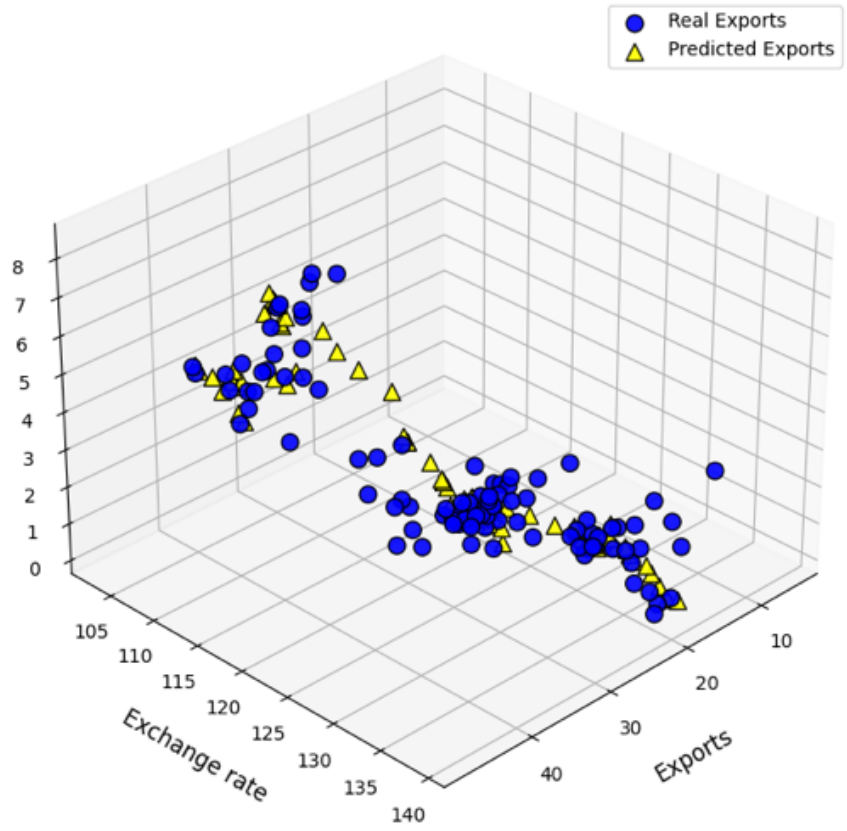
**Table 4. Model Coefficients**

| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95,0% | Upper 95,0% |
|---|---|---|---|---|---|---|---|---|
| Intercept | 57,1262564 | 7,24058866 | 7,88972541 | 4,8585E-12 | 42,7538015 | 71,4987113 | 42,7538015 | 71,4987113 |
| Inflation | 2,38380993 | 0,25833984 | 9,2274189 | 6,7994E-15 | 1,8710094 | 2,89661046 | 1,8710094 | 2,89661046 |
| Exchange rate | -0,2871805 | 0,05516817 | -5,205547 | 1,0986E-06 | -0,3966885 | -0,1776725 | -0,3966885 | -0,1776725 |

*Source: Author's calculation*

Below we have shown a graphical representation, illustrating the real and predicted exports values.

**Fig 3. Real and Predicted Exports**




*Source: Author's calculation*

## 5. Conclusion

In conclusion, the analysis of the dataset of 99 observations portrays a clear picture of the economic reality. The average amount of exports, inflation, and the exchange rate equals 28.07 units, 2.74%, and 123.89 units respectively. This range points to fairly active trade, low, but fluctuating inflations, and prevailing monetary values. The amount of noticeable variability, as measured by the standard deviation, equals 7.79 for exports and 9.27 for exchange rates. It is noticeable and the data hold a vivid picture of the economic situation. The amounts of negative correlation (-0.51984) between inflation and the exchange rate express a moderately inverse connection when finding their fluctuation. The regression analysis shows a huge existence of the dependent variable and independent variables where the R Square equals 0.698, which means that almost 69.83% of variation in the dependent variable variance is explained. Moreover, ANOVA reveals the significance of the modeling; it explains an important portion of the dependent variable variation. Moreover, both the inflation and exchange rates are significant contributors to the dependent variable where for the same percentage increase, it increases the dependent variable by about 2.38 units, and the decrease in the dependent variable is about 0.29 units for the same percentage increase in the exchange rates. These relationships are statistically significant in explaining the variability in the dependent variable.

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