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INDIRECT NON-TRADE BARRIERS IN INTERNATIONAL TRADE AND THEIR IMPACTS ON NON-OIL EXPORTS OF AZERBAIJAN

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1. INTRODUCTION

From economic perspective, the aim of foreign trade is to bring goods and services that are not in the domestic market and to improve the welfare in domestic market through transfers of local products to foreign markets. The ultimate objective is to increase welfare level of individuals, companies, and indirectly society. Foreign trade transactions consist of activities that are carried out to validate the interests of business entities (French, 2016; Reyes-Heroles *et al.*, 2020).

Exports play a pivotal role in fostering economic and social growth through impacting economic expansion and poverty reduction. Exports facilitate international trade and stimulate domestic economic activity by creating employment, production, and revenues. A trade surplus boosts a nation's economic expansion. Increased exports are indicative of high production levels of factories and other industrial facilities, as well as higher employment rates to maintain these factories (Ayob *et al.*, 2023; Ma and Lu, 2011).

To improve international trade performance, governments intervene in foreign trade activities and try keep export and import levels under control through setting policies and rules. The main aim of such interventions is to achieve favourable interests and continuous gains. Therefore, since trade interventions of governments are for the sake of own benefits, their actions might affect the entire world trade (Egan and Guimarães, 2017; Lin *et al*., 2023). Apart from direct government interventions, there could be policies implemented that could indirectly affect export performance of a country and become barriers for foreign trade. Such obstacles are considered non-trade barriers which are elaborated in this study (Mehtiyev and Magda, 2019).

A state intervenes its international trade activities with the aim of increasing employment, ensuring trade balance, protecting infant industries, eliminating market failures that do not meet the conditions of full competition, and improving national security and income distribution (Kinzius *et al.*, 2021). Many countries adopt protectionist trade policies to reduce trade deficit. These objectives are in line with the mercantilist doctrine that the trade surplus is accepted as nationally beneficial. However, in fact, substantial number of criticisms have been made about the foreign trade balance argument. For instance, if a country's economic growth is higher than that of other countries, it may lead to an outward trade deficit. In this case, the foreign trade deficit cannot necessarily be attributed to an unhealthy economy. In addition, policies that reduce imports may adversely affect exports that rely on imported raw materials and intermediate goods (Mehtiyev and Magda, 2022b). Thus, policies aimed at consistently maintaining higher exports than imports may not always be applicable. In protectionist policy implemented economy, consumers are subject to complex and inevitable small individual costs. While the overall economic impact may be significant, the individual cost to each consumer remains relatively low (Grübler and Reiter, 2021).

1.1. Problem statement

Foreign trade activities are being expanded in the recent decades. Since foreign trade has direct impacts on economic growth of a country, governments encourage their exporters as well as the imports which are demanded by citizens (Mehtiyev, 2020). Governments intervene foreign trade with the purpose of keeping it under control. Usually, such interventions ultimately result in trade barriers.

There are several practices that limit the growth of foreign trade volume globally. One of such practices is tax regulations that is also known as tariff. Any other practice applied on foreign trade activities are denominated as non-tariff barriers (NTBs) (Dhingra *et al.*, 2023). Moreover, there are non-trade barriers that indirectly affect foreign trade as well. The impacts of such hindrances are usually hidden as they are not elements of trade activities while the impacts could be significant on trade (Mehtiyev and Magda, 2019). Those barriers and their characteristics have never been differentiated from other NTBs.

Furthermore, impacts of indirect non-trade hindrances collectively have never been studied to best of my knowledge. Even though causality of some variables to trade have been analysed in the past, they have never been recognised as indirect trade barriers. Understanding NTBs from different perspectives can offer new insights into trade policy and economic strategy, shedding light on their wider implications for global trade dynamics and economic development (Tai, 2021; Yoganandan and Vasan, 2022). Therefore, this research examined key NTBs, assessed the collective impact of certain indirect hindrances, and derived conclusions based on the findings by identifying them as indirect non-trade barriers.

1.2. Significance of the study

The inspiration to make this research acquired by the fact that there have not been publications about non-trade barriers. Although there are plenty of research done about tariff and non-tariff barriers, non-trade barriers and their characteristics have never been differentiated (Mehtiyev, 2020). Thus, through this research non-trade barriers and their impacts on economy and international trade were analysed.

Since oil and oil products account for about 90% of all exports from Azerbaijan, the country's export volume is heavily reliant on the oil prices. The primary source of trade surplus is oil exports (Mehtiyev *et al.*, 2021). Oil prices directly affect the exports of Azerbaijan and, by extension, the country's total trade balance. While other factors would not considerably affect Azerbaijan's total exports, the volatility of oil prices is a major effect (Mukhtarov *et al.*, 2021). Stated differently, the impact of indirect non-trade obstacles on oil exports is negligible. Non-oil sector trade is

nevertheless hampered by several non-trade barriers. The study thus seeks to determine the degree to which Azerbaijan's non-oil exports are impacted by non-trade barriers.

1.3. Objectives of the study

The primary objective of the research is to ascertain indirect non-trade barriers, examine their attributes, and evaluate their effects on Azerbaijan's non-oil export performance. The study elaborated and analyzed four primary non-trade barriers: currency rate volatility, country reputation, R&D spending, and subsidies. The focus county for evaluating the effects of non-trade barriers is Azerbaijan.

The other objectives of this research are as follows.

- Identifying non-trade barriers and their characteristics.
- Elaborating non-trade barriers and distinguish them from other trade barriers.
- Illustrating effects of non-trade barriers on economy.
- Analysing significant hindrances among non-trade barriers and drive empirical results.
- Analysing cases where indirect hindrances impacted international trade to connect the research with real life cases.

Furthermore, the research aimed to provide useful insights by drawing several sources of information. Using different types of data, based on below four elements of research, the result was driven in an analytical framework. These approaches were combined to provide a unified basis for analysis.

1. Literature review on the existence of non-tariff barriers.
2. Differentiation of non-trade barriers from other non-tariff barriers (NTBS).
3. Multiple analyses and case study indicating impacts of non-trade barriers.
4. A review of policy implementations on exchange rate volatility.

1.4. Research questions

This study will attempt to answer the following research questions:

- What are non-trade barriers and their characteristics?
- What differentiates non-trade barriers from other trade barriers?
- Does exchange rate volatility impact export performance of Azerbaijan?
- What are the policies to keep exchange rate volatility at minimum in the long-term?
- Do non-trade barriers have any associations with non-oil exports of Azerbaijan?
- Do non-trade barriers impact and cause non-oil export trade balance change?

Apart from the above research questions, preventive actions against non-trade barriers and the ways to get rid of or lower the impacts of non-trade barriers are also questioned in the study with the intention of discussions in the future. Through this, the study opens a path for further research and analysis.

1.5. Hypotheses

Both local and global economic growth are indirectly influenced by non-trade barriers. These hidden trade hindrances are often more complex to assess than traditional barriers such as tariffs and NTBs. However, their impact on the global economy can be even more severe. Given these challenges, the following hypotheses are proposed to explore the extent of non-trade barriers' effects on Azerbaijan's non-oil exports.

Hypothesis 1 - I consider that non-trade hindrances to international trade exist and indirectly affect Azerbaijan's export volume.

Hypothesis 2 - I suppose correlation and regression analyses are insufficient for accurately assessing the impact of non-trade barriers on Azerbaijan's non-oil exports, as they fail to capture complex causal relationships and qualitative factors.

Hypothesis 3 - Exchange rate volatility, particularly currency devaluation, significantly influences Azerbaijan's export performance and inflation dynamics.

Hypothesis 4 - Subsidy incentives, R&D expenditures, and country reputation, as proxies for non-trade barriers, do not significantly impact Azerbaijan's non-oil export volume in the short run.

Hypothesis 5 - Subsidy incentives, R&D expenditures, and country reputation, as proxies for non-trade barriers, significantly impact Azerbaijan's non-oil export volume in the long run.

2. MATERIAL AND METHODS

2.1.Research design

The thesis adopted an inductive methodology to undertake explanatory research. Non-trade factors influencing exports were conceptualized as barriers within the framework of contemporary international trade. Initially, studies were conducted to identify and analyse their impacts in detail.

The main goal of the study was to identify indirect non-trade barriers and their characteristics and analyse their impacts on non-oil export performance of Azerbaijan. In the research, four main non-trade barriers – subsidy, country reputation, research and development expenditure, and exchange rate volatility were elaborated and analysed. Azerbaijan is taken as focus country to assess non-trade barrier impacts.

The research consists of three main parts.

In the first part, literature about trade and barriers is discussed and information related to trade and non-trade barriers on global trade is clearly stated. Indirect non-trade barriers were identified and listed, their characteristics, how they are different than direct trade and tariff barriers were discussed and their impacts in country level and on global economy are illustrated. Non-trade barriers were differentiated from direct barriers based on their engagement level with the trade activities.

In the second part, three main non-trade barriers – subsidy, country reputation, research and development, and their characteristics were discussed from different perspectives, sources and multiple analyses applied to find out their impacts on export performance of Azerbaijan. GNI per capita has been utilized as an indicator of country reputation (Mehtiyev and Magda, 2022a).

In the third part, the impact of exchange rate volatility on non-oil trade was analysed separately. The reason for analysing exchange rate volatility separately, while the other three non-trade barriers were examined together, is that the data sample covered thirty years, with ten years for each variable, allowing for more reliable results (Mackinnon *et al.*, 1999; Phaju, 2023). Moreover, exchange rate volatility had to be evaluated from different perspectives due to its wider impact across various economic dimensions. Thus, different analysis methods were applied to evaluate volatility impacts of exchange rate. To provide a clearer picture of the impacts, graphs and charts were used for the illustrations. The aim in this part was to identify if and how significantly this hindrance impacts the trade balance.

2.2. Data collection

This study utilizes time series data covering the period from 1993 to 2022. The data was sourced from the World Bank database and the State Statistical Committee of the Republic of Azerbaijan. The dataset includes key economic indicators such as R&D expenditures, government-provided subsidy incentives, total exports across various sectors, GNI per capita, and foreign exchange rates over the past three decades. These variables were selected to analyse the relationship between non-trade barriers and Azerbaijan's non-oil export performance.

2.3. Data specifications

In the study, subsidies, country image, R&D expenditures, and exchange rate volatility were chosen among non-trade barriers to be elaborated and analysed. These are some of the main indirect commerce hindrances that could have enormous impact on trade. Total exports of Azerbaijan as means of trade was analysed; however, oil and oil products were excluded. The reason of testing non-oil exports was that Azerbaijan's export volume is significantly dependent on oil as about 90 percent of total exports is oil and oil products. Trade surplus is acquired mainly because of oil exports. Azerbaijan's exports and consequently overall trade balance is directly impacted by oil prices. Thus, testing overall trade in the analysis would lead to completely different direction of results than the research aims. The reason was that obviously oil price volatility plays a crucial role in Azerbaijan's overall export level while other factors would not impact the total exports significantly. In other words, there is very few indirect non-trade barriers which can affect oil exports. However, plenty of non-trade barriers are associated with non-oil trade. The non-trade barriers which were analysed in this research have no or very limited association with oil exports. Therefore, non-trade barriers in non-oil exports were analysed.

Gross National Income (GNI) per capita was used as a proxy for country reputation in the analysis as it is one of the main indicators of country image since it includes the population size of a nation and total income received by the country from its residents and enterprises regardless of whether they are in the country or abroad. Variety of studies suggest that GNI per capita is directly and positively proportional with country image in global arena. General notion is that countries with higher GNI per capita tend to have better perceived reputation (The World Bank, 2014).

2.4. Methodological sequence and rationale

The test was run under the presumption of cointegration between the variables following a Vector Error Correction Model (VECM) estimation. This enables both short- and long-term Granger-causality testing. In the VECM analysis, three out of four main non-trade barriers which the research is based on were analysed. The independent variables in the VECM test are GNI per

capita as a proxy for country reputation, R&D expenditure, subsidy expenses and the dependent variable is non-oil exports. Exchange rate volatility was not included in the analysis due to the sample size which is thirty to get more reliable results. However, exchange rate volatility impacts on trade balance were analysed separately based on an empirical recent historical event in Azerbaijan.

Eviews and R software were used to analyse the data. The main analysis applied to gathered data is Vector Error Correction Model (VECM). This approach facilitated the examination of Granger-causality in both the short and long run. VECM model found whether there is causality between some of non-trade barriers and non-oil exports in Azerbaijan. To find out which causality test to apply and to check the eligibility of the data for VECM test, unit root test and Johansen Cointegration tests were run initially. Through unit root test, the data stationarity was checked and found out that the data is non-stationary at level, however, could become stationary at first difference. Cointegration test was applied to find out if there is a correlation between time series data in the long term. Besides, optimal leg selection was identified through Akaike information to avoid any spurious results. Using the optimal number of lags enabled the test to generate reliable results (Johansen, 1988; Persyn and Westerlund, 2008).

R was employed to run correlation and regression analyses. Through correlation analysis, possible linear association, and the strength of such relationships between each non-trade barrier and non-oil exports has been clarified. Based on Pearson Correlation Coefficient, the strength, and the direction of a linear relationship between two variables were detected. To determine to what extent the non-trade barriers in the study can predict Azerbaijan's exports of non-oil products, Multiple Regression test was used. With the analysis, the extent to which subsidies, GNI per capita, and R&D spending account for the variation in non-oil product exports was determined. Results compared with cointegration and causality test results.

In the third part, to test the hypothesis about exchange rate volatility and trade performance, an analysis of a case study pertaining to Azerbaijan's devaluation and economic reliance on it was conducted. The study indisputably demonstrated how, in 2015 and beyond, devaluation affected international commerce and the trade balance. The main purpose of this case study was to demonstrate how devaluation affects Azerbaijan's export volume. The Azerbaijan Statistics Committee database provides historical import and export data for Azerbaijan, which was used to further develop the study. The study presented the responses of the Azerbaijani Central Bank and other authorities in a clear and concise manner, together with the resulting changes in the trade balance.

Case study review about exchange rate volatility was followed by policy analysis. Even though exchange rates and international trade have been the subject of numerous studies, this research highlighted various facets of international trade in terms of exchange rate volatility in connection to non-oil trade in Azerbaijan and policies implemented to avoid FX irregularity impacts to economy, especially to foreign trade.

In addition, policy analysis was conducted to highlight and assess immediate actions taken by the Central Bank after the devaluation in 2016 and the initiatives implemented by authorities to keep the volatility stable. The analysis also emphasized the new policies that are necessary to improve FX stability and increase non-oil trade and open a path for further policy discussions. Monetary policy, inflation, devaluation, exchange rate volatileness, and export performance of Azerbaijan were all covered in the case study and policy discussions.

2.5. Model validation

Before applying the tests, several prerequisites were examined to validate the use of the Vector Error Correction Model.

2.5.1. Optimal lag selection

A lag is the value of a variable in a previous time. In other words, time series is shifted by the lag value before comparing it with itself, which is mainly applied in autocorrelation, which is comparing time series data with itself, whereas correlation tests how two time series are similar. Selecting a higher order lag length than the true lag length is likely to causes an increase in the mean-square forecast errors of the model and that lag length generates autocorrelated errors. Therefore, we ran tests to identify optimal number of lags in our model.

There are a few ways to identify optimal number of legs to run cointegration and VECM tests. Lag length is frequently selected using an explicit statistical criterion such as the AIC or SIC.

One of the ways is identify this is Akaike Information Criterion (AIC). Lower the AIC value, the better the model (Franses, 2021). Below, Table 1 illustrates optimal number of lag selection criteria. Based on lag length test result, the optimal number of lags to be used is four. Besides AIC value which our model prioritises, the other values such as Final Prediction Error (FPE), and Hannan-Quinn information criterion (HQ) suggests lag selection of four as well. However, we will apply three lags in VECM analysis. Since the model of the research is VECM, three lags will be applied in further analysis both in Johansen Cointegration and VECM tests. VAR Lag Order Selection Criteria indicates four lag selection is optimal. Because the VECM model is rewriting the VAR by differencing and losing one lag, we must follow p-1 for lag selection. So, if the Vector Autoregression (VAR) process at level, suggests four lags, applying three lags in Johansen

Cointegration and VECM tests is optimal. VAR is specified for original variables, while in the VECM test variables are in their first difference. In other words, VAR(p) model has an equivalent representation as a VEC(p-1) model. The VECM model is estimated using symmetric lags and the same lag length is used for all variables in all equations of the model. VECM model is characterized by their order, which refers to the number of earlier time periods the model will use (Pesaran *et al.*, 2000; Prüser, 2023).

Table 1. VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1256.234	NA	1.48e+37	96.94105	97.13460	96.99678
1	-1174.138	132.6162	9.36e+34	91.85676	92.82452*	92.13544
2	-1150.974	30.29171*	5.96e+34	91.30566	93.04764	91.80729
3	-1130.182	20.79121	5.43e+34	90.93711	93.45330	91.66168
4	-1100.622	20.46483	3.60e+34*	89.89400*	93.18441	90.84152*

Source: Author's computations

*Indicates lag order selected by the criterion

LR: sequential modified LR test statistic

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwartz information criterion

HQ: Hannan-Quinn information criterion

2.5.2. Conversion to stationary data

The other prerequisite to apply VECM model is stationary data. A common presumption in numerous time series methodologies is the requirement for data stationarity. A stationary process is characterized by the constancy of its mean, variance, and autocorrelation structure, which remain unchanged over time. A time series is deemed stationary when its statistical properties or moments, such as mean and variance, remain constant over time. On the contrary, non-stationarity characterizes a time series whose statistical properties undergo changes over time (Diniz *et al.*, 2020; Liang and Schienle, 2019; Pesaran *et al.*, 2000).

In the data of the thesis, all the variables are non-stationary at level. The data will need to be converted into stationary variables. First differences will be applied to determine whether the data becomes stationary. Correlogram and Q-statistics are used to examine the data.

Correlogram series statistics were run to clarify whether the data is stationary or not. Ten lags were included, which is the recommended optimal number of lags in the Correlogram test due to the sample size. The guideline is to use one third of sample size. Since the sample size is thirty in the analysis, the optimal number of lags is ten.

The null hypothesis for the test is variables are stationary. Below is the result of Correlogram time series test at level. All p values are less than 0.05 which means we need to reject the null hypothesis. Consequently, we consider our data is non-stationary at level and move on to next phase to check the data in first difference.

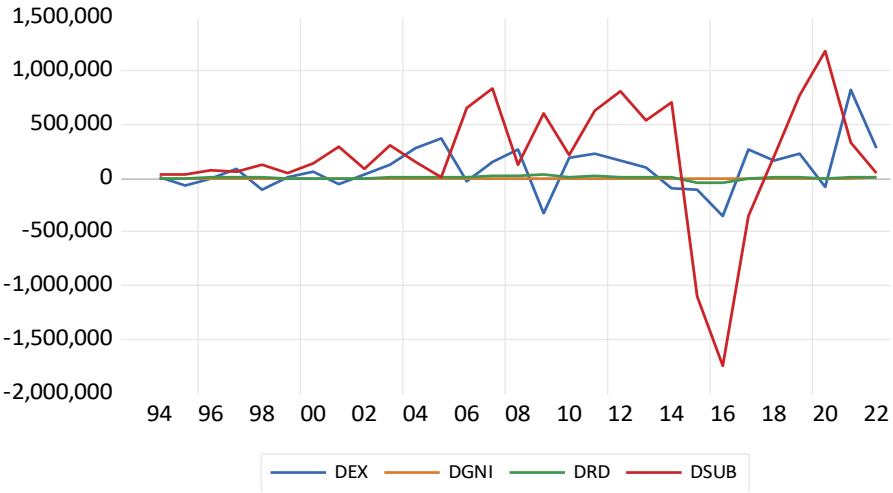
Table 2. Correlogram time series test at level

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.831	0.831	22.886	0.000
		2	0.678	-0.044	38.637	0.000
		3	0.600	0.157	51.446	0.000
		4	0.501	-0.108	60.715	0.000
		5	0.420	0.043	67.504	0.000
		6	0.363	-0.005	72.765	0.000
		7	0.337	0.101	77.498	0.000
		8	0.263	-0.173	80.508	0.000
		9	0.167	-0.078	81.783	0.000
		10	0.056	-0.204	81.933	0.000

Source: Author's computations

Below graph illustrates the data after converted to first difference. The trend vastly disappeared, and the deviation happens around zero which is indicator of stationary data.

Figure 1. Stationary data illustration

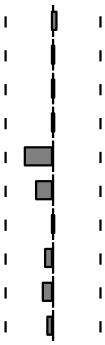
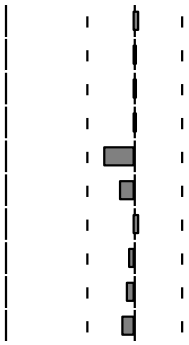


Source: Author's estimates

Below is the result of Correlogram test at first difference. At first difference, 10 lags is used again. All the p values for all ten lags are more than 0.05 which means we cannot reject the null hypothesis

which is “variables are stationary”. Moreover, the Autocorrelation and Partial Correlation values gradually going down in majority of the cases when the number of lags increased. Additionally, the spikes of Autocorrelation and Partial Correlation values are happening withing the limits of the model as illustrated. This is another indicator of stationary data. Furthermore, Ljun-Box (LB) statistics indicates that the data is stationary after first difference. LB is taking the last lag p value to analyse the data is stationary or not. Based on Correlogram test results, we can conclude that the variables are non-stationary at level, however, stationary at first differenced. Having the data stationary at first difference allows us to apply VECM test.

Table 3. Correlogram time series test at first difference

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.034	0.034	0.0367	0.848
		2	0.024	0.023	0.0564	0.972
		3	0.020	0.019	0.0706	0.995
		4	0.016	0.014	0.0802	0.999
		5	-0.228	-0.230	2.0257	0.846
		6	-0.116	-0.108	2.5530	0.862
		7	0.015	0.033	2.5621	0.922
		8	-0.059	-0.047	2.7105	0.951
		9	-0.066	-0.056	2.9075	0.968
		10	-0.037	-0.086	2.9711	0.982

Source: Author’s computations

In this section, we developed stationary variables from non-stationary variables with which we can apply time series model - VECM. When we convert and take first differenced, the data became stationary which is eligible for using in time series model such as VECM model. The variables are denominated as d(EX), d(GNI), d(RD), and d(SUB) after first differenced. The initial difference in a time series signifies the sequence of alterations from one period to the next one. In other words, If Y_t represents the value of the time series Y at period t, the first difference of Y at period t is defined as $Y_t - Y_{t-1}$.

3. RESULTS

3.1.Assessment of subsidy, country image, and R&D expenditure analyses

In this part, econometric analyses are applied to find out associations and causal relationship between non-trade barriers and non-oil exports using the time series data for the period of 1993 – 2022. Three main non-trade barriers - subsidy implementations, R&D expenditures, and GNI per capita as a proxy for country image are tested. Johansen's cointegration and Vector Error Correction Model (VECM) causality tests were applied to identify the short and long-run connection and causality direction. Moreover, correlation and multiple regression analyses were applied to test any other associations between the variables.

3.1.1. Cointegration test

A cointegration test is used to determine whether there exists a long-term correlation among multiple time series. Cointegration tests are designed to recognize situations where two or more non-stationary time series are integrated in a manner that prevents them from deviating from equilibrium over the long term. These tests serve to assess the extent of sensitivity of variables to the same average price over a specified period.

The other advantage of Johansen Cointegration test is that it circumvents the challenge of selecting a dependent variable and mitigates problems arising when errors are propagated from one step to the next. Consequently, Johansen Cointegration test can identify multiple cointegrating vectors, making it a more appropriate method than the Engle-Granger method for multivariate analysis (Johansen and Juselius, 1990).

In this part, Johansen Cointegration test has been applied to check whether the variables are cointegrated or having long-run association. In other words, cointegration test is used to analyse whether there is a correlation between several time series in the long term. The Johansen test is used to test cointegrating relationships between several non-stationary time series data gathered. The number of lags used in this test is three. The test is applied at level (original data) but not at first difference which is the requirement for Johansen Cointegration test. The other prerequisite to apply Cointegration test is that data must be integrated of the same order which means all variables become stationary at first difference (Johansen, 1988). Through Johansen Cointegration test, original data is analysed to find out whether there is cointegration and based on the outcome, time series model is identified for causality analysis. Below is the outcome of Johansen Cointegration test for the gathered data. Null hypothesis is "there is no cointegration".

Table 4. Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.771983	73.42884	47.85613	0.0000
At most 1 *	0.527013	34.99216	29.79707	0.0115
At most 2 *	0.443553	15.52629	15.49471	0.0495
At most 3	0.010921	0.285501	3.841465	0.5931

Source: Author's computations

Trace test indicates three cointegrating eqn(s) at the 0.05 level.

* Denotes rejection of the hypothesis at the level 0.05

** Mackinnon-Haug-Michelis (1999) p-values

Table 5. Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.771983	38.43668	27.58434	0.0014
At most 1	0.527013	19.46588	21.13162	0.0841
At most 2 *	0.443553	15.24079	14.26460	0.0349
At most 3	0.010921	0.285501	3.841465	0.5931

Source: Author's computations

Max-eigenvalue test indicates two cointegrating eqn(s) at the 0.05 level.

* Denotes rejection of the hypothesis at the level 0.05

** Mackinnon-Haug-Michelis (1999) p-values

As illustrated in the above tables, both Trace Statistics and Max-Eigen Statistics suggest the existence of cointegration equations for the data. MacKinnon-Haug-Michelis (1999) p values proves these suggestions (Mackinnon *et al.*, 1999). At None* assuming there is no cointegration or error term, the p value is less than 0.05, therefore, the assumption must be rejected. Proceeding to the subsequent stages of analysis in detail, the p-values in the Trace test were below 0.05 for three cointegrating equations, while the Maximum Eigenvalue test identified two cointegrating equations, leading to the rejection of the null hypothesis of no cointegration. This indicates that VECM rather than VAR could be applied to analyse the data. For determining the number of cointegrating equations to be used in VECM test, the model will rely on Trace statistics. Trace

statistics found out three cointegrating equations, while Max-Eigen statistics indicated two. Since Trace statistic considers all the smallest eigenvalues, it holds more power than the maximum Eigenvalue statistic (Kasa, 1992; Serletis and King, 1997). In addition, Johansen and Juselius (1990) recommend applying Trace statistic results in case of conflicting results on the number of cointegrating equations between Trace and Max-Eigen statistics. Therefore, the result of Trace statistics of three cointegrating equations will be used as input in VECM test. The guiding principle suggests that in case of cointegration existence between variables, VECM model from time series can be applied. Otherwise, we would run Vector Autoregressive Model (Carlucci and Montaruli, 2014).

3.1.2. Vector Error Correction Model (VECM) Test

The Granger causality test is a statistical hypothesis test used to assess whether one time series provides valuable information for forecasting another time series. Vector Error Correction Model falls within the realm of multiple time series models, often applied to data where the underlying variables share a long-run common stochastic trend, a phenomenon known as cointegration. VECM represent a theoretically driven method that is used to estimate both short-term and long-term effects of one or multiple time series on another. The term "error correction" is tied to the idea that the deviation from a long-run equilibrium in the last period, referred to as the error, influences the short-run dynamics. Consequently, VECM directly estimate the speed at which a dependent variable returns to equilibrium following changes in other variables.(Pesaran *et al.*, 2000; Zou, 2018).

The Vector Error Correction Model is a type of cointegrated Vector Autoregressive (VAR) model that considers the cointegrating relations among the variables. The concept involves a VAR model of order p - 1 on the differences of the variables, along with an error-correction term derived from the established cointegrating relationship. In this part, short-run and long-run causality of the variables will be analysed using VECM (Haslbeck *et al.*, 2020; Prüser, 2023).

The Granger-causality test was conducted to investigate the causal connection between non-oil exports and various indirect trade barriers. The test is executed following a Vector Error Correction Model (VECM) estimation, assuming cointegration between variables. This approach facilitates the examination of Granger-causality in both the short and long run. The chi-squared statistic is employed to determine short-run causality, while long-run causality is assessed based on the significance of the Error Correction Term (ECT) (Carlucci and Montaruli, 2014; Nguyen *et al.*, 2021).

To apply VECM, data must be stationary and cointegration must exist. The data used in the analysis is integrated of same order, at level they are non-stationary, however, when converted to first difference, they became stationary. This is a prerequisite of VECM; thus, it is verified that the model could be applied.

3.1.3. Long-term causality test

The equation of the VECM analysis is as follows from which residual of the cointegrating equations can be derived when EX is dependent variable.

D(EX) = C(1)(EX(-1) - 0.346557945264*SUB(-1) - 23564.274973) + C(2)*(GNI(-1) - 0.00124809812887*SUB(-1) + 344.163888482) + C(3)*(RD(-1) - 0.0238080880942*SUB(-1) + 1217.52656499) + C(4)*D(EX(-1)) + C(5)*D(EX(-2)) + C(6)*D(EX(-3)) + C(7)*D(GNI(-1)) + C(8)*D(GNI(-2)) + C(9)*D(GNI(-3)) + C(10)*D(RD(-1)) + C(11)*D(RD(-2)) + C(12)*D(RD(-3)) + C(13)*D(SUB(-1)) + C(14)*D(SUB(-2)) + C(15)*D(SUB(-3)) + C(16)*

Using the equation estimation with Least Squares method (Gauss-Newton/Marquardt steps), the probabilities is identified to prove causality.

Table 6. Least Squares method probabilities (Gauss-Newton/Marquardt steps)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.115270	0.607606	0.189713	0.8533
C(2)	-1377.492	682.5165	-2.018254	0.0712
C(3)	40.01890	31.12152	1.285891	0.2275
C(4)	-0.750782	0.743651	-1.009589	0.3365
C(5)	-0.567981	0.619075	-0.917468	0.3805
C(6)	-0.748042	0.471807	-1.585484	0.1439
C(7)	1085.281	587.0895	1.848579	0.0943
C(8)	572.6403	442.1612	1.295094	0.2244
C(9)	440.8241	273.0039	1.614717	0.1374
C(10)	-19.39193	21.99359	-0.881708	0.3986
C(11)	-15.74214	16.64236	-0.945908	0.3665
C(12)	2.731270	11.32552	0.241161	0.8143
C(13)	-0.365087	0.259984	-1.404267	0.1905
C(14)	-0.414615	0.292208	-1.418901	0.1863
C(15)	-0.375243	0.221839	-1.691512	0.1216
C(16)	213904.5	70208.95	3.046684	0.0123

R-squared	0.80316	Mean dependent var	101319.3
Adjusted R-squared	0.507899	S.D. dependent var	234021.1
S.E. of regression	164165.5	Akaike info criterion	27.1304
Sum squared resid	2.70E+11	Schwarz criterion	27.90461
Log likelihood	-336.6951	Hannan-Quinn criter.	27.35334

Source: Author's computations

R squared in VECM model indicates to what extent the model is performing or how well the predictions match the real results. A higher R-squared means the model is doing a better job predicting (Khan, 2023). In the model, the R-squared is 0.8 (more than 80 percent) which means the predictions match the real results.

Speed of adjustment towards long run equilibrium (C1) is positive and the probability is more than 0.05 which is not significant. To consider the long-run causality in VECM model, the speed of adjustment must be negative, and the probability must be significant (Shojaie and Fox, 2022). Thus, there is no long-run causality. The analysis shows that there is no long run causality from the independent variables to dependent variable. In other words, GNI per capita, R&D expenditure, and subsidy expenses have no influence on non-oil exports in Azerbaijan. In other words, there is no long-run causality running from GNI per capita, R&D expenditure, and subsidy expenses as proxies for non-trade barriers to non-oil exports.

3.1.4. Short-term causality test

In this section, short term influence from GNI per capita, R&D expenditure, and subsidy expenses on non-oil exports in Azerbaijan is tested. Wald statistics is applied to analyse short-run causality between each independent variable with dependent variable. The Wald test (Wald Chi-Squared Test) is a parametric statistical measure to confirm short term causality and whether each independent variable present in a model is significant or not (Friston *et al.*, 2014; Rosoł *et al.*, 2022).

Wald test result of GNI per capita independent variable found out the Chi-square probability is 0.0765. Thus, null hypothesis cannot be rejected since it is more than 5 %. Therefore, it can be concluded that there is no short-run causality from GNI per capita to export.

Null hypothesis: C (7) = C (8) = C (9) = 0

Table 7. Wald test 1

Test Statistic	Value	df	Probability
F-statistic	2.287111	(3, 10)	0.1408
Chi-square	6.861334	3	0.0765

Normalized Restriction (= 0)	Value	Std. Err.
C(7)	1085.281	587.0895
C(8)	572.6403	442.1612
C(9)	440.8241	273.0039

Source: Author's computations

To check short term causality from RD to EX, equation for coefficient diagnostics of Wald test is as follows:

Null hypothesis: C (10) = C (11) = C (12) = 0

In this scenario, we cannot reject the null hypothesis. As per the Wald test result, we can say that there is no short run causality from R&D expenditure to non-oil exports.

Table 8. Wald test 2

Test Statistic	Value	df	Probability
F-statistic	0.786533	(3, 10)	0.5283
Chi-square	2.359598	3	0.5012

Normalized Restriction (= 0)	Value	Std. Err.
C(10)	-19.39193	21.99359
C(11)	-15.74214	16.64236
C(12)	2.731270	11.32552

Source: Author's computations

The coefficients to test short run causality between SUB and EX are C13, C14, and C15. Coefficient diagnostic equation is formulated as follows:

Null hypothesis: C (13) = C (14) = C (15) = 0

Table 9. Wald test 3

Test Statistic	Value	df	Probability
F-statistic	1.409156	(3, 10)	0.2969
Chi-square	4.227467	3	0.2379

Normalized Restriction (= 0)	Value	Std. Err.
C(13)	-0.365087	0.259984
C(14)	-0.414615	0.292208
C(15)	-0.375243	0.221839

Source: Author's computations

3.1.5. Model evaluation

To check whether the model has any statistical error or not, Serial Correlation LM test is applied. Serial correlation can occur when the assumptions of a model regarding causality are inaccurate.

Errors emerge in a model when it lacks full precision, leading to variations in outcomes during real-world applications. If error terms from different and usually adjacent periods are correlated, the error term is serially correlated. In time-series analyses, serial correlation occurs when errors linked to a specific period persist into subsequent periods (Tank *et al.*, 2022).

Table 10. Breusch-Godfrey serial correlation LM test

Null hypothesis: No serial correlation at up to three lags

F-statistic	0.272306	Prob. F(3,7)	0.8436
Obs*R-squared	2.717165	Prob. Chi-Square(3)	0.4373

Source: Author's computations

As per the Serial Correlation LM test result, since the chi-square p value is 0.44, there is no serial correlations in the model which means that there is no statistical error in terms of serial correlation to predict current values through past values.

The other way to check statistical error in the model is heteroskedasticity test. If there is heteroscedasticity in the data, the variance differs across the values of the explanatory variables, thereby violating the underlying assumption. As a result, estimator will be unreliable due to bias. Thus, it is imperative to test for heteroscedasticity and apply corrective measures in case of presence. Heteroskedastic describes a situation where the variance of the residual term or error term in a model exhibits wide variations. In contrast, homoscedastic refers to a condition where the variance of the error term in a model remains constant. One of the ways to detect heteroscedasticities is Breusch-Pagan test (Halunga *et al.*, 2017).

Breusch-Pagan-Godfrey heteroskedasticity test is applied and below is the result.

Table 11. Heteroskedasticity test: Breusch-Pagan-Godfrey

Null hypothesis: Homoskedasticity

F-statistic	0.654425	Prob. F(16,9)	0.7799
Obs*R-squared	13.98200	Prob. Chi-Square(16)	0.6001
Scaled explained SS	2.762784	Prob. Chi-Square(16)	0.9999

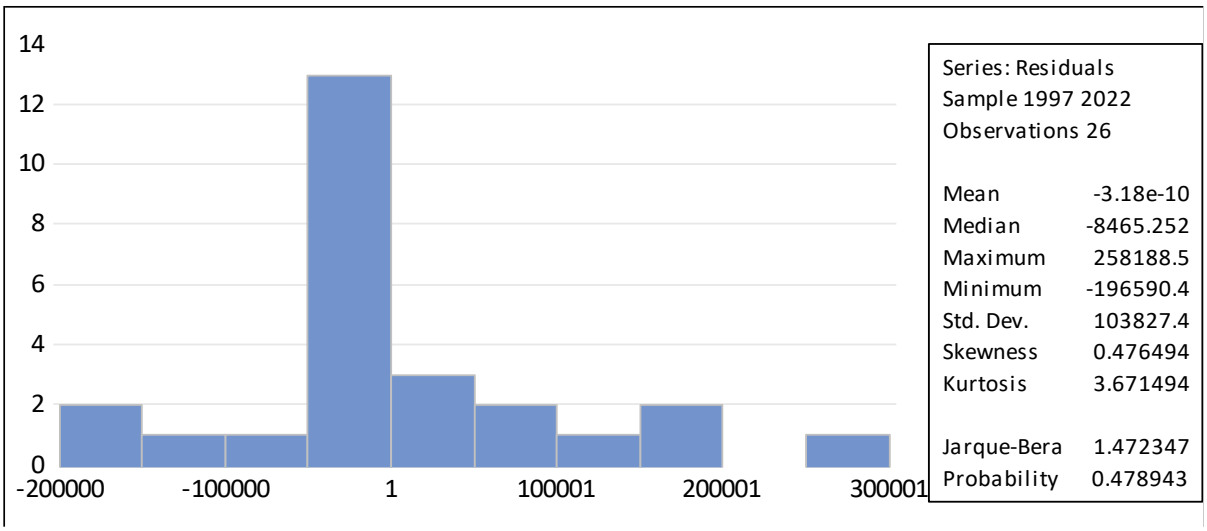
Source: Author's computations

As per Breusch-Pagan-Godfrey heteroskedasticity test results, heteroskedasticity does not exist. Chi-square probability which is 0.6 is the proof, therefore, existence of heteroskedasticity is

rejected and homoskedasticity accepted. Thus, model is homoscedastic which refers to a condition in which the variance of the error term in the model is constant.

Last but not least, Jarque-Bera statistics test is applied to check distribution of residuals. The Jarque–Bera statistic examines skewness and kurtosis simultaneously. In the context of single-equation results, it tests the null hypothesis that the disturbances for that specific equation follow a normal distribution. In other words, it checks whether residuals of the model is normally distributed (Chen and Kuan, 2003).

Figure 2. Jarque-Bera statistics



Source: Author's estimates

The result indicates that the Jarque-Bera (J-B) value is 1.47 and the probability of the test is 48 percent. The critical value for J-B is 5.99 and the confidence level is 5 percent. Since J-B value is less than critical value and the p-value is more than 0.05, it can be concluded that the data follows normal distribution.

3.2.Assessment of subsidy, country image, and R&D expense in conventional ways

3.2.1. Correlation assessment

In this section correlation analyses of non-oil product exports with R&D expenditure, GNI per capita, and subsidies expenditure are discussed respectively. Correlation coefficients are used to measure the strength and direction of a linear relationship between two variables. Using the below equation, model is formulated to find out the correlation coefficient (Akoglu, 2018).

$\rho xy = Cov(x,y) / \sigma x \, \sigma y$, where:

ρxy is Pearson product-moment correlation coefficient;

Cov (x,y) is covariance of variables x and y;

σx is the standard deviation of x;

σy is the standard deviation of y.

Based on the formulated calculations for each indirect barrier analysed in relation to non-oil exports, the findings are as follows:

R&D expenditure – 0.81

Subsidy transfers – 0.92

GNI per capita – 0.88

The results obtained as regards the relationship between non-oil products export and subsidies, R&D expenditures, and GNI per capita indicates that there is positive correlation in all three cases. Therefore, above mentioned independent variables are directly proportional with non-oil product exports and have association with the level of total non-oil exports of Azerbaijan.

3.2.2. Assessment of regression analysis

In this part, regression analysis was applied to find out to what extent independent variables (indirect barriers) can predict the non-oil product exports of Azerbaijan. Non-oil exports is taken as dependent variable while subsidies, GNI per capita, and R&D expenditures are categorized as independent variables. In the sample, the data of last 30 years (1993-2022) is analysed. Through the analysis, how much variability in export of non-oil products is explained by subsidies, GNI per capita, and R&D expenditures is found out.

Table 12. Regression statistics

Regression Statistics	
Multiple R	0.970863983
R Square	0.942576873
Adjusted R Square	0.935951127
Standard Error	188999.7717
Observations	30

Source: Author's computations

First, the analysis finds out that the significance value of our model (p value) is 0.000. The confidence level in the analysis is 95%. The model is statistically significant since the p value is less than 0.05. Given the p value is very close to zero, the null hypothesis is rejected. In other words, GNI per capita, subsidy transfers, and R&D expenditures predict non-oil products exports. The significance model of the analysis is shown below:

F (3, 26) = 142.260, p = 0.000,

where 3 is degree of freedom of regression (k-1) and 26 is the residual (n-k) degrees of freedom of analysis. And total degree of freedom of the analysis is 29 which is n-1. 142.260 is the F value of the analysis.

Second, with finding adjusted R square, we can see the comparison of the explanatory power of regression model that contain different predictors. Adjusted R square is 0.94 which is indicating model accuracy measure. Adjusted R square improved by the added predictor variables (Sperandei, 2014). In other words, 94 percent variance in the target field which is exports of non-oil products is explained by the predictor variables which are GNI per capita, subsidies, and R&D expenditures.

3.3. Comparison of causality and traditional analyses

Correlation and regression analysis have historically been used to determine relationship between variables. These historical approaches measured associations between variables through linear relationship. Especially, with non-stationary data the correlation and regression analysis yield spurious results. Spurious correlations are while two time series data lack causal relationship, they are correlated. In other words, correlation and regression do not mean causation (Johansen, 2011, 2012).

Azerbaijan specific findings of the analysis suggested that subsidies, GNI per capita as a proxy for country image, and R&D expenditures have some degree of associations with non-oil exports, however, they do not cause non-oil export level change. The thesis demonstrated that each above-mentioned variable is highly correlated with non-oil exports through correlation analysis, and through regression analysis, it was proven that these variables are collectively able to predict the variability in non-oil exports. However, these indirect barriers do not cause non-oil export balance change neither in the long or short run in Azerbaijan.

3.4. Assessment of exchange rate volatility analyses

This part of the thesis is encouraged by the discussed literature. Although there have been many studies conducted about exchange rates and foreign trade, this analysis shows different aspects of foreign trade in terms of exchange rate volatility relation to non-oil trade in Azerbaijan. In the literature, monetary policy, exchange rate volatility, inflation, devaluation are discussed. Hypotheses are elaborated through the literature and analysed through case study and policy discussions.

3.4.1. Case study overview

For the first time since 2006, manat (AZN), the currency of Azerbaijan, depreciated against the US dollar in February 2015. The country's official currency, the manat, was worth 33.86 percent more when the exchange rate was fixed before the depreciation happened. Before the devaluation, the exchange rate of AZN against USD was 0.78 (AZN/USD) and it became 1.20 (AZN/USD) with the devaluation in 2015. In the beginning of 2016, for the first time in its long history as a pegged currency, the manat switched to a floating exchange rate. As a result, manat faced another devaluation which resulted in losing its value by 52 percent in a few weeks after the announcement (Mukhtarov *et al.*, 2021).

3.4.2. Reasons of devaluation

65 percent of Azerbaijan's total revenue in 2015 came from State Oil Fund of Azerbaijan (SOFAZ). The monthly oil export revenue fell as the oil prices fell, even though the monthly exports had not decreased. Given that the state was mostly dependent on the export of natural gas and oil, this had a detrimental impact on the economy of Azerbaijan. Nevertheless, the government was able to benefit from the situation immediately. Prior to the devaluation of manat, the state was required to contribute USD 2.91 billion in oil revenue to the overall budget; nevertheless, this sum only amounted to USD 2.15 billion. In this instance, the government was able to save USD 760 million solely from direct oil income (CESD, 2015).

Azerbaijan's economy is heavily reliant on oil due to the abundance of natural resources, particularly crude oil, in the nation. In 2015, there was a notable decline in oil prices, with an average price drop of 48% when compared to 2014. Given that the economy is primarily dependent on oil exports, this was the primary cause of the economic downturn. The Azerbaijani Central Bank implemented regulatory measures aimed at maintaining and enhancing the nation's economic stability. The currency was devalued as a result (Hasanov *et al.*, 2018).

Expenses and expenditures of SOFAZ are expressed in manat, even though its revenue is expressed in US dollars. Thus, the fund was able to save billions of US dollars in 2015 due to the devaluation of the currency, and SOFAZ was able to meet its budgetary goals for the same year.

Following the Central Bank's announcement of the devaluation, there was a sharp spike in the demand for US dollars across the whole nation. Investors withdrew their savings from the bank as a result, and the percentage of manat deposits fell from 63 to 45 percent. The Central Bank would have lost all its reserves in a matter of months if the devaluation had been delayed any further. Consequently, devaluation prevented long-term decrease of Central Bank’s savings (Aliyeva, 2020; Yildirim and Arifli, 2021).

Furthermore, Central Bank of Azerbaijan (CBA) reserves decreased from $13.8 billion at the end of 2014 to $4.3 billion by the end of June 2015, due to sales of foreign exchange. Moreover, from 23 percent of the non-oil GDP in 2005 to 63 percent in 2015, the share of total credit has nearly tripled. Credit to households climbed from 6.5 to 24.5 percent of GDP (not including oil) throughout the same time. Construction sector and mortgages were the main components of the credit growth.

3.4.3. Impacts of devaluation on the economy of Azerbaijan

Several unfavourable shocks have hampered Azerbaijan's economic growth. Reduced oil prices, weak regional expansion, exchange rate devaluations swiftly diminished the substantial current account surplus the nation had during the oil boom years.

The government has taken several actions. The CBA depreciated the manat and switched to a managed float exchange rate since reserves decreased significantly and external shocks grew more severe. In addition to implementing new macroprudential lending limits on dollar loans, the authorities shut troublesome banks. Moreover, to protect vulnerable populations and encourage growth, public sector pay, total pensions, and social protection expenses have all increased. The CBA tightened its monetary policy in 2016 and increased the refinancing rate by 1,200 basis points to 15 percent to reduce inflationary pressures. Although the devaluations harmed bank balance sheets and boosted dollarization, they aimed increasing competitiveness.

The economy's performance was damaged because of series of shocks. Weak regional growth, falling oil prices, and currency fluctuations swiftly eliminated a sizable current account surplus. The Central Bank (CBA) devalued the currency by 25 percent in February 2015 and another 32 percent in December 2015 to maintain reserves. CBA moved to a managed floating exchange rate regime. Growth slowed to 1.1 percent in 2015 and 3.4 percent in the first half of

In manat terms, the GDP increased because of the Azerbaijani currency's devaluation versus the US dollar. However, in the short run, the country's economy did not much improve because of the increase in exports of several non-oil products. As a result, agriculture industry specifically, cotton have received more attention. The government offers subsidies and other incentives to farmers to boost exports and growth.

The steep increase in import prices resulting from the manat's value correction resulted in inflation. There was significant reduction in private consumption expenditure in 2015 due to the high base year for household consumption, which was officially estimated to have increased by 8 percent in 2015 and 2016. To encourage both domestic and foreign investment in the economy, the Central

Bank has been driving up the inflation rate. The inflation rate went up by three times in 2016 in comparison to 2015 and was reported 12.4 percent (Mukhtarov *et al*., 2019).

Near-term economic prospects was weak and after policies implemented, growth was slow in the next few years as expected. However, inflation gradually decreased. Significant fiscal surpluses during the oil boom years were replaced by deficits in the following three years. Due to the devaluations, which restricted imports and encouraged non-traditional exports, the account balance improved. To ensure sustainable growth, the authorities developed strategy to rapidly diversify the economy by creating a more business friendly environment and pursuing structural reforms.

Because 70 percent of the national debt of Azerbaijan was held in foreign currencies, the debt sustainability analysis (DSA) showed that the debt to GDP ratio increased from 11% in 2014 to roughly 38% in 2016 because of the devaluations and borrowing plans. CBA reserves went down from $13.8 billion at end of 2014 to $4.3 billion by the end of June due to foreign exchange (FX) sales. CBA tightened monetary policy to reduce inflationary pressures.

The economy continued to adjust, putting pressure on Azerbaijan's banking sector, fiscal position, and balance of payments even as the country's policy buffers held steady. To ensure macroeconomic and financial stability and advance a diverse economy driven by the private sector, it was necessary to move forward with reforms.

Spending cuts have been applied, while protecting priority social spending and enhancing the efficiency of capital expenditure. As a result, after a couple of years new tax policy as well as new minister was appointed aimed at fostering non-oil activity and revenue, to reduce tax exemptions and strengthen tax administration. Furthermore, careful debt management and pension reform plan helped to preserve fiscal sustainability.

The economy had to be diversified away from oil toward non-traditional sectors. Creating a private sector leading and non-oil economy requires reforms to further remove barriers to competition and reduce the costs of doing business.

3.4.4. Effects of devaluation on exports of Azerbaijan

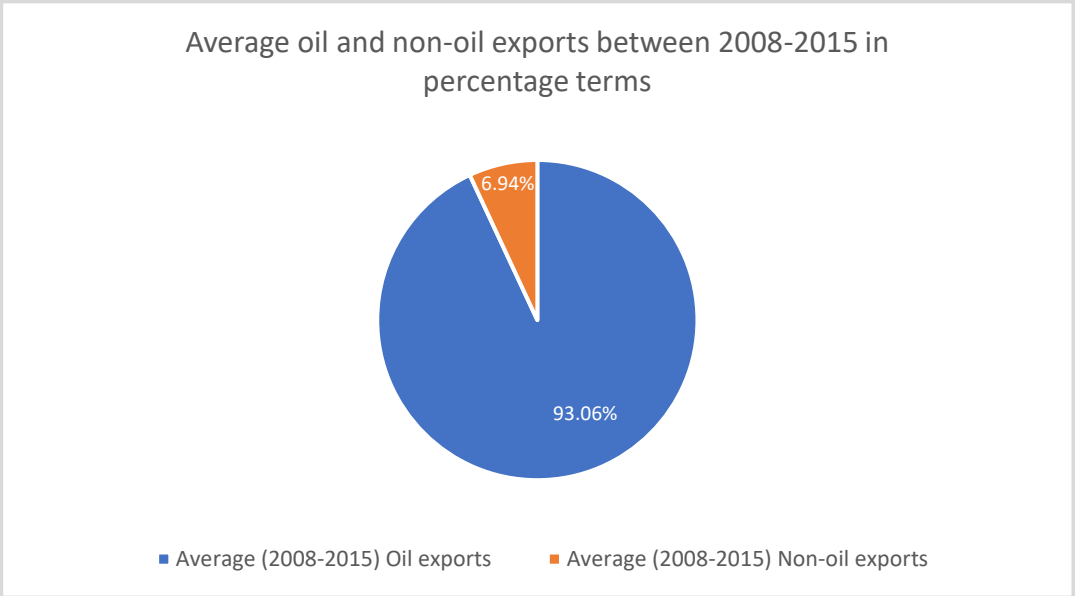
The exports is mainly dependent on oil prices in Azerbaijan. Non-oil sector exports are only less than 10 percent of total exports in each year. In the following years after devaluations in 2015 and 2016, there has been improvement in export performance of non-oil products. In terms of non-oil exports versus previous years, the increase is high. However, in terms of percentage of total exports, there is not sufficient improvement. Clearly, the increase in local currency terms have been significant due to value depreciation which indicates one of the aims of devaluation which was to encourage exports has been partially successful.

As a mid-term result, non-oil exports have been increased significantly 2021 and 2022. A notable increase have been on the exports of agricultural products and live animals, and chemical products and analogous items. Exports of both categories were close to 800 million USD in the last 2 years. Some other sectors have been fairly increased in the last two years.

While the nation's oil GDP fell by 2.7 percent in 2022, the non-oil GDP grew by 9.1 percent. 51.1 percent of GDP came from industry, 8.2 percent from trade and automotive repair, 6 percent from transport and logistics, 4.8 percent from construction, 4.8 percent from agriculture, forestry, and fisheries, 1.6 percent from hospitality services, 1.4 percent from information and communications, and 7.4 percent from taxes. Azerbaijan recorded a 55.4 percent rise in foreign trade activities of $52.7 billion in 2022. There was a rise in overall net exports at the same time, with imports rising by 23.9 percent to $14.5 billion and exports rising by 71.6 percent year over year to $38.1 billion. Iron and steel, machinery, automobiles, and food items are the top imports (International Trade Administration, 2023).

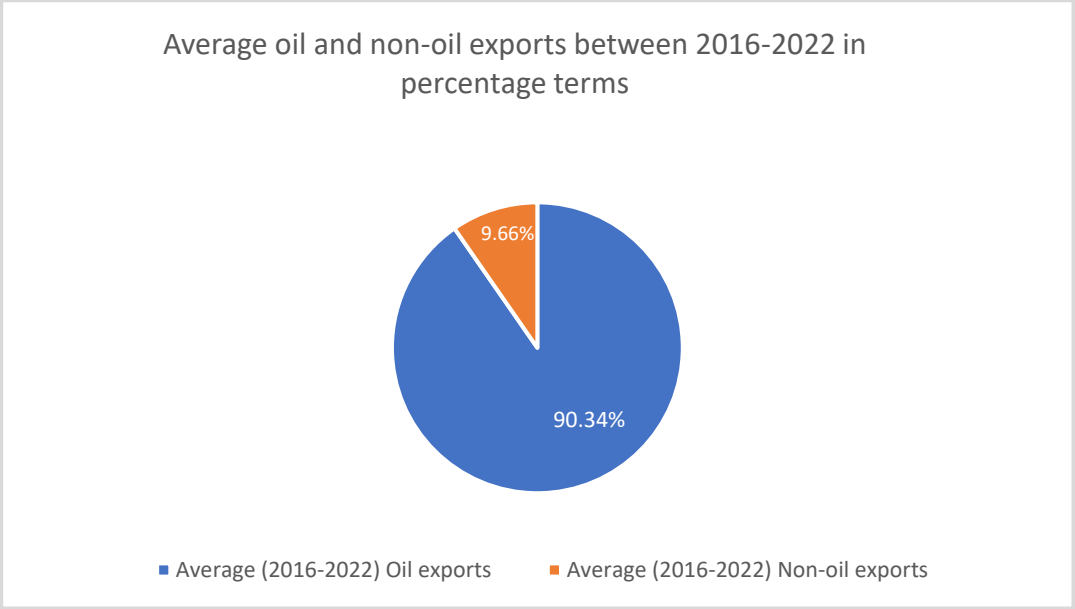
Dependence of exports of Azerbaijan on mineral fuel, lubricants, similar materials is not deniable. It is evident that devaluations caused a notable increase in exports of non-oil sector, suggesting that trade policies implemented after 2015 and 2016 devaluation have been partially achieved and yet to be continued and improved. Below charts illustrates the average of oil and non-oil export shares in total exports for 2008-2015 and 2016-2022 periods. There has been slight increase for the latter in comparison to the former. Moreover, it is a fact that non-oil exports as a share of non-oil GDP have increased in the last years, especially after 2016 (Mehtiyev *et al.*, 2021).

Figure 3. Average oil and non-oil exports between 2008-2015



Source: The State Statistical Committee of the Republic of Azerbaijan, 2023

Figure 4. Average oil and non-oil exports between 2016-2022



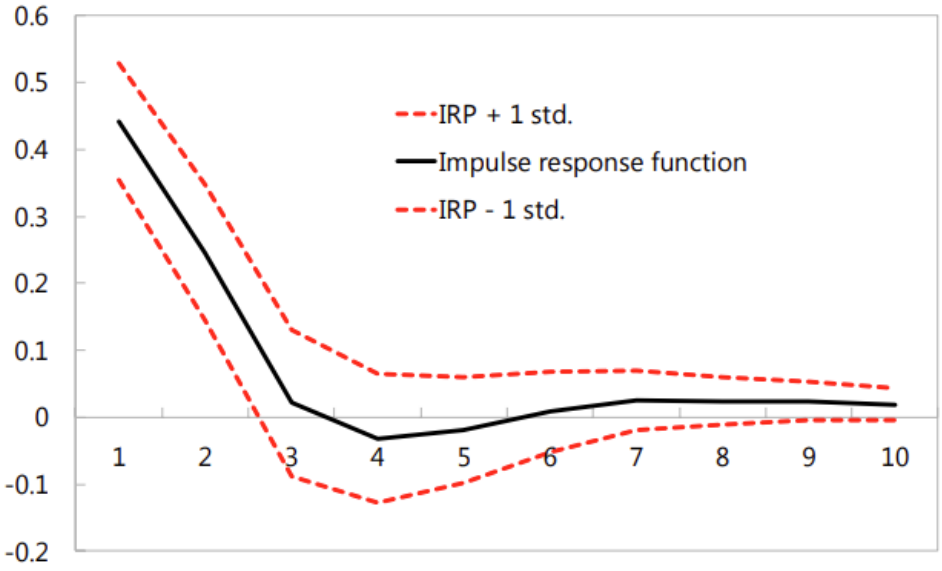
Source: The State Statistical Committee of the Republic of Azerbaijan, 2023

3.5. Devaluation and inflation associations

The price of inputs like labour and materials is directly impacted by rising inflation, which has an impact on exports. These higher costs will therefore have a big influence on exports' ability to compete in the context of world trade (Barguellil *et al.*, 2018; Lal *et al.*, 2023).

A vector auto-regression (VAR) model applied by IMF (2016) indicated that nominal exchange rate shocks impact inflation. In the VAR model, the log first differences of oil prices, nominal effective exchange rates (NEER), government expenditures, base money, and the consumer price index (CPI) were included. As per the results, one standard deviation Cholesky shock to the NEER increased inflation rates by 0.45 percent initially and diminished by the third month as illustrated by the impulse response function in Figure 5. The VAR model predicted an 18 percent increase in inflation in 2015 due to the approximately 40 percent depreciation of NEER. Increased inflation had impacts on exports as well by directly affecting the price of inputs like labour and materials (International Monetary Fund, 2016).

Figure 5. Impulse response function - response of CPI to a one standard shock to NEER



Source: Kim et al., 2021

These estimates are roughly consistent with the results of inflation in the first part of 2016, the low level of inflation before the devaluations, the tighter monetary policy of the CBA to lessen the impact of the second round, and the diminished pressure on prices due to weak domestic demand in a highly dollarized economy.

3.6. Policy analysis

There are three primary components to the framework of Azerbaijan's fiscal policy:

1. An ad-hoc rule to save half of oil revenue abroad in a well-managed oil fund.
2. Using 75 percent of transferred oil-fund revenue to finance investment.
3. Broad coverage of fiscal accounts, underpinned by three-year budget plans.

In 2016, increased exchange rate flexibility led to avoid shocks. In the long term, increased clarity in the Central Bank exchange rate policy aims and management method would lead to FX market performance enhancement and prevent policy errors. Following the full market determination of the exchange rate, the CBA used the policy rate as a nominal anchor in the following years. The degree of exchange rate volatility experienced under the new FX regime was satisfactory in 2016 (International Monetary Fund, 2016).

Some examples of initiations to further improve and control exchange rate volatility are opening new e-government service centre, simplifying customs clearance, increasing electronic payments, creating regional industrial zones, trade diversification (International Monetary Fund, 2016).

The economy lacks focus on long-term non-oil sustainability. It is based on excessive public spending and closely tied to oil prices. Rule-based framework to promote fiscal discipline and managing expectations is another essential policy to be implemented.

One of the reasonable consumption-savings policy could be guided by a modified permanent income model that is based on a non-resource primary balance (NRPB) as a percentage of non-resource GDP (Gushkhani, 2019).

In Azerbaijan, public investment as a percentage of GDP averaged 15.5 percent between 2008 and 2016. The modified permanent income model computes a long-term net national product balance objective of 26 percent, considering projected oil prices, fiscal revenues, and the depletion of natural resource wealth by 2035. The NRPB for 2016 was expected to be 38 percent (International Monetary Fund, 2016). Considering the non-oil field has not been improved significantly although there have been investments, the new projected NRPB should be less that 26 percent, realistic ration would be around 22 percent.

In April 2022, a new governor to Central Bank of Azerbaijan has been appointed after 27 years. Despite short period of time in management, new set of guidelines have been introduced by CBA aiming monetary growth in the long run. CBA became sole seller of FX through regular auctions. A tighter monetary stance helped to limit inflationary exchange rate effects and pressure on the currency.

Key monetary and exchange rate policy recommendations is as follows:

- Reidentifying intermediate and operational monetary targets formally.
- Liquidity planning and forecasting implementation. To satisfy short-term commercial and financial responsibilities, banks should keep cash and other assets on hand.
- Policy rate should be set considering liquidity management operations.
- Expansion of debt securities market.
- Eliminating market distortions to avoid pressure on the exchange rate.
- CBA's monetary and exchange rate policy framework should be clearly communicated to other authorities.

Longer-term planning, budgeting, and forecasting (PBF) is essential for managing exchange rate volatility, controlling spending on subsidies and R&D, and raising GNI per capita as a measure of a country's prosperity and reputation. Planning and budgeting would lead to improved credit and debt management, in-country investments, and budget management. PBF should specifically be used to forecast for the next five years or more at the end of each year. To monitor and modify

variations in sensitivity to economic performance, oil prices, and any other element that was included in initial plans, budgeted predictions should also be evaluated on a quarterly basis.

Azerbaijan should be striving to expand the green energy, agriculture, tourism, logistics, and information and communication technology sectors in addition to continuing to push for economic diversification away from oil and hydrocarbons.

Azerbaijan's economy has slightly been diversified away from oil towards non-traditional industries like tourism and agriculture. Further advancements in these fields would encourage inclusive and sustainable growth. Improving economy and trade governance, cutting operating expenses, and removing obstacles to competitions are all necessary for the development of a non-oil economy and exports driven by the private sector. Until core productivity issues are resolved, attempts to diversify the economy toward low-productivity industries are unlikely to grow (Mukhtarov *et al*., 2019).

In the sense of country reputation enhancement and connections, The Caspian Sea-European Union Green Energy Corridor is another project that Azerbaijan initiated. A deal has been made by Azerbaijan, Georgia, Hungary, and Romania to advance a project that would use renewable energy sources in Azerbaijan to produce green energy, which will then be exported to Europe via a subsea cable beneath the Black Sea. This project is another initiation to enhance country reputation and upon completion of the project, Azerbaijan will increase non-oil exports further as a result (Mehtiyev *et al*., 2024).

In the sense of assuring long term increase of non-oil exports volume, the development of Azerbaijan's east-west and north-south trade and transit corridors is still ongoing. Baku International Sea Port, in other words, The Port of Alat, and the adjacent Free Trade Zone (FTZ) are becoming major centres for regional logistics and transportation because of the significant trade increase on the Middle Corridor. The FTZ is an extraterritorial, legally autonomous zone that targets investors in high-value manufacturing with an emphasis on exports. It is necessary for at least 75% of all goods produced there to be exported (International Trade Administration, 2023). This project is the biggest initiative aiming to increase exports as well as economic growth after the Contract of the Century which was signed in 1994. This project is very likely to increase non-oil exports significantly by 2030.

3.7. Discussion

Policy recommendations, exchange rate volatility, inflation and export performance related findings of the research are in line with the International Monetary Fund 2016 Article IV Consultation - Press Release which was completed on 25th of August 2016, by IMF staff team after

discussions with the officials of the Republic of Azerbaijan on economic developments and policies.

As per the policy analysis, one of the crucial policies that needs to be put into place is a rule-based framework that encourages budgetary restraint and expectation management. Budgetary restrain encouragement has been being implemented in the last a few years, yet there is room for further effective management and relative framework implementation to diversify the public investments and assure constant growth (International Monetary Fund, 2016).

Removing market distortions to keep the exchange rate from being under pressure. Minimizing obstacles to competition, establishing private sector export driven economy would shrink pressure on exchange rate volatility.

Implementing forecasting and planning for liquidity is another crucial policy to further enhance. Banks should maintain cash and other assets to meet short-term financial and commercial obligations.

However, other than above mentioned policy recommendations, different than the IMF Article IV, this research suggests implementation of effective fiscal planning, budgeting, and forecasting for longer terms including quarterly adjustments.

The study discovered that devaluation is significantly predicted by inflation. The findings showed that the inflation rate could explain 52 percent of the variation in the depreciation rate. Furthermore, the investigation revealed correlation coefficient of 0.723, a high degree of correlation between the rates of inflation and devaluation. These results are of set of 130 countries' data applied for a single year. Likewise, International Monetary Fund 2016 Article IV Consultation - Press Release found out that any shocks to exchange rate impacts consumer price index, in other words causes inflation. Azerbaijan was used as focus country in the analysis, and it found out that 40 percent depreciation of manat causes inflation rate to go up by 18 percent.

Since inflation is directly linked to cost of goods and services, it impacts export performance as well as trade balance of country. Both findings support the proposed hypothesis that exchange rate volatility impacts exports performance.

Moreover**,** there is no widely accepted approaches for capturing non-trade hindrances that limit market access. Studies such as Andriamananjara *et al*, 2011; Michalopoulos, 1999; Deardorff, 2012, have well documented analysis and approaches about NTBs (Andriamananjara *et al.*, 2011; Deardorff, 2012; Michalopoulos, 1999). The analyses of above listed researchers have well documented above mentioned approaches which are about NTBs. However, non-trade barriers among NTBs have not been differentiated so far (Mehtiyev and Magda, 2021). Thus, the results

of the dissertation pertaining to NTB features are consistent with the above-mentioned studies with difference of non-trade barriers and their characteristics identification in this study.

The study identified the key features of non-trade barriers and distinguished them from (NTBs) and enumerated their features. Although most non-trade barriers fall under the category of NTBs, their effects and characteristics may differ greatly (Staiger, 2020). Similarly, these findings are in line with work of Staiger (2020) as well as the public policy based on UNCTAD report in 2013. As per UNCTAD report in 2013, all identified non-trade barriers in this study falls under section of NTBs. However, non-trade barriers have never been differentiated from NTBs neither in UNCTAD report in 2013 nor in any other public policy reports on trade barriers. Thus, this research contributes to foreign trade policies by differentiating and studying non-trade barriers for the first time.

In 2021, Mukhtarov *et al*. investigated the effects of oil price shocks on GDP per capita, currency rates, and total trade turnover with applying SVAR technique on time series data from 1992 to 2019. According to the estimation results, oil prices have a positive effect on GDP per person and overall trade turnover, which, in the case of Azerbaijan, has a negative effect on the exchange rate. Therefore, the exchange rate and GDP per capita are more strongly impacted by oil prices.

According to a recent study in 2022 conducted by Yoganandan and Vasan, cointegrations and Granger causality tests were applied to identify causal relationship between FDI, GNI, and exports of India was tested. The results of the cointegration test proved the existence of long-term relationship between the variables and the Granger causality test results indicated a bi-directional relationship between FDI, GNI, and exports. Both GNI and FDI play crucial roles in country image formation and at the sime time, country reputation leads to increase of GNI per capita and FDI inflows. Thus, this study tested some variables as proxies for country reputation with exports. Different than our study, the research found out that GNI and exports of India have bidirectional causal associations in both short and long term. However, in Azerbaijan's case, GNI per capita has no causal relationship with non-oil exports neither in the short or long term. Obviously, there are some differences between these two studies such as populations size, exports volume, and petroleum exports. Firstly, Yoganandan and Vasan did not include population size but only tested GNI rather than GNI per capita. In addition, they have included total exports while our study only focused on non-oil exports. If the same analysis applied for Azerbaijan, the results would be different. This is a great example to emphasize the causal relationship between non-trade barriers should be country specific as every nation has its own unique economic structure and macroeconomic indicators.

Huseynov (2022) conducted a study to investigate the impact of R&D and innovation on the economic development of the Republic of Azerbaijan. For this purpose, causality test with using time series analysis was applied on R&D expenditure and the GDP data as an indicator of economic development. As per the results, causality from R&D expenditures to economic growth in the long run has not been determined (Huseynov, 2022). The results of our study and research of Huseynov indicates that R&D expenditures impact neither economic growth nor non-oil exports of Azerbaijan. While nonexistence or lack of R&D investments is considered indirect trade barrier, in Azerbaijan's case they have no impacts on exports of non-oil products and GDP as a proxy for economic growth.

4. CONCLUSION AND RECOMMENDATIONS

4.1. Conclusion

Trade barriers have been discussed for a while, and governments and policymakers have implemented several steps to decrease the impacts of such hindrances and preserve free international trade. Furthermore, initiatives i.e., as reducing tariff barriers and applications against the negative impacts of non-tariff barriers to ensure foreign trade are some proves of the importance of further studies and applications to avoid or decrease potential issues in trade.

The goal of this research was to learn characteristics of non-trade barriers, differentiate them from other NTBs, illustrate the effects of some of such hindrances on economy and foreign trade.

This research investigated the relationship between non-trade obstacles and Azerbaijan's non-oil exports using time-series data from 1993 to 2022. The short- and long-run connections as well as the causality direction were determined using Johansen's cointegration and the Vector Error Correction Model causality tests. In these econometric analyses, as proxies for non-trade barriers, subsidy implementations, R&D expenditures, and GNI per capita as a proxy for country reputation were used. The cointegration test findings demonstrated that non-trade obstacles and non-oil exports are correlated. On the other hand, the VECM results showed no causal associations between Azerbaijan's non-oil exports, R&D spending, subsidies, and GNI per capita as a measure of country reputation.

Additionally, through case studies and policy analysis, the study further examined currency rate volatility, another indirect trade barrier, to determine its effects on Azerbaijan's export performance and possible countermeasures. With the findings, it is emphasized that the policymakers should take into consideration any possible volatility to maximise the trading benefits for the country.

On of the main results of policy discussions suggests that longer-term planning, budgeting, and forecasting is essential for managing exchange rate volatility, controlling spending on subsidies and R&D, and raising GNI per capita as a measure of a country's prosperity and reputation.

To systematically assess the research findings, Table 13 presents the hypothesis testing results, showing whether the proposed relationships were supported or rejected based on empirical analysis. Table 14 follows with a summary of the key novel findings, highlighting the impact of non-trade barriers, exchange rate volatility, and the limitations of traditional analytical methods in evaluating trade dynamics. These insights contribute to a deeper understanding of Azerbaijan’s non-oil export performance, the role of non-trade barriers, and offer valuable implications for policymakers and researchers.

Table 13. Summary of hypothesis testing

No:	Hypothesis Statement	Status
H1	Non-trade hindrances to international trade exist and indirectly affect Azerbaijan's export volume.	Accepted
H2	Correlation and regression analyses are insufficient for accurately assessing the impact of non-trade barriers on Azerbaijan's non-oil exports, as they fail to capture complex causal relationships and qualitative factors.	Accepted
H3	Exchange rate volatility, particularly currency devaluation, significantly influences Azerbaijan's export performance and inflation dynamics.	Accepted
H4	Subsidy incentives, R&D expenditures, and country reputation, as proxies for non-trade barriers, do not significantly impact Azerbaijan's non-oil export volume in the short run.	Accepted
H5	Subsidy incentives, R&D expenditures, and country reputation, as proxies for non-trade barriers, significantly impact Azerbaijan's non-oil export volume in the long run.	Rejected

Source: Author's own work

Table 14. Summary of novel findings

No:	Summary of Novel Findings
1	Non-trade barriers (R&D expenditure, subsidies, and country reputation) have no long-term impact on Azerbaijan's non-oil exports, nor do they individually affect exports in the short run.
2	Significant correlations exist between non-oil exports and R&D expenditure, GNI per capita, and subsidies, with these factors explaining 94% of export variance.
3	Correlation and regression analyses are inadequate for assessing non-trade barriers' impact due to their inability to capture complex causal relationships.
4	The transition to a floating exchange rate regime encouraged non-oil exporters, leading to a gradual increase in export volume.

Source: Author's own work

In consideration of the novelty of the study, this research will be one of the pioneering works which will be considered as a direction for future research works. The findings will assist future researchers to develop their scientific research on distinguishing the indirect trade barriers from other NTBs and help policymakers to alter their strategies for eliminating the obstacles in foreign trade and increasing export volume.

The study's findings have significant theoretical and managerial ramifications. All in all, this study's findings shed new light on trade hindrances.

4.2. Recommendation and implications

This study shows that the relationship between indirect trade barriers and export volume is a substantive and empirically valid topic. For public policy makers looking to stimulate exports to a specific country, analysing the indirect trade hindrances appears to be as viable as other factors (e.g., trade negotiations, free trade agreements). For business leaders at international companies, the findings suggest that companies may consider indirect trade barriers as a factor when analysing ways to expand their export volume. Other than the direct trade barriers, indirect barriers should be considered as key influencing factors.

The study's empirical outcomes suggest that country reputation, subsidisation, and R&D expenditures do not have causal impacts on non-oil export level of Azerbaijan. Thus, the policy makers with intention to increase overall exports of the country other than oil and gas exports may benefit from the findings. For instance, as any subsidization application applied with the aim to increase overall exports or increasing R&D investments with pure intention to enhance the overall export volume would not have significant or not any positive outcomes. As a result, the other indirect trade barriers other than the ones analysed in this study could be tested initially and based on the results further implications could be made whether those NTBs should be focused; either invested more or prevented, so desirable outcomes – increased export level of the country could be achieved.

The study's other empirical findings demonstrate how significantly the exchange rate affects global trade. In this sense, businesses and governments alike should design trade policies with the impact of fluctuating currency rates on international trade in mind.

Exchange rate applications will undoubtedly have an indirect impact on global trade activities and balance. Control over foreign exchange plays a significant role in a nation's trading activities given the implications that have been examined. In some ways, exchange rate volatility is regarded as a non-trade barrier because it could have an indirect impact on trade besides its direct impacts. In conclusion, exchange rate volatility affect international trade; they can have both positive and

negative effects, and they heavily depend on the conditions of the transaction as well as the actions of the trading nations. All in all, in any type of currency applications, the trade balance should be taken into consideration and prioritized by policymakers.

The findings open a path to further trade policy analysis. Responsible authorities could benefit from the findings, especially in terms of increasing exports of non-oil products. Some other authorities should take into consideration reviewing expenditures on non-trade barriers whether they are invested with the main purpose of increasing the exports or not. If significant portion of R&D and subsidy expenditures are being spent with the purpose to increase overall exports, we can say that it is ineffective in the short run. However, if these expenses are being invested proportionally with distinct aims, the results could be analysed separately to draw conclusion whether expected results could be achieved in the long run.

4.3. Limitations and future research directions

As every study or research is bound to have some limitations, so this study also realized some limitations. One of the limitations of the study is that three indirect barriers were analysed at a time in VECM model. Even though the sample size of the data was thirty due to availability of data, having ten per each variable, the results could be better predicted using less variables at a time or accessing to more enhanced data. Alternatively, in the future, non-trade barriers used as variables in this research could be analysed separately to find out detailed impacts on exports of Azerbaijan.

The other limitation is that in case of country image, the study only tested GNI per capita as a proxy for country reputation. However, other indicators such as literacy rate, IQ level, human development index and other variables as indicators of country reputation could be used to test any impacts or cause on exports.

Moreover, the data of the study considered the total amount of subsidization in Azerbaijan. The other future research direction is that subsidies provided on a specific sector or industry can be identified and analyses can be implemented on the export level of the same industry to find out more specific associations.

Due to limited resources, time constraints, and restrictions on data availability, this study could not examine the impacts of non-trade barriers on local companies engaged in international trade. Hence, studies can be done using different statistical approach to further analyse the same or other indirect trade barriers on the trade activities of export companies. Furthermore, several other theories and econometric analyses like grounded theory, factor analysis model can be employed to reach the desired objectives.

The study also highlights key areas for future discussion, particularly regarding preventive measures against non-trade barriers and strategies to mitigate their effects. This enhances the study's relevance and opens avenues for further investigation and analysis.

5. NEW SCIENTIFIC RESULTS

This study presents novel scientific findings derived from research data and results. These insights contribute to the advancement of future studies by building upon the analytical approach and incorporating additional constructs into the model. The key findings are outlined below.

1. I validated the absence of a causal relationship between non-trade barriers and Azerbaijan's non-oil exports, demonstrating that R&D expenditure, subsidy implementations, and country reputation collectively have no long-term impact, while each factor separately has no short-term effect on export performance. This conclusion was reached by employing Granger causality analysis within the VECM framework to examine whether non-trade barriers - GNI per capita (as a proxy for country image), R&D expenditures, and subsidies drive Azerbaijan's non-oil exports.
2. I verified significant correlations between Azerbaijan's non-oil exports and R&D expenditure, GNI per capita (as a proxy for country reputation), and subsidies individually. Additionally, 94% of the variance in non-oil export volume can be explained by GNI per capita, subsidies, and R&D expenditures. In the analysis, correlation coefficients are used to measure the strength and direction of a linear relationship between non-oil exports and three non-trade barriers. The direction of the correlation is positive in all three cases which means in case any of three variables increased, non-oil exports are likely to increase or vice versa. Moreover, Multiple Regression analysis was applied to find out to what extent non-trade barriers as independent variables - subsidies, GNI per capita, and R&D expenditures can predict the non-oil exports of Azerbaijan. Statistically significant results suggested that GNI per capita, subsidy transfers, and R&D expenditures as a proxy for non-trade barriers can predict Azerbaijan's non-oil exports.
3. I confirmed that correlation and regression analyses are insufficient for accurately assessing the impact of non-trade barriers on Azerbaijan's non-oil exports due to their inability to capture complex causal relationships and qualitative factors. Even though significant level of associations were found between Azerbaijan's non-oil exports and subsidy incentives, R&D expenditures, GNI per capita (as a proxy for country image) through Pearson Correlation Coefficient and Multiple Regression Model, there is no causal relationship between these variables. In other words, it has been validated that these non-trade barriers do not cause Azerbaijan's non-oil export volume.
4. I verified that exporters of non-oil products in Azerbaijan were encouraged following the transition to a floating exchange rate regime, and the volume of non-oil exports has gradually increased ever since. Regarding the indirect effects of exchange rate fluctuations,

negative volatility (currency depreciation) favoured exporters but adversely impacted importers, as they were required to accumulate and remit higher amounts in local currency to vendors. The practical implication is that a currency's strength influences export levels, and the results suggest that exchange rate volatility should be kept under control to ensure trade balance growth. Since consumer price inflation and devaluation is correlated, the other implication is that to keep the exchange rate volatility in balance, the inflation should be kept in the loop. Besides, planning, budgeting, and forecasting (PBF) for longer periods is a must to control exchange rate volatility, manage subsidization and R&D expenditures, increase GNI per capita as a proxy for the nation's prosperity and country reputation. Effective planning and budgeting would not only benefit above mentioned fields, but also would result in better management of SOFAZ budget, in-country investments, as well as credit and debt management.

6. SUMMARY

This research investigated the causal relationship between non-trade barriers and non-oil exports of Azerbaijan, as well as their trends, utilizing time-series data spanning a 30-year period from 1993 to 2022. The thesis utilized time-series-based econometric analysis using the EViews and R software as the analytical tools. Johansen's cointegration and Vector Error Correction Model (VECM) causality tests were employed to determine the short- and long-run relationships as well as the direction of causality. Moreover, correlation and multiple regression analyses were applied to test any other associations between the variables. In these econometric analyses, as proxies for non-trade barriers, subsidy implementations, R&D expenditures, and GNI per capita as a proxy for country reputation were used. The results of the cointegration test proved the existence of a correlation between non-trade barriers and non-oil exports. The VECM results indicated no causal relationship between subsidy, R&D expenditures, GNI per capita as proxy of country reputation and non-exports of Azerbaijan.

The study further analysed the other indirect trade barrier – exchange rate volatility through case study and policy discussions which found out impacts on export performance of Azerbaijan and potential policies to implement to keep the volatility effects at minimum. The results of this study provided new insights into non-trade barriers.

In addition to highlighting the role of non-trade barriers, this research provides a nuanced understanding of the structural and institutional challenges that influence Azerbaijan's non-oil export sector. The analysis not only sheds light on the limitations of existing trade policies but also emphasizes the importance of integrating targeted R&D support, fostering innovation, and improving the country's reputation through strategic economic and diplomatic initiatives.

The results of this study provided new insights into non-trade barriers and highlighted the broader implications for economic diversification in resource-rich economies like Azerbaijan. Furthermore, the outcomes of this study offered robust theoretical and managerial implications, serving as a foundation for future research and policy development aimed at enhancing non-oil exports and reducing dependency on oil revenues.

The findings provide valuable insights for future research and policymaking, highlighting the importance of addressing indirect trade barriers to improve trade and economic performance.

7. APPENDICES

7.1. References

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7.2. List of Tables

7.3. List of Figures

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