Niftiyev, Ibrahim; Namazova, Natavan

Article

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Analysis of Cyclicality in the Azerbaijan Economy: Results of the Chi-Square Test

Ibrahim Niftiyev[1], Natavan Namazova[2]

[1]Doctoral School in Economics, University of Szeged, Szeged, Hungary, E-mail: ibrahimniftiyev@gmail.com/Azerbaijan State University of Economics (UNEC), European Economy Research Center
[2]Azerbaijan State University of Economics (UNEC), Baku, Azerbaijan/UNEC, European Economy Research Center,
E-mail: natavan.namazova@unec.edu.az

Abstract

This study investigates the cyclical association between gross domestic product (GDP), monetary variables, international trade and foreign directed investments (FDI), and annual average oil prices (BRENT trademark) as explanatory variables in the Azerbaijan economy. The research methodology utilized a chi-square test of independence and goodness of fit test. The crosstabulation analysis used the nominal variables "increased" and "decreased" years, which refer to the transformation of the time series, mainly between 1991 and 2019. The results of the independence test demonstrated a statistically significant association between GDP, GDP per capita in current prices, international trade, FDI, and oil prices. However, the monetary indicators of economic growth, real GDP variables, and trade balance did not exhibit the same pattern. The results of the goodness of fit test showed a non-random deviation from the expected increased and decreased year in terms of GDP indicators and imports. This research is topical in light of the sharp oil price slump of 2020, which is reminiscent of the 2014–2015 downturn in commodity prices.

Keywords

Azerbaijan economy, macroeconomic data, business cycles, boom and bust, frequency analysis

JEL Codes: E01, E32, E66

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1. Introduction

After independence from the USSR in 1991, Azerbaijan moved from a socialist economic system to a market economy, and its economic relationships with other countries surged. However, Azerbaijan has faced a number of challenges throughout the process of regaining its independence, and its the transition from a planned economy to a market economy created a number of difficulties. Some of the biggest challenges involved determining not only what kind of products or services to trade with other countries, but also what to produce. Indeed, such challenges were felt by all the post-Soviet countries, not solely Azerbaijan. The sudden transitioning of an economy from one economic system to another is not a straightforward process, and numerous reforms were required in Azerbaijan to modernize the country's economic structure. Thus, Azerbaijan followed the path of the extractive industry-led economy due to its abundant oil and natural gas resources and industrial heritage, which brought both the benefits and challenges of the boom and bust periods that are typical of commodity markets.

Boom and bust periods, which are periods marked by rapid growth, high employment, and increased profits, followed by economic recession, illustrate a common reality among capitalistic economies (Stutz & Warf, 2012). Capitalist systems become more economically prosperous during boom periods; however, after entering a period of bust, they seek to eliminate the factors that led to the recession and begin the process of recovery (Sadik-Zada 2001a; Sadik-Zada 2001b). Resource-rich countries can suffer more severely from busts than non-resource-intensive countries because the commodity prices strongly influence the economic indicators among them (Arezki & Ismail, 2013). Price booms in international markets lead to increased gross domestic product (GDP), inclined monetary terms (such as appreciated real effective exchange rate [REER], inflation, and exchange rate) and leveraged international trade (i.e., increased exports and stimulated imports). However, fluctuations are inevitable during periods of volatility in commodity markets, which creates severe instability in relation to macroeconomic indicators. For example, Mexico, Venezuela, and Nigeria reaped the benefits of the oil price booms, but suffered as a result of a collapse in oil prices (Gelb, 2010). Mehrara and Oskoui (2008) studied the resource-rich countries of Iran, Saudi Arabia, Kuwait, and Indonesia and concluded that boom and bust cycles led to a high level of instability in economies that were undiversified and institutionally underdeveloped.

Resource-dependent countries are highly responsive to boom and bust cycles of commodity prices. Oil, which is an essential commodity in the world economy, demonstrates price volatility and cyclicality, which both generates opportunities

for and has detrimental effects on oil-producing counties (Karl, 2007). In this study, the Azerbaijan economy has been examined through boom and bust cycles in terms of the frequencies of the increased and decreased years in which critical economic indicators are affected by oil price cycles. In fact, the country is one of the 15 most oil-dependent economies in the world (Czech, 2018).

The Azerbaijan economy was rapidly taken over by the extractive industry in the years following independence from the Soviet Union. Economic growth, as measured by the change in real GDP, rose from –22.6% in 1992 to 10% in 1998, boosting GDP (current prices, oil booming period of 2006–2014) and increasing GDP per capita, PPP, to $16.829 USD in 2015 from the low indicators of the 1990s (The Global Economy, 2020). The Azerbaijan economy emerged largely unscathed from the global financial crisis of 2007–2008 due to its accumulated oil revenues and the fact that its financial markets were not as interdependent or integrated as was the case in European countries (Hübner & Jaiznik, 2009); however, the crises in commodity markets that occurred in 2014 and 2015 led to a significant collapse in macroeconomic indicators. For example, external debt as a percentage of gross national income rose from 15.01% in 2013 to 26.35% and 41.73% in 2015 and 2016, respectively (The Global Economy, 2020); GDP in current U.S. dollars fell to $37.9 billion in 2016 compared to the 2014 historic peak of $75.24 billion; GDP per capita in current U.S. dollars showed a similar pattern, reaching $3,880.7 in 2016, which represented a fall of 50.8% from 2014. Meanwhile, the proportion of gross domestic savings as a percentage of GDP in 2016 was 24.2% less than 2011 (The Global Economy, 2020). Moreover, according to the State Customs Committee (2015), foreign trade turnover in 2015 decreased by 33.3% to $20.7 billion USD and similarly in 2016, foreign trade turnover decreased by 14%, amounting to $17.8 billion USD (State Customs Committee, 2016).

Based on the above discussion, the following research question was formulated to be answered in this study: is there an association between oil price booms and busts and key economic indicators of the Azerbaijan economy when they are evaluated in terms of the frequencies of increased and decreased years? To the best of our knowledge, this study represents the first attempt to answer this question via a frequency and crosstabulation analysis by applying a chi-square test of independence and goodness of fit test in relation to the Azerbaijan economy. With the help of relatively simple and widely available techniques, this paper contributes to the research on the Azerbaijan economy via a frequency analysis. In this research, the macroeconomic indicators of Azerbaijan from 1991 to 2019 are analyzed. The research hypotheses regarding the chi-square test of independence and goodness of fit test are as follows:

H1: There is a statistically significant relationship between the frequencies of GDP variables/monetary variables/international trade and FDI and the frequencies of oil prices.

H2: The oil prices identify the distribution of the frequencies in GDP variables/monetary variables/international trade and FDI in terms of increased and decreased years.

The first hypothesis examines the statistical relationship between the selected variables and oil prices and establishes a cyclical relationship. The second hypothesis tests the deviation of the indicators from the expected decreasing and increasing years, which were 13.5 for both. In other words, the statistical significance of the proportional frequencies of the categories of variables may indicate the cyclicality, and non-random deviations from the expected years would support such a connection. As a null hypothesis related to the test of independence, it is assumed that there is no statistically significant relationship between the selected variables and oil prices; similarly, in the goodness of fit test, it is assumed that there is no connection between the distribution of the variables' frequencies and oil prices.

2. Lierature review

A period-based overview in conjunction with the latest research into the Azerbaijan economy provides the framework for the frequentative and cyclical evaluation conducted in the present study. Following Aliyev & Suleymanov (2015), the recent history of the Azerbaijan economy can be separated into three stages: the *recession period* 1991–1994, the *restructuring period* 1995–2005, and the *oil boom period* post-2005. The recession period was marked by contracted GDP, a dramatic decrease in value-added, and hyperinflation and increased unemployment. The restructuring period was known for the cooperation between Azerbaijan and the International Monetary Fund (IMF), the restructuring of the oil industry, land reforms, privatization, and trade liberalization. Lastly, the oil boom period saw increased oil production and exports, high mineral revenue accumulation in the sovereign wealth fund—the State Oil Fund of the Republic of Azerbaijan (SOFAZ)– and a surge in government spending.

The 2016 Strategic Road Map for the National Economic Prospects of the Republic of Azerbaijan proposed a similar classification for the Azerbaijan economy (Decree of the President of the Republic of Azerbaijan, 2016). Based on this, the process of economic growth in the country over the last 28 years (1991–2019) can be classified into the following periods: 1991–1994, 1995–2003, 2004–2014, and 2015–2019.

From 1991 to 1994, Azerbaijan's real GDP fell by an average of 17% each year, the state budget was financed mainly through borrowing, and the national currency depreciated sharply. From 1995 to 2003, strategic economic reforms were implemented to restore political stability, promote the transition to a market economy, and ensure effective economic relations. During this period, work began on the development of Azeri-Chirag-Guneshli as part of an agreement of the Contract of the Century, which is today the country's most important oil field. The first stage of development of the project began in 1997, and the final stage was completed in 2008 (Ciarreta & Nasirov, 2012). During the third period (2004 – 2014), as a result of the active reinvestment of oil revenues in the economy, Azerbaijan became a high- and middle-income country. The socio-economic infrastructure was renewed, leading the country to rank thirty-seventh globally in terms of global competitiveness in 2016 (World Economic Forum, 2016).

Between 2015–2019, the adverse effects of the sharp drop in oil prices on world commodity markets at the end of 2014 could be observed in the Azerbaijani economy, enduring until the latter half of 2015. The price of Brent oil in the world market decreased by 44% from early 2015 prices and reached to $62 USD per barrel by the end of the year. This more recent period of the economy demonstrates cyclical developments. Oil price booming in the international commodity markets encouraged resource-rich countries like Azerbaijan to generate high surpluses from mineral exports and boosted government spending. However, the collapse in fossil fuel prices in 2014 and 2015 significantly impacted GDP and fiscal policy (EBRD, 2017). The drop in oil prices led to decreased output and increased inflation (Hajiyev, 2019), increasing the dependency of the Azerbaijan economy and increasing such risks as the overspending of the accumulated reserves (Huseynov, 2019). For these reasons, research has drawn attention to the presence of phenomena such as the Dutch disease (Gahramanov & Fan, 2002; Hasanov, 2010; Bayramov & Conway, 2010; Hasanov, 2013; Zulfigarov & Neuenkirch, 2019) and the resource curse (Mahnovski, 2003; Gojayev, 2010) in the Azerbaijan economy.

The period from 2015 to 2019 vividly reflects the cyclical nature of the Azerbaijan economy. Although SOFAZ provided an escape route from the crisis, in the long-term, in the absence of government policies on non-oil-led growth and solutions to economic mismanagement, the country failed to fulfil its economic potential (Meissner *et al*., 2019). To boost economic growth and decrease dependency on natural resources, the government executed several initiatives. For example, the development of the financial sector positively affected non-oil sectors (Hasanov & Huseynov, 2013), the *New Budget Policy* and the introduction of qualitative restrictions created an institutional response to inefficiencies in mineral revenue management (Eurasia Extractive Industries Knowledge Hub), a number of non-oil processing enterprises were established (Ahmadov, 2017), a tight monetary policy was applied, and the *Strategic Road Maps on the National Economy and Main Sectors of the Economy* was approved (Hasanov, 2017). However, research circles continued to suggest additional institutional regulations, policies and reforms to accompany the actions that had been implemented (Ahmadov, 2016; Aslanli, 2016; Guliyev, 2016; Mammadov, 2016; Huseynov, 2017). Interestingly, non-oil GDP and exports have been shown to heavily depend on oil GDP and exports, and external shocks have been found to create inflationary effects in the Azerbaijan economy (Guliyev, 2018). Therefore, from 2015 to 2019, the Azerbaijan economy mirrored decreased economic performance as the national economy suffered from the undiversified industrial production and exports.

Some researchers have explored economic diversification and cyclicality in the context of the Azerbaijan economy. For example, Bayramov & Abbas (2017) analyzed the degree of diversification in the Caspian basin resource-rich countries, namely Azerbaijan, Kazakhstan, and Russia, and found that Azerbaijan showed a high reliance on resource revenues with low diversified export baskets; however, it drew somewhat more optimistic conclusions for Russia and Kazakhstan. While oil-dependent exports pose serious risks to macroeconomic stability Mikayilov (2011), Imamverdiyeva & Aliyev (2015) argue that Azerbaijan has strong potential to reinforce non-oil exports due to favorable foreign trade policies. However, Falkowski (2018) reported a strong and stable comparative advantage only in the exports of oil tradables between 2000–2015, also indicating the essential role of the extractive industry in enhancing macroeconomic stability. In other words, during an upsurge of oil prices, a country can produce and export oil and petroleum products, earning high mineral revenue to subsequently inject into the national economy. In such a scenario, it is not hard to imagine the potential consequences of a collapse in oil prices, wiping out much of the value of a country's only important source of revenue.

To conclude based on the developmental features of the Azerbaijan economy and the volatility of commodity markets, the identification of a strong cyclicality among the essential macroeconomic indicators was anticipated in the present research. In developing and dependent economies, the price of oil is a key factor in economic growth (Kira, 2013). Hasanov & Huseynov (2018) emphasize the impact of oil prices, forecasted oil prices, forecasted balance of payments, foreign trade balance, and strategic currency reserves on the value of Azerbaijan's national currency (AZN). Moreover, Azerbaijani Manat is affected by pressures resulting from increased imports, currency devaluations of neighboring countries, and increased interest rates (Hasanov & Huseynov, 2018). Based on this, the frequency analyses could shed light on Azerbaijan's economy from a new angle, which is the result of the oil price fluctuations.

3. Methodology of research

This study employs the non-parametric chi-square test to assess the significance and determine the extent of the relationships of the frequencies related to selected variables and oil prices in Azerbaijan. *The Global Economy (https://theglobaleconomy.com)* was used as the data source. The statistical analysis was conducted on SPSS software (ver. 23) with the *Crosstabs* (test of independence) and *Non-parametric tests/Legacy dialogs/Chi-Square tests* (goodness of fit) functions. The data range covered the period of 1991–2018 for economic growth and GDP variables, while inflation and exchange rate indicators were analyzed between 1991 and 2019; both groups of variables had no missing data. However, data were missing for both FDI and current account balance (CAB) and were replaced by the series mean for the period of 1991–1994 in the time series [one of available methodology according to Kaiser (2014)]. McHugh (2013) lists three main criteria for which the data must fulfill at least one for the chi-square test to apply: 1) data are nominally or ordinally measured; 2) the sample size of the data is equal or unequal [according to McHugh (2013)], when variables unequally sampled, a chi-square test can be used; however, parametric tests usually require equal sample sizes); 3) if an interval and ratio level of measurement are used to collect the original data but fail to fulfill one of the following assumptions of the parametric tests: 3.1) data should be normally distributed; 3.2) data should have homogeneity of variance; and 3.3) data were transformed into nominal or ordinal data from interval or ratio level.

The collected data did not fulfill the first criteria because the labels of each year were based on the time series. In other words, data were transformed from time series into dichotomous to apply in the crosstabulations. In terms of the second criteria, in this study, all variables used in the chi-square test had an equal sample size, which were generally 27. As previously noted, non-parametric tests are usually insensitive to the sample size and differ from parametric tests in this regard. The third assumption can be broken down into three parts: 1) normal distribution, 2) homogeneity of variance, and 3) transformation from interval or ratio level. To test the applicability of the collected data for the normal distribution, a Shapiro–Wilk test was applied. Then, the results of the non-parametric Levene test and Welch test reported the outcomes of the homoscedasticity or equality of the variance examination. The findings showed a non-normal distribution in line with the first section of the third assumption. However, the non-parametric Levene test and Welch test indicated a deviation from the second part of the corresponding assumption (The first part of the *Results* section provides the test results). The initial time series data were transformed into the labels of *increased* and *decreased* years according to the results of formula 1 to apply a crosstabulation procedure. The following formula describes the method of transformation, where *x* is a given variable in a period of *t*:

$$if \Delta X > 0, where\ \Delta X = x_t - x_{t-1}, Label = Increased$$
$$if\ \Delta X \leq 0, Label = Decreased \quad (1)$$

If the difference was positive, the variable was given an *increased* label, and if the difference was negative, the variable was evaluated as a *decreased* year. Accordingly, the total number of increased years was equal to the sum of the individual increased years in a given variable. A similar principle applied to decreased years. In this case, a certain transformation process according to the intended research design was clear, which fulfilled the third aspect of the third criteria.

McHugh (2013) outlines six assumptions of the chi-square test: 1) data must be in quantity (count) or in the form of frequencies (i.e., not monetary value, percentages or similar transformations of data); 2) the variables must be mutually exclusive (for instance, GDP cannot increase and decrease at the same time in a given year; instead, it should be categorized as either increased or decreased); 3) each case or subject must be a part of only one cell of the contingency table (to eliminate the double-counting problem); 4) study groups must be independent; 5) a minimum of two variables must be present; 6) 80% of the cells should meet an expected value of 5 or more, and no cell must contain an expected value of less than 1. This study fulfilled the first five assumptions, while the sixth was partially fulfilled. In the results section, if a cell of the contingency table violated the fifth assumption, a Fisher's exact test was used. As the contingency table was a two-by-two (2x2) table, a continuity correction value and its significance were included in the analysis. Moreover, the Phi coefficient[1] and its approximate significance were reported if the chi-square test of independence illustrated a statistically significant value. The goodness of fit test adopted an expected year of 13.5 as the sample size was 27 years and because the assumed probability of being either an increased or decreased year was 50%. Accordingly, the output of the goodness of fit test included the chi-square value and the asymptotic significance of the deviation of the increased and decreased years of a given variable.

[1] SPSS provided both the Phi coefficient and Cramer's V to demonstrate the correlation between the frequencies of the categories; however, generally two by two tables requires Phi coefficient. Moreover, in most cases, both Cramer's V and Phi values were identical.

4. Data analysis

This section provides the results of the normality test and equal variance analysis (homogeneity of variance or homoscedasticity). A Shapiro–Wilk test verified that the data were not normally distributed among the 15 selected indicators (see Table 1, where the significance level of a variable less than .050 indicates non-normal distribution, and the opposite illustrates normal distribution). Meanwhile, a non-parametric Levene's test and Welch test verified the homogeneity of variance. According to the non-parametric Levene's test (where a significance of less than .050 indicated a violation of the assumption of equal variance), only two variables, namely, Gross domestic product (GDP) in current prices and inflation, showed a statistically significant difference in their variances (oil frequencies as a break variable). Furthermore, the results of the Welch's unequal variance test demonstrated homoscedasticity among all variables (again, with oil frequencies as the break variable). The non-normal distribution of the chosen economic indicators supported the use of a non-parametric test like the chi-square test, while the equality of variance pointed to the possibility of also applying parametric tests. Nevertheless, the time series were transformed into frequencies to understand the boom and bust cycles of the economy in relation to oil prices, and the violation of the homoscedasticity did not exhibit a serious impediment to apply the chi-square test.

Table 1. Normality (Shapiro–Wilk) and equal variance tests (Levene and Welch)

Category	Variable	Shapiro-Wilk Test			Levene's Test		Welch Test	
		Statistic	df	Sig.	F stat.	Sig.	Statistic	Sig.
GDP	Economic growth, % change in real GDP	.921	28	.038	2.194	.297	2.852	.103
	GDP, 2010 prices	.818	28	.000	5.287	.151	.361	.554
	GDP, current prices	.821	28	.000	1.269	.030	1.178	.292
	GDP per capita, PPP	.816	28	.000	4.120	.270	.370	.549
	GDP per capita, current prices	.826	28	.000	1.269	.053	1.104	.307
	GDP per capita, 2010 prices	.816	28	.000	2.194	.270	.370	.549
Monetary	Inflation, % change in Consumer Price Index (CPI)	.364	28	.000	4287.037	.000	1.547	.238
	Real Effective Exchange Rate (REER), base year=2000, in%	.826	28	.000	1.924	.177	.063	.805
	Exchange Rate, AZN per U.S. dollar	.922	28	.039	3.271	.082	1.263	.278
International Trade and FDI	Exports, billion USD	.832	28	.000	1.073	.310	.804	.381
	Imports, billion USD	.851	28	.001	.401	.532	.903	.354
	Foreign Directed Investments (FDIs), billion USD	.885	24	.011	.249	.622	.249	.625
	Current Account Balance (CAB), billion USD	.817	24	.001	.000	.994	1.211	.288
	Trade Balance (TB), billion USD	.821	24	.001	.009	.927	1.156	.299
Oil	Annual Oil Prices, BRENT trademark, USD	.882	29	.004	--	--	--	--

***Source**:* Author's calculations based on data from The Global Economy, World Bank, and Islamic Development Bank.

Notes: The Shapiro–Wilk test of FDI, CAB and TB was based on the original time series, before the missing values were replaced by the series mean.

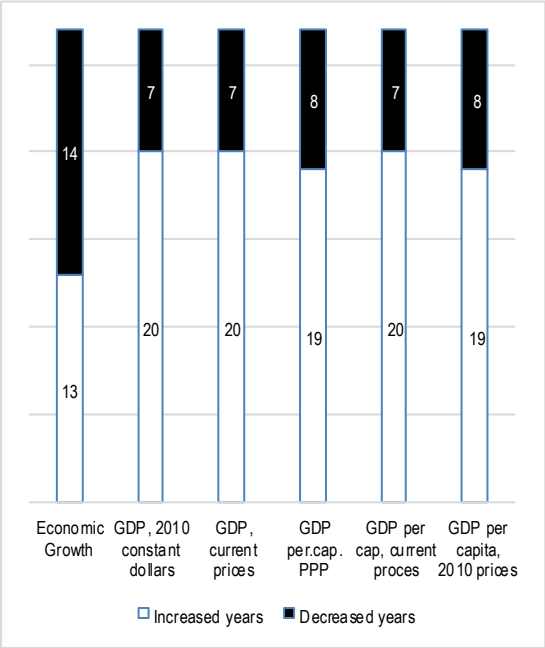
5. Results

5.1. Frequency Analysis of GDP

Figure 1 reports the summary statistics (panel *a*) and the frequency of the increased and decreased years (panel *b*) of the selected variables in the Azerbaijan economy from 1991 to 2018. The economy grew 4.20% per annum, as measured by the percentage change of real GDP, which was very low during the early and mid-1990s but recovered rapidly after the year 2000. GDP in current prices with a lower mean (26.81) varied more (coefficient of variation = 93.68) in comparison with GDP in 2010 prices (mean = 31.99) within the same period. The frequency of increased and decreased years showed a similar distribution among the indicators; however, economic growth had more decreased years than any other variable (Fig. 1*b*).

	Min	Max.	Mean	St.Dev.	Coefficient of Variation
Economic Growth	-23.1	34.7	4.20	12.92	307.74
GDP, constant 2010	9.5	58.5	31.99	19.35	60.49
GDP, current prices	3.05	75.24	26.81	25.11	93.68
GDP p.c, PPP	3,427.55	16,853.57	9,970.26	5,344.08	53.60
GDP p.c, current prices	3,97.2	7,891.31	2,940.10	2,639.72	89.78
GDP p.c, 2010	1,235.00	6,072.59	3,592.43	1,925.55	53.60

a. Summary statistics



b. Frequency of increased and decreased years

Figure 1. Summary statistics and frequency of the increased and decreased years of the selected variables in the Azerbaijan economy, 1991–2018

***Source**:* The Global Economy, World Bank.

Notes: 1) Sample size was 27 for all indicators; 2) economic growth is the percentage change of real GDP.

Table 2 reports the chi-square test of independence and goodness of fit test (shaded area of the table). In this category, only two outcomes of the chi-square test of independence, the GDP in current prices and GDP per capita in current prices, showed a statistically significant association with oil price frequencies. Meanwhile, the Phi coefficient for both GDP in current prices and GDP per capita in current prices was 0.542, which indicated a strong and statistically significant correlation with a 0.005 level. Thus, the findings failed to confirm the null hypotheses for GDP and GDP per capita in current prices.

Moreover, all variables showed statistically significant results and produced relatively higher chi-square values for the goodness of fit test, excluding economic growth. Thus, the goodness of fit test failed to reject the null hypothesis for economic growth, but for all other variables, the null hypothesis was rejected, indicating a statistically significant difference between the expected year of increase and decrease (13.5) and the actual year.

Table 2. Crosstabulation and Chi-square test of independence and goodness of fit for economic growth and GDP variables

			Economic Growth		Total
			Decreased	Increased	
Oil Price	Decreased	Count	7 (25.9%)	4 (14.8%)	11 (40.7%)
		Exp. count	5.7	5.3	11.0
	Increased	Count	7 (25.9%)	9 (33.3%)	16 (59.3%)
		Exp. count	8.3	7.7	16.0
Total		Count	14 (51.9%)	13 (48.1%)	27 (100.0%)
		Exp. count	14.0	13.0	27.0

		Goodness of fit test—Economic Growth			
Pearson Chi-square – value	1.033		Observed	Expected	Residual
Pearson Chi-square – sig.	0.310	Increased	13	13.5	-0.5
Continuity correction – value	0.390	Decreased	14	13.5	0.5
Continuity correction – sig.	0.532	Chi-square	0.037		
Fisher's exact test (2-sided)	0.440	Asymp. Sig.	0.847		

			GDP—2010 prices		Total
			Decreased	Increased	
Oil Price	Decreased	Count	4 (14.8%)	7 (25.9%)	11 (40.7%)
		Exp. count	2.9	8.1	11.0
	Increased	Count	3 (11.1%)	13(48.1%)	16 (59.3%)
		Exp. count	4.1	11.9	16.0
Total		Count	7 (25.9%)	20 (74.1%)	27 (100.0%)
		Exp. count	7.0	20.0	27.0

Pearson Chi-square – value	1.053	Goodness of fit test—GDP 2010 Prices			
Pearson Chi-square – sig.	0.305		Observed	Expected	Residual
Continuity correction – value	0.336	Increased	20	13.5	6.5
Continuity correction – sig.	0.562	Decreased	7	13.5	-6.5
Fisher's exact test (2-sided)	0.391	Chi-square	6.259		
		Asymp. Sig.	0.012		

			GDP—Current prices		Total
			Decreased	Increased	
Oil Price	Decreased	Count	6 (22.1%)	5 (18.5%)	11 (40.7%)
		Exp. count	2.9	8.1	11.0
	Increased	Count	1 (3.7%)	15 (55.6%)	16 (59.3%)
		Exp. count	4.1	11.9	16.0
Total		Count	7 (25.9%)	20 (74.1%)	27 (100.0%)
		Exp. count	7.0	20.0	27.0

Pearson Chi-square – value	7.917	Goodness of fit test—GDP Current prices			
Pearson Chi-square – sig.	0.005		Observed	Expected	Residual
Continuity correction – value	5.602	Increased	20	13.5	-6.5
Continuity correction – sig.	0.018	Decreased	7	13.5	6.5
Phi coefficient Value	0.542	Chi-square	6.259		
Phi coefficient App.Sig.	0.005	Asymp. Sig.	0.012		

			GDP per capita—PPP		Total
			Decreased	Increased	
Oil Price	Decreased	Count	5 (18.5%)	6 (22.2%)	11 (40.7%)
		Exp. count	3.3	7.7	11.0
	Increased	Count	3 (11.1%)	13 (48.1%)	16 (59.3%)
		Exp. count	4.7	11.3	16.0
Total		Count	8 (29.6%)	19 (70.4%)	27 (100.0%)
		Exp. count	8.0	19.0	27.0

Pearson Chi-square – value	2.229	Goodness of fit test—GDP Per Capita PPP			
Pearson Chi-square – sig.	0.135		Observed	Expected	Residual
Continuity correction – value	1.133	Increased	19	13.5	5.5
Continuity correction – sig.	0.287	Decreased	8	13.5	-5.5
Fisher's exact test (2-sided)	0.206	Chi-square	4.481		
		Asymp. Sig.	0.034		

			GDP per capita—Current Prices		Total
			Decreased	Increased	
Oil Price	Decreased	Count	6 (22.2%)	5 (18.5%)	11(40.7%)
		Exp. count	2.9	8.1	11.0
	Increased	Count	1 (3.7%)	15 (55.6%)	16 (59.3%)
		Exp. count	4.1	11.9	16.0
Total		Count	7 (25.9%)	20 (74.1%)	27 (100.0%)
		Exp. count	7.0	20.0	27.0

Pearson Chi-square – value	7.917	Goodness of fit test—GDP Per Capita Current Prices			
Pearson Chi-square – sig.	0.005		Observed	Expected	Residual
Continuity correction – value	5.602	Increased	20	13.5	6.5
Continuity correction – sig.	0.018	Decreased	7	13.5	-6.5
Phi coefficient Value	0.542	Chi-square	6.259		
Phi coefficient App.Sig.	0.005	Asymp. Sig.	0.012		

			GDP per capita—2010 Prices		Total
			Decreased	Increased	
Oil Price	Decreased	Count	5 (18.5%)	6 (22.2%)	11(40.7%)
		Exp. count	3.3	7.7	11.0
	Increased	Count	3 (11.1%)	13 (48.1%)	16 (59.3%)
		Exp. count	4.7	11.3	16.0
Total		Count	8 (29.6%)	19 (70.4%)	27 (100.0%)
		Exp. count	8.0	19.0	27.0

Pearson Chi-square – value	2.229	Goodness of fit test—GDP Per Capita 2010 Prices			
Pearson Chi-square – sig.	0.135		Observed	Expected	Residual
Continuity correction – value	1.133	Increased	19	13.5	5.5
Continuity correction – sig.	0.287	Decreased	8	13.5	-5.5
Fisher's exact test (2-sided)	0.206	Chi-square	4.481		
		Asymp. Sig.	0.034		

***Source**:* Author's calculations based on data from The Global Economy and World Bank.

Notes: 1) Calculated percentages inside the brackets are the share of each cell in the total count; 2) degrees of freedom (df) is 1 for all variables throughout the test results.

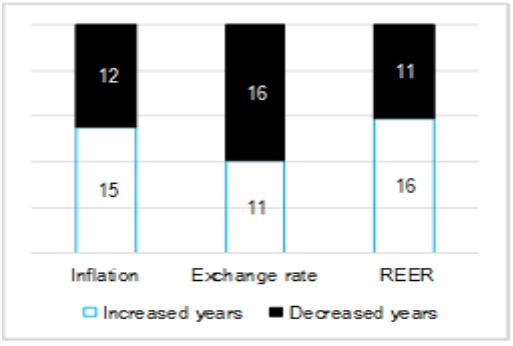
5.2. Inflation and Exchange Rate

Inflationary effects and exchange rate indicators are essential points to consider when analyzing international trade and investment. Panel *a* in Figure 2 reports the summary statistics of three variables: inflation as the percentage change in the consumer price index; the exchange rate, which is the local currency per U.S. dollar; and the REER (the base year being 2000). Inflationary pressures on the economy were high during the early years of independence (1992–1997), but began to ease in around 2004. Although the mean value of inflation was 119.93% in the period of 1991–2019, the average rate of inflation was 6.23% between 2000–2019. The coefficient of variation also pointed to the more spread out distribution of inflation compared to the other three variables.

Azerbaijan applies a fixed exchange rate regime despite claims of officials to the contrary in 2015 (Statement of the Central Bank of the Republic of Azerbaijan, 2015a; 2015b). Excluding the period of 1991–1993, the average exchange rate of AZN against USD was 0.99, which was close to the mean value for 1991 and 2019 (0.90). As a result of the fixed exchange rate regime, the standard deviation and coefficient of variation were also relatively low compared to the inflation dynamics. High oil revenues were shown to have appreciated the national currency, particularly between 2008 and 2015, leading to a maximum value of 132.92 in 2014. However, compared to the previously analyzed variables, the distribution of REER showed higher stability, as indicated in Figure 2. Finally, inflation and REER had more increased years than decreased years, which reflected the unfavorable conditions in the country in terms of exports and FDI. The exchange rate had more decreased years than increased years between 1991–2019, which illustrated the appreciated national currency alongside inflationary pressures in the economy.

a. Summary statistics

	Min.	Max.	Mean	St.Dev	Coefficient of Variation
Inflation	-10.6	1662.2	118.93	368.92	310.19
Exchange rate	0.01	1.72	0.90	0.40	44.55
REER	7.388	132.924	92.74	27.38	29.53



b. Frequency of increased and decreased years

Figure 2. Summary statistics and frequency of inflation and exchange rate, 1991–2019.

***Source**:* The Global Economy, World Bank, and Islamic Bank of Development.

Notes: 1) Sample size was 27 for all indicators; 2) inflation is the percentage change in the consumer price index, exchange rate is the local currency units per U.S. dollar and the base year for the real effective exchange rate is 2000.

Table 3 reports the outcomes of the chi-square test of independence and goodness of fit for inflation, exchange rate, and REER.

Between 1993 and 2019, no statistically significant association between the frequencies of oil prices and inflation, exchange rate, or REER was noted, which allows us to accept the null hypothesis for the test of independence. However, these findings diverge from previous findings by Ağazade (2008), Hasanov & Samadova (2010), Hasanov, (2010), and Dikkaya & Doyar (2017), who found that oil prices were the statistically significant identifier of the national currency's value in Azerbaijan. This apparent incongruity could be due to the limited ability of the chi-square test to capture the causality of the determined relationship.

Table 3. Crosstabulation and Chi-square test of independence and goodness of fit for exchange rate variables, 1993–2019

			Inflation—Test of Independence		Total
			Decreased	Increased	
Oil Price	Decreased	Count	5 (18.5%)	6 (22.2%)	11 (40.7%)
		Exp. count	4.9	6.1	11.0
	Increased	Count	7 (25.9%)	9 (33.3%)	16 (59.3%)
		Exp. count	7.1	8.9	16
Total		Count	12 (44.4%)	15 (55.6%)	27 (100.0%)
		Exp. count	12.0	15.0	27.0

Pearson Chi-Square Value	0.008	Inflation—Goodness of fit test			
Pearson Chi-Square – Sig.	0.930		Observed	Expected	Residual
Continuity Correction Value	0.000	Increased	15	13.5	1.5
Continuity Correction – Sig.	1.000	Decreased	12	13.5	-1.5
Fisher's exact test (2-sided)	1.000	Chi-square	0.333		
		Asymp. Sig.	0.564		

			Exchange Rate—Test of Independence		Total
			Decreased	Increased	
Oil Price	Decreased	Count	6 (22.2%)	5 (18.5%)	11 (40.7%)
		Exp. count	6.5	4.5	
	Increased	Count	10 (37.0%)	6 (22.2%)	16 (59.3%)
		Exp. count	9.5	6.5	
Total		Count	16 (59.3%)	11 (40.7%)	27 (100.0%)
		Exp. count	16.0	11.0	27.0

Pearson Chi-Square Value	0.171	Exchange Rate—Goodness of fit test			
Pearson Chi-Square – Sig.	0.679		Observed	Expected	Residual
Continuity Correction Value	0.000	Increased	11	13.5	-2.5
Continuity Correction – Sig.	0.988	Decreased	16	13.5	2.5
Fisher's exact test (2-sided)	0.710	Chi-square	0.926		
		Asymp. Sig.	0.336		

			REER—Test of Independence		Total
			Decreased	Increased	
Oil Price	Decreased	Count	5 (18.5%)	6 (22.2%)	11 (40.7%)
		Exp. count	4.5	6.5	11.0
	Increased	Count	6 (22.2%)	10 (37.0%)	16 (59.3%)
		Exp. count	6.5	9.5	16.0
Total		Count	11 (40.7%)	16 (59.3%)	27 (100%)
		Exp. count	11.0	16.0	27.0

Pearson Chi-Square Value	0.171	REER—Goodness of fit test			
Pearson Chi-Square – Sig.	0.679		Observed	Expected	Residual
Continuity Correction Value	0.000	Increased	16	13.5	2.5
Continuity Correction – Sig.	0.988	Decreased	11	13.5	-2.5
Fisher's exact test (2-sided)	0.710	Chi-Square	0.926		
		Asymp. Sig.	0.336		

***Source**:* Author's calculations based on The Global Economy, World Bank data, Islamic Bank of Development.

Notes: 1) calculated percentages inside the brackets are the share of each cell in the total count; 2) degrees of freedom (df) is 1 for all variables throughout the test results.

5.3. International Trade and Investment

Similar to economic GDP variables, the extractive industry boosted international trade and investment dynamics in a short period in Azerbaijan. Between 1992 and 2018, oil and gas production concentrated FDI in the extractive industry, leading to

a high level of exports and a positive current account and trade balance (Fig. 3a). Imports had more increased years than any other category in this section, which was mainly due to stimulated demand towards foreign goods and services resulting from excess mineral revenue and the booming economy (Fig. 3b).

a. Summary statistics

	Min.	Max.	Mean	St.Dev	Coefficient of Variation
Exports	0.79	37.21	13.76	13.09	95.13
Imports	1.02	19.72	8.51	6.59	77.39
FDI	0.13	5.29	2.86	1.68	54.23
Current account balance	–2.59	17.14	4.39	6.16	140.07
Trade balance	–2.08	21.33	5.27	7.79	147.81

b. Frequency of increased and decreased years

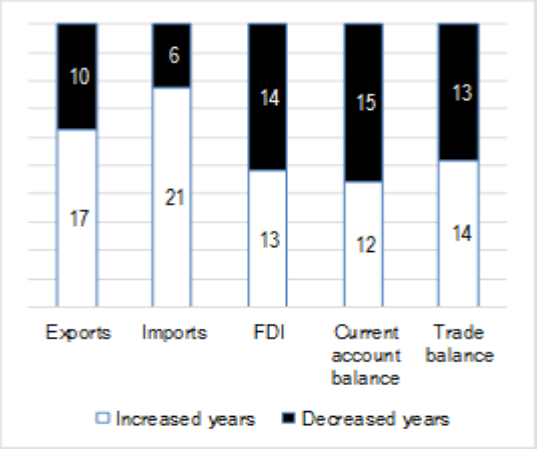


Figure 3. Summary statistics and frequency of international trade and investment, 1992–2018

***Source**:* The Global Economy, World Bank.

Notes: 1) Sample size was 27 for all variables; 2) observation range for the frequency figure is based on 28 years, including the replaced missing data for early 1990s; 3) missing data for the period of 1992–1995 were replaced by the series mean; 4) exports, in billion USD, Imports in billion USD, FDI in billion USD, Current account balance in %, and trade balance in %.

Table 4 reports the results of the chi-square test of independence and goodness of fit test for international trade and FDI between 1992–2018. Only the trade balance indicated an insignificant relationship; in contrast, the frequencies of exports, imports, FDI, and CAB were statistically significant at a level of 0.050 in the test of independence. Moreover, the Phi coefficient indicated a statistically significant association in exports (0.613) and imports (0.463). The goodness of fit test found a non-random deviation from the expected increased and decreased year only for the imports. Therefore, the results of the test of independence accepted the alternative hypothesis, excluding the trade balance, but failed to accept the alternative hypothesis in the goodness of fit test (with the exception of one variable: imports).

Table 4. Crosstabulation and chi-square test of independence and goodness of fit for international trade and investment variables, 1992–2018

			Exports—Test of Independence		Total
			Decreased	Increased	
Oil Price	Decreased	Count	8 (29.6%)	2 (7.4%%)	10 (37.0%)
		Exp. count	4.1	5.9	10.0
	Increased	Count	3 (11.1%)	14 (51.9%)	17 (63.0%)
		Exp. count	6.9	10.1	17.0
Total		Count	11 (40.7%)	16 (59.3%)	27 (100%)
		Exp. count	11.0	16.0	27.0

Pearson Chi-Square Value	10.139	Exports—Goodness of fit test			
Pearson Chi-Square – Sig.	0.001		Observed	Expected	Residual
Continuity Correction Value	7.721	Increased	17	13.5	3.5
Continuity Correction – Sig.	0.005	Decreased	10	13.5	–3.5
Phi coefficient Value	0.613	Chi-square	1.815		
Phi coefficient App.Sig.	0.001	Asymp. Sig.	0.178		

			Imports—Test of Independence		Total
			Decreased	Increased	
Oil Price	Decreased	Count	5 (18.5%)	1 (3.7%)	6 (22.2%)
		Exp. count	2.4	3.6	6.0
	Increased	Count	6 (22.2%)	15 (55.6%)	21 (77.8%)
		Exp. count	8.6	12.4	21.0
Total		Count	11 (40.7%)	16 (59.3%)	27 (100%)
		Exp. count	11.0	16.0	27.0

Pearson Chi-Square Value		5.797	Imports—Goodness of fit test			
Pearson Chi-Square – Sig.		0.016		Observed	Expected	Residual
Continuity Correction Value		3.750	Increased	21	13.5	7.5
Continuity Correction – Sig.		0.053	Decreased	6	13.5	–7.5
Phi coefficient Value		0.463	Chi-square	8.333		
Phi coefficient App.Sig.		0.016	Asymp. Sig.	0.004		
			FDI—Test of Independence			Total
				Decreased	Increased	
Oil Price	Decreased	Count		7 (25.9%)	7 (25.9%)	14 (51.9%)
		Exp. count		5.7	8.3	14.0
	Increased	Count		4 (14.8%)	9 (33.3%)	13 (48.1%)
		Exp. count		5.3	7.7	13.0
Total		Count		11 (40.7%)	16 (59.3%)	27 (100%)
		Exp. count		11.0	16.0	27.0
Pearson Chi-Square Value		1.033	FDI—Goodness of fit test			
Pearson Chi-Square – Sig.		0.039		Observed	Expected	Residual
Continuity Correction Value		0.390	Increased	13	13.5	–0.5
Continuity Correction – Sig.		0.532	Decreased	14	13.5	0.5
Phi coefficient Value		0.196	Chi-Square	0.037		
Phi coefficient App.Sig.		0.310	Asymp. Sig.	0.847		
			Current Account balance			Total
				Decreased	Increased	
Oil Price	Decreased	Count		9 (33.3%)	6 (22.2%)	15 (55.6%)
		Exp. count		6.1	8.9	15.0
	Increased	Count		2 (7.4%)	10 (37.0%)	12 (44.4%)
		Exp. count		4.9	7.1	12.0
Total		Count		11 (40.7%)	16 (59.3%)	27 (100%)
		Exp. count		11.0	16.0	27.0
Pearson Chi-Square Value		5.185	Current Account balance			
Pearson Chi-Square – Sig.		0.023		Observed	Expected	Residual
Continuity Correction Value		3.546	Increased	12	13.5	-1.5
Continuity Correction – Sig.		0.60	Decreased	15	13.5	1.5
Phi coefficient Value		0.438	Chi-Square	0.333		
Phi coefficient App.Sig.		0.023	Asymp. Sig.	0.564		
			Trade Balance—Test of Independence			Total
				Decreased	Increased	
Oil Price	Decreased	Count		7 (25.9%)	4 (14.8%)	11 (40.7%)
		Exp. count		5.3	5.7	11.0
	Increased	Count		6 (22.2%)	10 (37.0%)	16 (59.3%)
		Exp. count		7.7	8.3	16.0
Total		Count		13 (48.1%)	14 (51.9%)	27 (100.0%)
		Exp. count		13.0	14.0	27.0
Pearson Chi-Square Value		1.784	Trade Balance—Goodness of fit test			
Pearson Chi-Square – Sig.		0.182		Observed	Expected	Residual
Continuity Correction Value		0.890	Increased	14	13.5	0.5
Continuity Correction – Sig.		0.345	Decreased	13	13.5	–0.5
Fisher's exact test Value		0.252	Chi-Square	0.037		
Fisher's exact test – Sig.		0.173	Asymp. Sig.	0.847		

***Source**:* Author's calculations based on data from The Global Economy and World Bank.
Notes: 1) the calculated percentages inside parentheses are the share of each cell in the total count; 2) degrees of freedom (df) is 1 for all variables throughout the test results.

6. Conclusions

The economic patterns observed in relation to procyclical resource-rich economies demonstrate decreased performance and weakened macroeconomic conditions during bust periods. Azerbaijan has achieved historic peaks in its macroeconomic indicators in a short space of time since independence from the Soviet Union thanks to its abundant oil reserves and oil production; however, the recent commodity crisis has had a sobering effect on the government and policymakers and has revealed the inherent dangers of resource-driven economies in terms of cyclicality.

The analysis of the Azerbaijan economy through the crosstabulation and chi-square test of independence and goodness of fit test revealed a cyclicality in GDP and GDP per capita (both being in current prices), exports, imports, current account balance, and FDI with oil prices. The present research found a statistical significance in the non-random deviation of GDP (current and 2010 prices), GDP per capita (current and PPP), and imports from the expected value (13.5). This aspect of the economy invites policymakers and decision-makers to establish better institutional regulations regarded spending of the oil revenue and boosting non-oil sectors, as their prices are not volatile like mineral exports. The failure to do so is likely to jeopardize both the achievements of the national economy and the country's future economic potential—two outcomes that are further threatened by the downward trend in extractive industry production and exports.

In addition to addressing the over-dependency on oil and lack of diversification in the economy, governments of small, mineral-exporting countries like Azerbaijan should also be cognizant of macroeconomic stability. Understanding cyclicality and essential macroeconomic variables according to their frequencies would allow for a better understanding of economic cyclicality. Thus, the results of this study should be handled carefully as a complex topic like cyclicality requires a more comprehensive approach than statistical tests like the chi-square test of independence and goodness of fit. These analytical techniques are relatively simple and might not fully examine the patterns of the cyclicality in the Azerbaijan economy. However, the transformation of available macroeconomic data into frequencies allowed us to start the conceptualization of the cyclicality in Azerbaijan. The lack of prior research regarded cyclicality or frequency analysis of the Azerbaijan economy, and the initial status of this research should also be kept in mind.

References

Ağazade, S. (2018). Reel Döviz Kuru ve Petrol Fiyatlari İlişkisinde Asimetri: Azerbaycan Örneğinde Bir İnceleme [Asymmetry in The Relationship Between Real Exchange Rate and Oil Prices: An Analysis for Azerbaijan]. *Uluslararası İktisadi ve İdari İncelemeler Dergisi*, 113–126, http://static.dergipark.org.tr:8080/article-download/41ed/ff0d/dfb7/5b69922386743.pdf?, accessed on 10/03/2020.

Ahmadov, I. (2016). Azerbaijan's New Macroeconomic Reality: How to Adapt to Low Oil Prices. *Caucasus Analytical Digest*, N83, 2–5, http://www.laender-analysen.de/cad/pdf/CaucasusAnalyticalDigest83.pdf, accessed on 01/04/2020.

Ahmadov, I. (2017). Diversification Problems of Azerbaijani Economy: Obstacles and Solutions, http://edf.az/ts_general/eng/layihe/IIED/policy-papers/ingilab-ahmadov_diversification.pdf, accessed on 02/04/2020.

Aliyev, K., & Suleymanov, E. (2015). Macroeconomic Analysis and Graphical Interpretation of Azerbaijan Economy in 1991-2012. *Expert Journal of Economics*, 3(1), 40–49.

Aslanli, K. (2016). Lower Oil Revenues, Higher Public Debt: The Fiscal Policy Implications of Low Oil Prices in Azerbaijan. *Caucasus Analytical Digest*, N83, 11–15, http://www.laender-analysen.de/cad/pdf/CaucasusAnalyticalDigest83.pdf, accessed on 02/04/2020.

Bayramov, G., & Conway, P. (2010). The Azerbaijan Producers Survey: Dutch Disease and Financial Crisis. *Economic Research Center,* Baku, http://www.erc.az/files/reports/Bayramov_Conway_Azerbaijan.pdf accessed on 01/03/2020.

Bayramov, V., & Abbas, G. (2017). Oil shock in the Caspian Basin: Diversification policy and subsidized economies. *Resources Policy*, 54, 149–156.

Ciarreta, A., & Nasirov, S. (2012). Development trends in the Azerbaijan oil and gas sector: Achievements and challenges. *Energy Policy*, 40, 282–292.

Czech, K. (2018). Oil Dependence of Post-Soviet Countries in the Caspian Sea Region: The Case of Azerbaijan and Kazakhstan. *Acta Scientiarum Polonorum. Oeconomia*, 17(3), 5–12.

Decree of the President of the Republic of Azerbaijan, (2016). "Strategic Road Map for the National Economic Prospects of the Republic of Azerbaijan" https://static.president.az/pdf/38542.pdf, accessed on 01/03/2020

Dikkaya, M., & Doyar, B. V. (2017). Causality Among Oil Prices, GDP and Exchange Rate: Evidence from Azerbaijan and Kazakhstan. *Bilig*, 83, 79–98.

Eurasia Extractive Industries Knowledge Hub. Azerbaijan Has Started Implementation of Fiscal Rules, http://eurasiahub.khazar.org/uploads/publications/pdf//Summary_EN_Fiscal_Rules.pdf, Accessed on 22/04/2020

European Bank of Reconstruction and Development (EBRD), (2017). Transition Report 2017–18: Sustaining Growth. London: EBRD, https://www.ebrd.com/documents/oce/pdf-transition-report-201718-english.pdf, accessed on 17/03/2020.

Falkowski, K. (2018). The Importance of Energy Resources for Azerbaijan's International Competitiveness. *Journal of International Studies*, 11(4), 44–56.

Gahramanov, E., & Fan, L. S. (2002). The "Dutch Disease" in Caspian Region: The Case of Azerbaijan Republic. *Economic Studies*, (10)5, 9–30.

Gelb, A. (2010). Economic Diversification in Resource Rich Countries. Center for Global Development, International Monetary Fund, Washington DC, 1–23.

Gojayev, V. (2010). Resource Nationalism Trends in Azerbaijan. 2004-2009. RUSSCASP Working Paper, https://www.academia.edu/7563039/Resource_Nationalism_Trends_in_Azerbaijan_2004-2009, accessed 01.03.2020.

Guliyev, F. (2016). Azerbaijan: Low Oil Prices and Their Social Impact. *Caucasus Analytical Digest*, N83, 16–21, https://www.laender-analysen.de/cad/pdf/CaucasusAnalyticalDigest83.pdf, accessed on 20/03/2020.

Guliyev, N. (2018). The Effects of External Shocks on Azerbaijan Economy, Working Paper Series, No. 02/2018, https://uploads.cbar.az/assets/53f26bb60f02187e311ef5cba.pdf, accessed on 10/04/2020.
Hajiyev, N., & Rustamov, A. (2019). How Oil Price Drops are Reflected by Imported Inflation in Azerbaijan?. *International Journal of Energy Economics and Policy*, 9(2), 182–193.
Hasanov, F. (2013). Dutch Disease and the Azerbaijan Economy. *Communist and Post-Communist Studies,* 46(4), 463–480.
Hasanov, F. (2010). The Impact of Real Effective Exchange Rate on The Non-Oil Export: The Case of Azerbaijan. Munich Personal RePEc Archive (MPRA) MPRA Paper No. 29556. 12(2), 1–10.
Hasanov, F., & Huseynov, F. (2013). Bank Credits and Non-Oil Economic Growth: Evidence from Azerbaijan. *International Review of Economics & Finance*, 27, 597–610.
Hasanov, F., & Samadova, I. (2010). The Impact of Real Effective Exchange Rate on the Non-oil Export: The Case of Azerbaijan, MPRA Paper No. 79559, https://mpra.ub.uni-muenchen.de/79559/1/MPRA_paper_29556.pdf, accessed on 30/03/2020.
Hasanov, R., & Huseynov, K. (2018). The National Currency Rate of Azerbaijan: After the Presidential Elections. *Center for Economic and Social Development* (CESD PRESS), http://cesd.az/new/wp-content/uploads/2018/04/CESD_Research_Paper_Currency_Market_2018.pdf, accessed on 05/04/2020
Hübner, G., & Jainzik, M. (2009). Splendid Isolation? Azerbaijan's Economy between Crisis Resistance and Debased Performance. *Caucasus Analytical Digest*, N6, 12–15, https://ethz.ch/content/dam/ethz/special-interest/gess/cis/center-for-securities-studies/pdfs/CAD-6-12-15.pdf, accessed on 18/03/2020.
Huseynov, N. (2017). Approach to the Azerbaijan Economic Structure: Non-Oil Sector. *North Economic Review*, 1(1), 28–40.
Huseynov, N. (2019). The Azerbaijan Economy by 2025: Crude Oil Production and Prices in the World. *Social & Economic Revue*, 17(2), 33–48.
Imamverdiyeva, S., & Aliyev, E. (2015). Assessment of Trade Policy in Terms of Export Diversification in Azerbaijan. *International Journal of Business and Social Research*, 5(9), 50–64.
Kaiser, J. (2014). Dealing with Missing Values in Data. *Journal of systems integration*, 5(1), 42–51.
Karl, T. L. (2007). Oil-led Development: Social, Political, and Economic Consequences. *Encyclopedia of energy*, 4(8), 661–672.
Kira, A. R. (2013). The Factors Affecting Gross Domestic Product (GDP) in Developing Countries. The Case of Tanzania. *European Journal of Business and Management*, 5(4), 148–158.
Mahnovski, S. (2003). Natural Resources and Potential Conflict in The Caspian Sea Region. *Rand-Publications-Mr-All Series-,* 109–143.
Mammadov, J. (2016). Oil Price Shocks and Monetary Policy in Azerbaijan: Challenges and Opportunities. *Caucasus Analytical Digest*, N83, 6–10, http://www.laender-analysen.de/cad/pdf/CaucasusAnalyticalDigest83.pdf, accessed on 01/04/2020.
McHugh, M. L. (2013). The Chi-Square Test of Independence. *Biochemia medica*, 23(2), 143–149.
Meissner, H., Martyna-David, E., & Leitner, J. (2019). Resource Driven Growth in Azerbaijan and Russia-Changes and Risks in Times of Economic Crisis. *In 9th International ASECU Conference on Systemic Economic Crisis: Current Issues and Perspectives.* Vienna, http://www.asecu.gr/files/9th_conf_files/meissner-david-and-leitner.pdf, accessed on 31/03/2020.
Mikayilov, K. (2012). "Azerbaijan's Foreign Trade Turnover: Comparative Analysis", *Center for Economic and Social Development (CESD PRESS),* http://cesd.az/new/wp-content/uploads/2011/05/CESD_Paper_Foreign_Trade.pdf, accessed on 20/03/2020.
Sadik-Zada, Elkhan (2001a). *İqtisadiyyatin Tsiklik Inkişafı* [Cyclical Development of Economic Systems], Baku: Elm.
Sadik-Zada, Elkhan (2001b). Цикличное Развитие Экономики и Перспективы Мирогого Капилатизма (Cyclical Development of Economic Systems and the Crisis of Global Capitalism). *Возрождение XXI век, 3*(37), 91–102.
State Customs Committee of the Republic of Azerbaijan, (2015). Customs Statistics of Foreign Trade of the Republic of Azerbaijan, https://customs.gov.az/modules/pdf/pdffolder/28/FILE_5ACDFE-6ABB50-5D07D4-9B4D06-DD4FB9-22847A.pdf. Accessed on 20/04/2020.
State Customs Committee of the Republic of Azerbaijan, (2016). Customs Statistics of Foreign Trade of the Republic of Azerbaijan, https://customs.gov.az/modules/pdf/pdffolder/29/FILE_82AA10-3D95DC-B6BD16-2BC4C5-AD9199-C474C7.pdf. Accessed on 24/03/2020.
Statement of the Central Bank of the Republic of Azerbaijan (2015a). https://www.cbar.az/press-release-919/statement-of-the-central-bank-of-the-republic-of-azerbaijan?language=en, accessed on 24/03/2020.
Statement of the Central Bank of the Republic of Azerbaijan (2015b). https://www.cbar.az/press-release-863/statement-of-the-central-bank-of-the-republic-of-azerbaijan, accessed on March 24, 2020.
Stutz, F. P., & Warf, B. (2012). *The World Economy: Geography, Business, Development*. Upper Saddle River, NJ: Prentice Hall.
The Global Economy (2020), www.theglobaleconomy.com, accessed on 05/04/2020.
World Economic Forum. (2016). The Global Competitiveness Report 2016–2017. Geneva: World Economic Forum, http://www3.weforum.org/docs/GCR2016-2017/05FullReport/TheGlobalCompetitivenessReport2016-2017_FINAL.pdf, accessed on 01/04/2020
Zulfigarov, F., & Neuenkirch, M. (2019). Azerbaijan and Its Oil Resources: Curse or Blessing? Universitat Trier, *Research Papers in Economics*, 11/19, https://www.econstor.eu/bitstream/10419/207043/1/1667010700.pdf, accessed on 10/04/2020.