"The relationship between monetary stability and central bank independence: The case of Azerbaijan"

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THE RELATIONSHIP BETWEEN MONETARY STABILITY AND CENTRAL BANK INDEPENDENCE: THE CASE OF AZERBAIJAN

Abstract

The independence of the central bank is one of the most important factors for effective monetary policy. Central bank independence is closely related to monetary stability, which is an important part of monetary policy. In this study, the purpose of the analysis is to understand whether monetary stability functions effectively for central bank independence in Azerbaijan using the vector autoregression method. In addition, the Granger Causality test was conducted to empirically investigate how central bank independence affects the provision of monetary stability in the economy of Azerbaijan over the data period from 1996 to 2022. In this framework, indices or variables are the exchange rate stability index (ERS) in 1996–2022, the level of monetary independence index (MI) in 1996–2020, taken from the "trilemma indexes", which are defined as the consumer price index (CPI) in 1996–2022, and the broad money supply (M2) in 1996–2022. The findings of the study show that the independence of the central bank has a positive effect on the monetary stability of the Azerbaijani economy.

Keywords	central bank independence, monetary stability, monetary independence, consumer price index, vector auto-regressive
JEL Classification	E52, E58, P44

INTRODUCTION

The beginning of the world's inflationary problems arose when countries became indebted to commercial banks when they exported banknotes to finance the wars that took place between the 18th and 20th centuries. Furthermore, the need for some significant changes in current monetary policies to ensure price stability was created by the double-digit inflation rates that resulted from the oil crisis and the collapse of the Bretton Woods system in the 1970s, as well as the inability of nations to find a solution with their current monetary policies and the ongoing increase in inflation rates (Goodfriend, 2007; Burns et al., 1979; Wang et al., 2022).

Being independent, the central bank would implement a policy aimed at ensuring price stability as its primary goal and would not use bank resources for the short-term goals of political power. For this reason, debates on central bank independence (CBI) intensified in the 1980s to prevent governments from using central bank resources for their own purposes and interests and destabilizing national economies (Barro & Gordon, 1983; Walsh, 2010).

Some central banks at the time tended to avoid getting involved in these political disputes, which allowed them to take a more successful stance in maintaining price stability – a position that eventually served as a model for other nations – and preserve the value of mon-

ey. In order to make their central banks independent, several nations that share this viewpoint have changed their legal frameworks (Hayo B.,1998; Bethlendi et al., 2019; Lentner et al., 2019; Szyszko & Rutkowska, 2022; Espinosa et al., 2023).

Azerbaijan also made some arrangements in this regard, like many other nations. Thus, in 1991, Azerbaijan established the legal framework for the Central Bank and the banking system, marking the first move in this direction. The authority and standing of the Central Bank, as well as the exchange rate of the country's currency, have all been established by this law. This law designates the Central Bank as a high-level management body that carries out state policy and oversees banking operations. It also addresses money turnover, loans, and foreign exchange transactions.

In addition to the national bank's priority goal of ensuring money stability, the question of finding a balance between stability and economic development, the influence of the independence of the national bank on monetary stability remains relevant.

1. LITERATURE REVIEW

Central Bank Independence has been a topic of significant interest in the field of economics for decades. CBI refers to the degree of independence that a central bank has in formulating and implementing monetary policy without external influence. But practical experience has proven that politicians frequently forgo the long-term goal of price stability in favor of advancing their electoral interests. Political power attempts to achieve short-term economic growth through an expansionist monetary policy that created inflation to sway public opinion and win elections (Beju, 2008; Ouyang et al., 2022). Many empirical studies have found that average inflation is negatively related to CBI measures (Cukierman et al., 1992; Eijffinger & de Haan, 1996; Walsh, 2003; Vasylieva et al., 2022; Khokhych et al., 2023; Kerimov et al., 2023a, 2023b); studies have shown that countries with higher levels of CBI tend to have lower inflation rates and are more successful in controlling inflation. The relationship between CBI and monetary stability has been a subject of extensive empirical analysis in the literature.

Cukierman et al. (1992) created the most widely used index of CBI, though other researchers, including Bade and Parkin (1988), Grilli et al. (1991), and Alesina and Grilli (1991), developed other metrics as well.

Using a random coefficient model with the Hildreth-Houck estimator, Klomp and de Haan (2010) re-examine the relationship between infla-

tion and central bank independence, as measured by the turnover rate of central bank governors and an indicator based on in force laws. The analysis covers more than 100 countries from 1980 to 2005. They conclude that there is not a generally significant inverse relationship between CBI indicators and inflation. Only a small percentage of nations see a major impact from CBI.

Furthermore, Jácome and Vázquez (2008) examined the impact of CBI on inflation in a sample of 24 Latin American and Caribbean countries between 1985 and 2002. The study found a negative correlation between CBI and inflation using panel regressions. This outcome persisted after accounting for global inflation, banking crises, and exchange rate regimes, as well as for three alternative measures of legal CBI and a measure of effective CBI. The outcome is not totally resilient, though, to the addition of a structural reform indicator, which is usually included when central bank laws are changed. Additionally, the results related to the measure of effective CBI are the only ones that provide evidence of a causal relationship between inflation and CBI.

Other empirical studies by Eijffinger and Geraats (2006) and Mukhtarov et al. (2020) also support this relationship between CBI and inflation stability. Thus, the research used data from a number of countries that extend more than 20 years to investigate the effect of CBI on inflation stability. The study's conclusions point to a solid and substantial correlation between CBI and inflation stability. In particular, researchers find that in both developed

and developing countries, higher CBI levels are associated with reduced volatility in inflation. Even after considering additional variables such as fiscal policy, external shocks, and the degree of economic development that might impact inflation stability, this relationship persists (Szymańska, 2022). Additionally, the study offers evidence that suggests a stronger correlation between CBI and inflation stability may exist in countries with higher levels of instability and corruption. This result supports the hypothesis that countries with less stable political environments and higher likelihoods of monetary policy intervention may find that independent central banks play a more significant role.

Cukierman et al. (1992) provide evidence of the negative impact of low levels of CBI on inflation. They examine the role of CBI in controlling inflation in various countries, focusing on examples where low levels of CBI have led to hyperinflation. The study analyzes the experiences of countries such as Venezuela and Zimbabwe, where political interference in monetary policy and low levels of CBI have resulted in high levels of inflation. The findings of the study suggest that there is a strong and negative relationship between low levels of CBI and high levels of inflation. Specifically, the study shows that countries with low levels of CBI are more likely to experience high and volatile inflation rates. Overall, Cukierman et al. (1992) provide important evidence of the negative impact of low levels of CBI on inflation. The findings have important policy implications, suggesting that policymakers should prioritize strengthening CBI to promote macroeconomic stability and prevent the occurrence of hyperinflation.

The connection between CBI and inflation is not always easy to understand, though. Higher CBI levels have been linked to higher inflation rates in emerging markets, according to certain studies. In the context of developed economies, De Haan and Eijffinger (2001) investigate the connection between CBI and inflation. The study concludes that lower inflation rates are correlated with higher CBI levels after analyzing data from 38 countries over a 20-year period. The argument posits that enhanced CBI allows for a more effective pursuit of monetary policy objectives, leading to improved control over inflation (Eijffinger et al., 2001).

Empirical studies have consistently shown that countries with higher levels of CBI tend to have lower inflation rates and are more successful in controlling inflation. Hefeker and Zimmer (2011) examine the relationship between CBI and inflation rates using a panel dataset of 158 countries over the period of 1970 to 2015. The study employs various econometric techniques to analyze the data and assess the impact of CBI on inflation. The findings suggest that higher levels of CBI are associated with lower inflation rates. The study also finds that the effectiveness of CBI in controlling inflation is influenced by factors such as political institutions, the level of economic development, and the degree of financial market development. The study concludes that reinforcing CBI can serve as an effective instrument for managing inflation and upholding macroeconomic stability, especially in developing nations (Hefeker & Zimmer, 2011).

However, the relationship between CBI and inflation is not always straightforward. Some studies have found that higher levels of CBI lead to higher inflation rates in emerging markets. De Haan and Eijffinger (2017) investigate the relationship between CBI and inflation rates in emerging market economies. The study analyzes data from 24 emerging market economies over the period of 1995 to 2015 and finds that higher levels of CBI are actually associated with higher inflation rates in these economies. This finding is ascribed to the inclination of emerging market economies to experience politically motivated monetary policy decisions, potentially resulting in elevated inflation rates even when independent central banks are in place. The study also examines the impact of other factors, such as economic development, financial market development, and political institutions, on the relationship between CBI and inflation. The findings suggest that the effectiveness of CBI in controlling inflation in emerging market economies is influenced by a complex set of factors, and that the relationship between CBI and inflation is not always straightforward. According to de Haan and Eijffinger's (2017) study, policymakers in emerging market economies should carefully consider the unique political and economic environments in which they operate when developing frameworks for monetary policy.

Using a variety of techniques, empirical research has also looked at the link between mon-

etary stability and CBI. A widely used approach is the Vector Autoregression (VAR) method (Zhuravka et al., 2023; Yang et al., 2023; Le et al., 2023; Seyfullayev, 2023). For instance, Riaz and Ramakrishnan's study examines the relationship between Pakistan's monetary stability and CBI. Using quarterly data from 2004 to 2018, the study applies the Vector Autoregression (VAR) approach to examine how the CBI affects inflation and other monetary stability indicators. The results imply that Pakistan has more monetary stability and lower rates of inflation when there is a higher CBI. The analysis also reveals that CBI has a favorable impact on the growth of the money supply, interest rate stability, and exchange rate stability. These findings are credited to the capacity of an independent central bank to enact more efficient monetary policies and sustain macroeconomic stability. The research also investigates the influence of political factors on the correlation between CBI and monetary stability, revealing that political instability has the potential to erode the effectiveness of CBI in controlling inflation and maintaining monetary stability. The study concludes that enhancing Central Bank Independence can serve as an effective instrument for fostering monetary stability in Pakistan, emphasizing the crucial role of political stability in ensuring the effectiveness of CBI (Haneef et al., 2012).

The Granger Causality test is another empirical technique used to examine the relationship between CBI and monetary stability. This method investigates the relationship between changes in the CBI and changes in inflation. For example, Aras and Özsoy (2018) employed the Granger Causality test in their investigation of the relationship between CBI and monetary stability in Turkey and discovered that CBI significantly affects inflation. Aras and Özsoy (2018) look into how Turkey's CBI affects inflation. The study investigates the causal relationship between CBI and inflation by using the Granger Causality test and analyzing data from 1987 to 2016. The results imply that CBI significantly affects Turkey's inflation rate. The study also finds that inflation has a significant effect on the level of CBI. According to the study, the observed results can be explained by the notion that maintaining macroeconomic stability and controlling inflation would be more effective by a central bank with greater independence. It also looks

into how other elements, like the growth of the financial system and political stability (Shkolnyk et al., 2021; Danylyshyn & Bohdan, 2022), affect the relationship between inflation and central bank independence. The results show that these variables can also have a major impact on how well the CBI controls inflation. The study's conclusion, which emphasizes the significance of taking institutional and political factors into account, is that strengthening the CBI can be a useful tool for controlling inflation and maintaining macroeconomic stability in Turkiye (Aras & Özsoy, 2018).

The possible trade-off between CBI and democratic accountability has been the subject of another research. Bodea and Hicks (2015), for instance, use a sample of 96 countries to investigate the effect of CBI on democratic accountability. The relationship between CBI and different metrics of democratic accountability, such as political representation, civil liberties, and political stability, is examined in the study using a variety of econometric techniques. The results imply that lower levels of democratic accountability are related to higher levels of CBI. The study does discover, though, that this effect is smaller in countries with strong democratic institutions. The argument posits an intricate connection between Central Bank Independence and democratic accountability. Several variables, including the quality of democratic institutions, the level of economic development, and the extent of political polarization, are asserted to influence how efficacious CBI is in promoting or hindering democratic accountability. The conclusion drawn is that, when formulating frameworks for monetary policy, policymakers should diligently assess the potential trade-offs between the benefits of CBI in fostering macroeconomic stability and the potential drawbacks to democratic accountability (Bodea & Hicks, 2015).

Similarly, Dincer and Eichengreen (2014) investigate the relationship between CBI and democratic accountability using a sample of 89 countries. The study employs various econometric techniques to analyze the impact of CBI on different measures of democratic accountability, such as political representation, civil liberties, and political stability. The findings suggest that greater levels of CBI are associated with lower levels of democratic accountability. However, the study also finds that this effect

is smaller in countries with strong democratic institutions and a long history of democratic governance. According to the study, there is a complex relationship between Central Bank Independence and democratic accountability, and CBI's ability to support or impede democratic accountability depends on a number of variables, such as the strength of democratic institutions, the degree of economic development, and the degree of political polarization. Furthermore, the study explores the impact of additional variables on the relationship between CBI and democratic accountability, including the degree of economic globalization and the degree of economic inequality. The conclusion is that when developing monetary policy frameworks, policymakers should carefully consider the potential trade-offs between the benefits of CBI in fostering macroeconomic stability and the potential disadvantages to democratic accountability, particularly in countries with weak democratic institutions (Dincer & Eichengreen, 2014).

The Autoregressive Distributed Lag (ARDL) model is another empirical method used to analyze the relationship between CBI and monetary stability. For instance, a study by Sánchez-Fung used the ARDL model to examine the relationship between CBI and inflation in five Caribbean countries. The study found that higher levels of CBI contribute to lower inflation rates in these countries. Sánchez-Fung et al. (2021) investigate the relationship between CBI and inflation in five Caribbean countries: Barbados, Jamaica, Trinidad and Tobago, Guyana, and Suriname. The study employs the Autoregressive Distributed Lag (ARDL) model using annual data from 1980 to 2019 to analyze the impact of CBI on inflation in these countries. The findings suggest that higher levels of CBI contribute to lower inflation rates in the Caribbean region. Additionally, the study reveals that in nations characterized by elevated economic development and reduced political instability, the influence of CBI on inflation is notably pronounced. This observation is ascribed to the ability of an autonomous central bank to execute more effective monetary strategies, thereby maintaining macroeconomic stability, according to the study. It also explores the impact of additional factors, such as exchange rate stability and fiscal policy, on the correlation between Central Bank Independence and inflation. The results indicate that these factors can also play a substantial role in determining the effectiveness of CBI in controlling inflation. The conclusion is that reinforcing CBI can be an effective instrument for promoting macroeconomic stability and reducing inflation in the Caribbean region, with the caveat that policymakers should also consider the specific economic and political circumstances of each country (Sánchez-Fung et al., 2021).

In Azerbaijan, to increase the central bank's independence in deciding on monetary policy, the Law on the Central Bank of Azerbaijan was revised in 2009. The central bank was given independence through the law to determine interest rates and monetary policy (Lybek, 1999).

In recent times, Azerbaijan has experienced comparatively low rates of inflation, with an average of approximately 3-4% per year. The aforementioned trend is consistent with the hypothesized relationship between inflation stability and CBI. It is important to keep in mind, though, that over 90% of Azerbaijan's export revenue comes from the country's oil exports. Thus, the country's economy and capacity to preserve monetary stability are greatly impacted by changes in the price of oil on a worldwide scale (CBAR, 2020).

Examining the effectiveness of Central Bank independence in developing nations has generated discussion. Though widely accepted as an essential component of managing inflation, particularly in developed economies, new research employing sophisticated statistical methods suggests that CBI may be more effective than previously thought in reducing inflation in developing countries. This paper aims to clarify and substantiate these findings using the Augmented Dickey-Fuller, Lagrange Multiplier, Granger Causality test under VAR, etc. to investigate the long-run relationship between CBI and monetary stability in Azerbaijan.

2. DATA AND METHODOLOGY

In this study, the relationship between the independence of the Central Bank of Azerbaijan and price stability is analyzed using various cointegration techniques and a VAR (Vector Autoregression) framework. In this framework,

indices or variables are the exchange rate stability index (ERS) in 1996–2022, the level of monetary independence index (MI) in 1996–2020, taken from the "trilemma indexes" (Aizenman et al., 2008), which is defined as the consumer price index (CPI) in 1996–2022, and the broad money supply (M2) in 1996–2022, taken from the statistics of the World Bank (World Bank, 2023; Białek, 2020). To start the analysis, some preliminary tests, namely, autocorrelation, heteroscedasticity (constancy of the variance of the deviations), and normal distribution of residuals tests, were conducted, and the stability of the established model was checked. So, before estimating the parameters of the model, the stationarity of the variables was checked using unit root tests, and for this purpose, the Augmented Dickey-Fuller (ADF) test was used. Based on the results of the Augmented Dickey-Fuller test, if the variables and residuals of the model are stationary, a VAR model will be constructed to estimate the causal relationship between the variables. Subsequently, the Lagrange Multiplier (LM) test will be applied to assess the presence of autocorrelation issues between the model residuals, and the results will be analyzed. To investigate potential variance issues in the model, the White Test will be executed to confirm homoscedasticity under the null hypothesis, provided that the LM test indicates no autocorrelation problem with the residuals. Following this, a Normal Distribution Test will be performed on the model's residuals to determine their distribution. If the residuals are found to be normally distributed and all other model conditions are satisfied, a standard Granger causality test will be conducted under VAR assumptions to examine the existence of a causal relationship between the variables. Based on the obtained results, the relationship between CBI and monetary stability can be determined.

2.1. Exchange Rate Stability Index (ERS)

To measure exchange rate stability, annual standard errors of monthly exchange rates between current and base countries are calculated and a formula between 0 and 1 is entered to normalize the index.

$$ERS = \frac{1}{1 + \frac{stdev(exch\_rate)}{|d \log E_t / dt| + 0.01}}, \qquad (1)$$

where *stdev(exch_rate)* is the annual standard error of currencies, $|d \log E_t / dt|$ is the modular value of the annual depreciation of the exchange rate as of December. The approach of this index to 1 indicates that the exchange rate of the current country is more stable than the exchange rate of the base country. The annual real exchange rate dynamics in Azerbaijan from 1996 to 2014 was less than 1. But since 2015, this indicator began to grow, and in 2017 it was 1.72. During 2018–2022, this indicator remained unchanged and amounted to 1.7.

2.2. Monetary Independence Index (Monetary Index – MI)

The monetary independence level index (Monetary Independence – MI) is measured as the annual inverse correlation of monthly interest rates between current and base countries.

$$MI = 1 - \frac{corr(i_i, i_j) - (-1)}{1 - (-1)}, \qquad (2)$$

where "*i*" is the current country, and "*j*" is the base country. As can be seen from the equation, the maximum and minimum values are 1 and 0, respectively. The closer the index is to 1, the higher the monetary independence, and the closer it is to 0, the less monetary independence.

So, the main country is considered to be the country closely related to the current country's monetary policy. Which countries are the main ones, and which ones are designated based on the IMF, Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), and CIA (Central Intelligence Agency) Factbook (Aizenman & Hutchison, 2016). The annual monetary independence index dynamics in Azerbaijan (1996-2020) has such a dynamic. From 1996 to 1997, the MI indicator increased from 0.5 to 0.7, and starting from 1997, the indicator began to decrease, and during 2000-2009, fluctuated between 0.2-0.4. Starting from 2010, this indicator began to grow, and in 2015, it reached the mark of 0.79 and began to decrease again. In 2020, it reached the mark of 0.09.

2.3. Consumer Price Index (CPI)

The price index that is most frequently monitored is the consumer price index. The entire cost of all

goods and services bought for consumption is represented by the consumer price index (CPI). This index is calculated monthly by the State Statistics Committee. After computation, the inflation rate is determined by comparing the new index to the index from the prior period. Formula (3) is the rate of inflation formula.

$$Inflation\ Rate = \frac{CPI_1 - CPI_0}{CPI_0} \cdot 100. \qquad (3)$$

In this case, the base country consumer price is denoted by "CPI_0", and the current country is represented by "CPI_1." The annual dynamics of the consumer price index in Azerbaijan (1996-2022) during the entire period grew, and from the mark of 51 in 1996, it reached 195.76 in 2022.

2.4. Money supply growth (M2)

The "M2 Money Supply", also referred to as the "M2 Money Stock", is a measure for the amount of currency in circulation. M2 includes M1 (physical cash and checkable deposits) as well as "less liquid money", such as saving bank accounts. Plots the yearly M2 growth rate and the inflation rate, which

is defined as the yearly change in the Consumer Price Index (CPI). When inflation is high, prices for goods and services rise, and thus the purchasing power per unit of currency decreases. The dynamics of the annual money supply index in Azerbaijan (1996-2022) increased throughout the entire period. During 1996-2005, growth was slow and from 0.3 in 1996 reached 1.84 in 2005. Since 2006 (the indicator was 3.43), the indicator began to grow and reached a value of 42.82 in 2022.

3. EMPIRICAL RESULTS AND DISCUSSION

Unit root tests should be used to verify the stationarity of the variables prior to estimating the model parameters. The Augmented Dickey-Fuller (ADF) test was employed for this purpose. Table 1 displays the test results.

Table 1 shows the results of the augmented Dicky-Fuller test, which show that the variables were I(1) because they are stationary at the first difference. This result suggests that the model can be con-

Table 1. Unit root test results

Source: Critical values are taken from a table developed by MacKinnon (1996).

Level					
Variable	**t-tests**	**p-value**	**Lag Length***	**Test critical values****	
MI	−1.753371	0.3922	0	1%	−3.788030
CPI	1.988460	0.9997	0	5%	−3.012363
ERS	−2.559652	0.1167	1	10%	−2.646119
M2	−1.723645	0.9663	1		−
First Difference					
Variable	**t-test**	**p-value**	**Lag Length***	**Test critical values****	
Δ MI	−5.535469	0.0002	0	1%	−3.788030
Δ CPI	−2.727040	0.0862	0	5%	−3.012363
Δ ERS	−3.255922	0.0314	1	10%	−2.646119
Δ M2	−3.720962	0.0116	0		−

Note: * Schwarz information criteria; ** MacKinnon (1996) one-sided p-values. The maximum delay length was taken as 4, and the optimal delay was determined by the Schwarz criterion.

Table 2. Lag interval tests

Information criterion						
Lag	**Log*L***	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	−40.09388	NA	0.000783	4.199417	4.398374	4.242596
1	35.57570	115.3060*	2.77e−06	−1.483400	−0.488617*	−1.267506
2	57.26654	24.78954	1.96e−06*	−2.025385*	−0.234775	−1.636777*

Note: * indicates the number of delays selected based on the criterion; *LR*: shows the modified LR (Lagrange multipliers) test (at 5% significance level); *FPE*: Final prediction error; *AIC*: Akaike information criterion; *SC*: Schwarz information criterion; *HQ*: Hannan-Quin information criterion.

structed using the variables within the given time interval because the variables and residuals of the model are stationary.

Building a VAR model is required to determine the causal relationship between the variables. To determine the vector to be evaluated, the ideal number of lags for the dynamic model, and the estimation of the VAR model containing all endogenous variables with a randomly chosen lag length, tests are utilized to determine the number of lags in the residuals. Table 2 displays the results of the tests. A lag length of two was found to be appropriate by three of the applied tests, and this duration was used as the starting point for the analysis that followed.

Subsequently, the Lagrange Multiplier (LM) test is executed, and the results are acquired to assess the presence of an autocorrelation issue within the model's residuals. The obtained LM test results reveal the absence of any autocorrelation problem among the residuals. The outcomes of the LM test are presented in Table 3.

Table 3. LM test results

Lags	LM-Statistics	P-value
1	14.73760	0.5439
2	19.76466	0.2310
3	22.49405	0.1279
4	18.48602	0.2962

The inverse roots must be less than 1, that is, they must be found inside the unit circle, in order for the VAR model to remain stable. It is evident from Figure 1 that every inverse root is situated on the same circle. This indicates that the stability requirement is fully met by the VAR model.
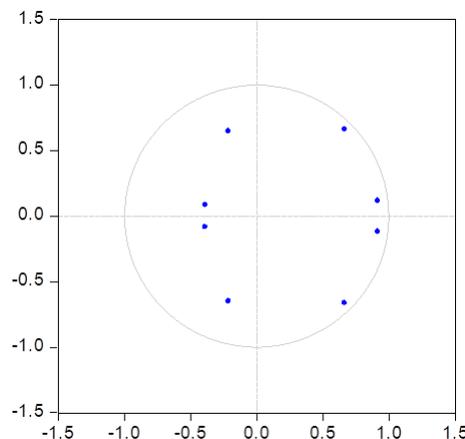
Furthermore, the existence of different variance problems in the model was established as a consequence of the White test that was performed. Thus, it is evident from this test that homoscedasticity is the null hypothesis. Table 4 provides a description n of the test results. The table shows that this hypothesis is not rejected because the probability value, or 0.3036, is greater than 0.05. Stated differently, the conclusion is that this model does not have a heteroskedasticity problem.

Table 4. White test results

Chi Square	df	P-value
168.6867	160	0.3036

Next, the Normal Distribution Test was used to determine whether or not the model's residuals are normally distributed. The results are shown in Table 5. The table shows that the model's residuals have a normal distribution.

Table 5. Normal distribution test results

Panel B: Normal Distribution Test [b]			
Statistics	χ^2	df	P-value
Jarque-Bera	3.710149	8	0.8823

Ultimately, a standard Granger causality test was carried out under VAR assumptions to ascertain whether there was causality between the variables after it had been confirmed that all other model conditions had been met. Table 6 presents the test's findings.

As can be seen from Table 6, at the 10% significance level, the hypothesis "LOG(MI) does not Granger cause LOG(CPI)" is rejected, but the hypothesis "LOG(CPI) does not Granger cause LOG(MI)" is not rejected. Thus, there is a one-way causality from

Figure 1. Inverse roots

Table 6. Granger causality test results

Null hypothesis	F-value	df	p-value
LOG**MI** does not Granger cause LOG**CPI**	5.195588	2	0.0744
LOG**CPI** does not Granger cause LOG**MI**	4.116332	2	0.1277
LOG**ERS** does not Granger cause LOG**CPI**	16.01102	2	0.0003
LOG**CPI** does not Granger cause LOG**ERS**	2.732812	2	0.2550
LOG**M2** does not Granger cause LOG**CPI**	17.43476	2	0.0002
LOG**CPI** does not Granger cause LOG**M2**	0.831537	2	0.6598

the monetary independence level index to the consumer price index. This means that there is some evidence to suggest that changes in MI have a statistically significant relationship with changes in CPI. Specifically, it suggests that changes in MI (Monetary Independence) can help to predict or influence changes in CPI (Consumer Price Index), but the reverse is not true. In other words, MI may be a leading indicator or predictor of inflation as measured by CPI. In practical terms, these results indicate that monetary independence levels, which might include central bank policies and actions, have a statistically significant influence on changes in consumer prices.

According to other results from the test, the hypothesis "LOG(ERS) does not Granger cause LOG(CPI)" is rejected, but the hypothesis "LOG(CPI) does not Granger cause LOG(ERS)" is not rejected. This means that there is a one-way causality from the fixed exchange rate index to the consumer price index. Given the results, this suggests there is a causal relationship between exchange rate stability and CPI, but it is a one-way relationship. Changes in exchange rate stability appear to Granger cause changes in CPI, meaning exchange rate stability can be used to predict CPI movements. However, the reverse relationship, where changes in CPI predict changes in exchange rate stability, is not statistically supported based on the test at the specified significance level. In practical terms, this means that exchange rate stability, which reflects the stability or volatility of a country's currency exchange rates, can influence or predict changes in the Consumer Price Index. The results imply that exchange rate stability could be a useful indicator for forecasting inflation or deflation. In February 2015, the exchange rate of the Azerbaijani manat against the US dollar rose from 0.7 to 1.05. By December of the same year, the exchange rate further increased to 1.72. The observed fluctuations in the exchange rate had a discernible impact on inflation within Azerbaijan. This situation in 2015 also supports this result.

In the final result of the test, although the hypothesis "LOG(M2) does not Granger cause LOG(CPI)" is rejected, the hypothesis "LOG(CPI) does not Granger cause of LOG(M2)" is not rejected. Here, as in the other two hypotheses, there is evidence of a one-way causal relationship between the broad money supply and the consumer price index. This implies that changes in the broad money supply (M2) can influence or predict changes in the Consumer Price Index (CPI), reflecting inflation or deflation. Monetary policymakers often monitor money supply as an indicator for making policy decisions related to inflation control. Theoretically, the increase in money supply increases investment and consumption expenditures, creating upward pressure on prices and resulting in increased inflation. However, the reverse relationship, where changes in CPI predict changes in M2, is not supported by the test results.

Klomp and de Haan (2010) and Jácome and Vázquez (2008) re-examine the relationship between CBI. They conclude that there exists a negative relationship between indicators of CBI and inflation. CBI has a significant effect only in a minority of the countries. Other some empirical studies have found that average inflation is negatively related to measures of CBI (Cukierman, 1992; Eijffinger & de Haan, 1996; Walsh, 2003, ch. 8). Studies have shown that countries with higher levels of CBI tend to have lower inflation rates and are more successful in controlling inflation. When looking at the conducted studies, the results can confirm the effect of CBI on inflation stability is also supported by other empirical studies (Eijffinger & Geraats, 2006; Berger et al., 2001). The findings of the study suggest that there is a strong and robust relationship between CBI and inflation stability. Similarly, Aras and Özsoy's (2018) findings suggest that CBI has a significant impact on inflation for Turkey's economy.

CONCLUSION

The purpose of the study is to empirically investigate the effect of the independence of the Central Bank on the provision of monetary stability in the economy of Azerbaijan. The long-run effects of the Central Bank Independence level on price stability, which is the ultimate statutory goal, are analyzed empirically. Thus, to determine the long-term effects of the level of independence of the Central Bank on price stability, the inflation rate is evaluated by tracking it within the framework of time series analysis. As a result of the study, Granger Causality test was evaluated using a VAR (Vector Autoregression) approach to investigate the effects of Central Bank Independence on price stability. Then, autocorrelation, heteroscedasticity (constancy of variance of deviations), normal distribution of residuals, and stability of the built model were checked in the models used in the analysis. The obtained LM test results reveal the absence of any autocorrelation problem among the residuals. The model's residuals have a normal distribution.

In addition, to perform the Granger Causality test under VAR, it was investigated whether the variables are stationary or not. After completing all initial performance tests and ensuring the necessary conditions were met, a Granger causality test was conducted. This test, based on VAR assumptions, aimed to determine if there was a causal relationship between variables. The results confirmed the positive impact of CBI on ensuring monetary stability. To put it another way, one of the most important requirements for preserving monetary stability is that the central bank be as independent as possible; based on the study's findings, actions can be taken to make the bank more independent so that the chairman of the central bank's term of office is not dependent on political power and can be extended from the current three years to five years or longer.

AUTHOR CONTRIBUTIONS

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