Effects of Some Macroeconomic Variables on Economic Growth

Mohammad Omar Lutfy
Lutfy114@gmail.com
Parwan University, Afghanistan
Mohammad Bilal Tayeb
m.bilaltayeb@gmail.com
Alberoni University
Mohommad Edris Belal
Edris.belal@gmail.com
Kabul Institute of Accounting
Abdul Mohammad Qudosi
Qudosiajmal@gmail.com
Pryadko Svetlana
pryadko_s@bsu.eu.ru
Belgorod National Research University, Russia

Abstract: The economy is significantly impacted by macroeconomic variables. Both enterprises and nations are equally impacted. Economists and policymakers frequently research the interrelationships among various macroeconomic variables. This study's main goal is to evaluate how various macroeconomic factors affect economic growth. GDP has been used in place of the economy's development as a dependent variable in this study, whereas interest rates, inflation (INF), and exchange rates have been used as independent variables. Furthermore, all econometric analyses in this work were conducted using time series secondary data spanning from 2002 to 2020. On the other hand, we used multiple linear regression to examine the overall impact of macroeconomic factors on the expansion of the economy, the Durbin-Watson (DW) statistic technique to confirm the autocorrelation of variables, and the ADF (Augmented Dickey-Fuller) test to investigate the unit root (stationary property) of data. The results show that there is no long-term association between GDP and the interest rate or exchange rate, but there is a short-term relationship between GDP and the rate of inflation. Ultimately, nevertheless, there is a strong and inverse relationship between GDP and interest and exchange rates, as well as a strong and positive association between GDP and inflation.

Keywords: economic growth, exchange rate, gross domestic product (gdp), inflation, interest rate

1. Introduction

The ability of an economy to generate more goods and services results in economic growth. This ability to enhance production capacity is known as economic growth. Furthermore regarded as the foundational element of economic policy is economic growth. Numerous economic indicators, including the GDP growth rate, total factor productivity (TFP), human development index (HDI), and GDP growth rate, can be used to assess a nation's level of development (Smyth, 1995). The sluggish and unsustainable rate of economic growth in emerging nations has long caused issues for the government, experts, and politicians. High inflation, rising foreign debt, exchange rate swings, increased spending rather than saving, the effects of bad policy and governance, trade imbalances, higher expenses associated with lower income, scarcity of energy and water, political unrest, etc. are the main causes of unsustainable growth. One of the primary objectives of policymakers is to effectively formulate economic policies by maintaining a low rate of inflation and a steady increase in the pace of economic growth. The ability of an economy to raise its production capacity and so become more capable of creating more units of goods and services is referred to as economic growth. The degree of economic development determines the relationship between macro indicators including GDP, the labor market, inflation, purchasing power index, consumer confidence survey, exchange rate, and interest rate, and GDP growth rate. A nation's economic health is enhanced by rapid growth that does not raise inflation. Afghanistan is a developing nation with improper utilization of its natural resources and insufficient investment in its already-existing resources. It is believed that financial capital, which makes up a significant portion of the nation's needs, as well as technology and capital equipment must be imported in order to adequately employ the resources. The impact of various factors on the gross domestic product of Afghans has been examined in this research since it is thought to be the most significant indicator of economic conditions. One of the variables that can impact GDP is inflation. Theoretically, rising inflation drives up demand while driving up output levels to boost GDP and total productivity.

According to Keynesian theory, the economy is more vulnerable to inflation when output levels are at or above potential GDP, but not when inflationary pressures are high during a recession. Reduced unemployment and higher demand are the results of increased output. Demand rises in response to pay increases because consumers may spend more freely. Both inflation and a larger GDP result from this. One of the variables influencing GDP is the interest rate; a higher rate makes borrowing more expensive, decreases disposable income, and slows the expansion of consumer expenditure. Interest rate hikes both raise the exchange rate and lessen inflationary pressures. Reduced interest rates promote investment and consumption by lowering the cost of borrowing. Growth in the economy and aggregate demand

follow from this. There could be inflationary pressures as a result of this increase in aggregate demand. GDP is also impacted by the currency rate. According to (Friedman, 1953), variable rates serve as shock absorbers from outside sources. Changes in the comparable price level are used to make adjustments in the case of the precise exchange rate target. However, in a world with Keynesian prices, the adjustment happens slowly, burdening the economy excessively and ultimately impeding growth. Furthermore, interest rate changes result in considerable costs for the economy in attempting to preserve the peg in the event that the currency is challenged under full (or at least high) capital mobility. In this context, (Fisher, 2001) describes how unfettered capital flows across borders destabilize pegs and cause catastrophic recessions during times of crises in the contemporary era. With Afghanistan as an example, an analysis of the impact of a few macroeconomic variables on the economic growth of developing nations has been attempted in this paper. This study paper's primary goal is to comprehend how factors like interest rates, inflation, and exchange rates affect Afghanistan's economic expansion. The theories taken into account in this study include:

1. The gross domestic product (GDP) is significantly impacted by interest rates.

2. The gross domestic product (GDP) is significantly impacted by the exchange rate.

3. The gross domestic product (GDP) is significantly impacted by inflation.

In Table 1, the situation of inflation, interest rate, and exchange rate in Afghanistan from 2002 to 2020 is shown.

Table 1

Data of variables (Source: World Bank)

Years	GDP	Interest rate	Inflation rate	Real Exchange rate
2002	7228795956	8.736826667	3.15687	47.263
2003	7867263298	9.00056	6.1893	48.76275358
2004	7978515683	9.12548	8.15478	47.8453125
2005	8874480241	9.855862	12.68626872	49.4945975
2006	9349921934	10.04689711	6.78459655	49.92533083
2007	10642672018	-3.58511111	8.680570785	49.96201777
2008	11060395173	12.55796015	26.41866415	50.24961474
2009	13426272143	17.54292893	-6.811161089	50.325
2010	15354612621	11.36409374	2.178537524	46.452461
2011	15420077746	-1.241506002	11.80418581	46.74700774
2012	17386490330	7.174387244	6.441212809	50.9214
2013	18360263258	9.784495938	7.385771784	55.3775
2014	18860496593	14.35168934	4.673996035	57.2475
2015	19134221745	12.25254816	-0.661709165	61.14346154
2016	19566715276	17.58393816	4.383891955	67.86608577
2017	20084646856	12.14117829	4.975951506	68.02690408
2018	20323499126	13.75730271	0.626149149	72.08324718
2019	21118473812	13.62728839	2.302372515	77.73794918
2020	20621957232	13.49727408	5.61	76.81353644

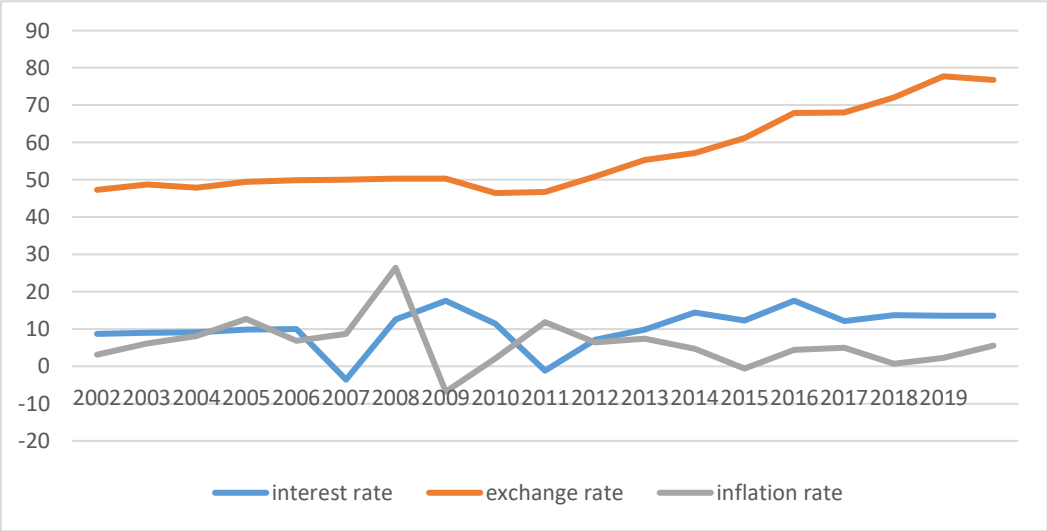

Figure 1. Trend of the independent variables in years 2002-2020

Based on the information received from the World Bank, it shows that the interest rate has fluctuated over time but has encountered fewer changes. At the same time, inflation has fluctuated less during the above years, but the real exchange rate has been on the rise during the period, showing a decrease in the value of the domestic currency.

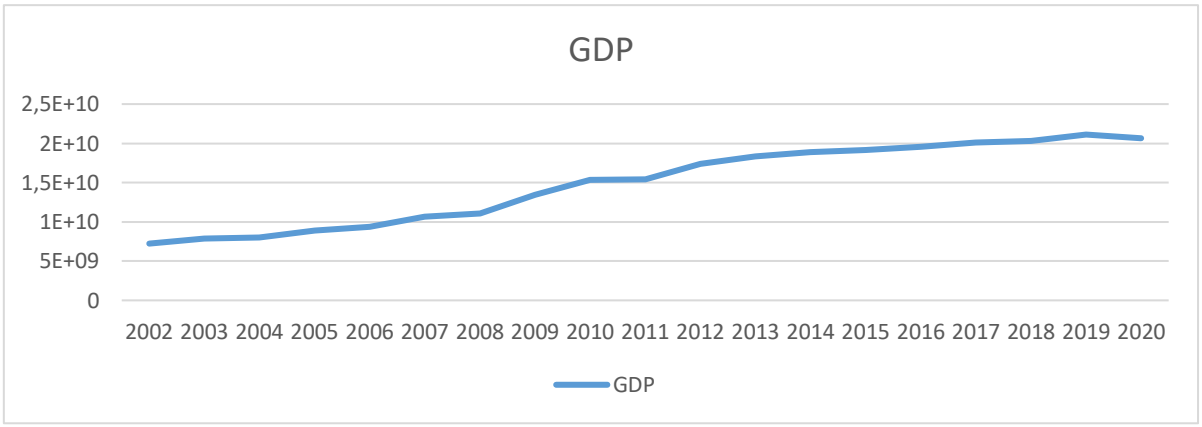

Figure 2. Ttrend of GDP in years 2002-2020

Figure 2 shows the state of the gross domestic product, which indicates an upward trend. In 2002, these figures were at a very low level, and in recent years, they have shown high figures.

Literature review

In his scientific paper titled The Impact of Inflation on Afghanistan's Economic Growth, (Faten, 2020) delves into the matter. He attempted to use the ARDL model in this work to investigate the short- and long-term correlations. He also made use of monthly secondary data from January 2010 to December 2016. His research indicates that there is a correlation between inflation and economic growth in the short run, but no discernible relationship exists between the two variables over the long run.

The impact of exchange rate shocks on economic growth has been the subject of research by (Muhsin & Akbar, 1389) in their work Nonlinear Effects of

Macroeconomic Variables on Economic Growth with Emphasis on the Exchange Rate (Case of Iran). The results of the aforementioned study support the main research hypothesis, which is that negative impulses have a significantly greater impact on slowing economic growth than positive impulses due to the imbalance of positive and negative impulses in the exchange rate. Positive exchange rate shocks have little influence on production, but negative shocks to the real exchange rate-that is, the strengthening of the home currency's real value-reduce economic growth.

In his research thesis, "The Effect of Determined Variables on the Economic Growth of Nairobi," (Kyalo, 2020) tackles this subject. The variables that affect economic growth in this paper are foreign direct investment, inflation, and currency rates. Time series data from 1970 to 2018 were used as secondary data in this study. According to his research, there is a large positive correlation between foreign direct investment and economic growth in Kenya, however there is a negative and significant correlation between inflation and growth. Lastly, there is a substantial correlation between the exchange rate and Kenya's pace of economic growth.

In his study, (Mukit, 2021) looked at the impact of macroeconomic factors on Bangladesh's economic growth as well as the effects of independent variables like inflation, imports, and exports. In this work, time series from 1982 to 2019 representing second-hand data have been studied. The results of this study indicate that imports had a large and negative impact on Bangladesh's economic growth, whereas exports had a slight but favorable influence. However, the rate of inflation has had a beneficial and significant impact.

In his article, (Panga, 2014) examined macroeconomic factors and India's economic expansion. The data gathered between 2004 and 2014 is examined in this article. His study's findings demonstrate that factors influencing GDP growth include inflation, net domestic investment, and gross domestic savings.

In the article, (Račić & Stanić, 2019) examined the impact of macroeconomic factors on the GDP growth of Bosnia and Herzegovina. This work examines time series data from 2005 to 2018 that has been obtained through secondary data analysis. The analysis employed a multivariate linear regression model. According to his research's findings, the majority of study factors have an impact on economic growth. Among them are imports, which have a significant impact on GDP, followed by FDI and exports, which have a larger impact.

The article by (Wulandari, Utomo, & Narmaditya, 2020) examined the connection between macroeconomic factors and Malaysia's economic expansion. The data used in this study was examined on a quarterly basis between 2010 and 2017. The study's findings indicate that while exporting and transferring electronic money has a negative association with GDP over the short and long terms, investment has a favorable link both ways.

2. Data, Methodology and Experimental Results

2.1. Data

As it has been reviewed in the theoretical foundations, various research has been conducted on the related topic in different geographies. Additionally, the research models are taken into account in several ways concurrently. Secondary data, which is regarded as a time series spanning from 2002 to 2020, was employed in this study. The World Bank website provided the aforementioned data.

2.2. Research model

In this study, the Dickey-Fuller unit root (ADF) test was used to guarantee data stability. Regression analysis was used to examine the impact of the independent factors on the dependent variable after the data's stability was confirmed.

The statistical model that was employed in this study to look at how macroeconomic factors affected Afghanistan's GDP growth is shown below:

$Y = \beta_o + \beta 1X1 + \beta 2X2 + \beta 3X3 + Ɛ$……1

Y = amount of GDP β_o - constant coefficient, X1 is the exchange rate of dollar against Afghani, X2 is the inflation level, X3 is the bank interest rate, and E is the level of error in the research.

Equation 1 can be written as follows:

$Y\ (GDP) = \beta_o + \beta 1INT + \beta 2INF + \beta 3EXR + Ɛ$ …….2

In equation (2), Y represents the variable of the model, which is the GDP, β represents the coefficients in the model, INF is the inflation level in Afghanistan, INT is the bank interest rate, EXR is the exchange rate of the dollar against the Afghani, and Ɛ represents the error level.

2.3. Experimental results

The Dickey-Fuller unit root test findings are displayed in Table 2 and indicate that the variables in the model are stationary at first difference for the exchange rate and gross domestic product, but stationary at level for the inflation rate and interest rate variables. Based on the existing theories, if the data is stationary at the level and the first difference, the ARDL model can be used.

Table 2

Unit test root of the variables

Variables	Details	T	Level	Prob.
GDP	Gross domestic Products	-5.115193	I(1)	0.01
INF	Inflation	-4.624585	I(0)	0.0021
INT	Interest rate	-3.323481	I(0)	0.0290
EXR	Exchange rate	-2.464091	I(1)	0.0172

Source: own calculation

The limits test in Table 3 indicates that there is a long-term relationship between the variables. There may be a long-term association in the model if the null hypothesis is disproved. The data derived from the aforementioned table demonstrate

that there is a long-term link between the variables and that the null hypothesis is rejected at the 5% significant level.

Table 3

Bound test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Sig.	Bond critical value I(0)	I(1)
F-statistic	3.864585	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Own calculations

Table 4's findings demonstrate that the independent and dependent variables have a substantial long-term association. This test demonstrates that there is a significant long-term link between the independent factors and the dependent variable.

Table 4

Log-Term Relationship of Variables

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	0.102585	0.067966	1.509362	0.1655
INFR(-1)	1.05E+08	65766527	0.000000	0.0000
INTR	-16715212	32248732	0.000000	0.0000
EXR	-54024765	30984421	0.000000	0.0000
C	2.21E+09	1.51E+09	0.000000	0.0000

Source: Own calculations

Table 5 displays the short-term relationship between the variables. Based on the statistics presented in the table, it is evident that there was a short-term relationship between the variables, but the relationship between GDP and inflation was negative in the first interval. However, it does not demonstrate a short-term correlation between interest rate and exchange rate factors.

Table 5

Short-Term Relationship between the Variables

ARDL Model Dependent variable: GDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.452373	0.233973	-1.933437	0.0852
D(INFR)	-11223014	15193892	0.000000	0.0000
D(INFR(-1))	-76459007	17063390	0.000000	0.0000
CointEq(-1)*	0.102585	0.019418	5.283076	0.0005
R-squared 0.708899 Adjusted R-squared 0.641722 Durbin-Watson stat 1. 1.571373				

Source: own calculations

Table 6 shows the model recognition tests in the data. Since the ARDL model requires that the researched data have normality, the co-variance between the

variables also exists within the normal range. Therefore, taking into account the statistics shown in the table below, the data has the necessary normality, and the covariance is at the appropriate level.

Table 6

Diagnostic Tests

Tests	Results
Normality Test	0.781265
Breusch–Godfrey Serial Correlation Test	0.7430
Heteroscedasticity Test: ARCH	0.7134

Source: Own calculations

3. Results and finding

For politicians and other economic decision-makers, the expansion of a nation's gross domestic product (GDP) is one of the most crucial and significant topics. In the meanwhile, a variety of factors, such as interest rates, currency rates, and inflation rates, affect GDP. An attempt has been made to investigate the impact of the three variables on GDP in this study. The research employs quantitative data that was collected through a documentary method. The World Bank website provided the data for this study, which covered the years 2002 to 2020. The inferential statistics approach (ARDL) was applied to the data analysis. The model's output indicates that the GDP and the rate of inflation have a short-term link. The findings show that while there is no correlation between GDP, interest rate, and exchange rate in the short term, there is a significant and negative correlation between GDP, interest rate, and exchange rate as well as a positive correlation between GDP and inflation over the long run.

References

Faten, M. F. (2020). The Impact of Inflation on Economic Growth in Afghanistan. Kardan Journal of Economics and Management Sciences, 40-50.

Faten, M. F. (2020). The Impact of Inflation on Economic Growth in Afghanistan. Kardan Journal of Economics and Management Sciences, 40-50.

Fisher, S. (2001). Exchange Rate Regimes: Is the Bipolar View Correct? Journal of Economic Perspectives, 15, 3-24.

Friedman, M. (1953). The Case of Flexible Exchange Rates. CESifo Working Paper, 1-34.

Kyalo, L. M. (2020). Efects of selected macroeconomic variable on the economic growth in Kenya. Nairobi: University of Nairobi.

Muhsin, M., & Akbar, S. (1389). The nonlinear effects of macroeconomic variables on economic growth with an emphasis on the exchange rate (Case study of Iran). Tehran University, 1-29.

Mukit, M. M. (2021). Impact of Macroeconomic Variables on GDP of Bangladesh: An Empirical analysis. Kardan Journal of Economics and Management Sciences, 82-93.

Panga, D. M. (2014). Macroeconomic Variables and Economic Growth in India. UNNAYAN, 14-21.

Račić, Ž., & Stanić, S. (2019). ANALYSIS OF MACROECONOMIC FACTORS EFFECT TO GROSS DOMESTIC PRODUCT OF BOSNIA AND HERZEGOVINA USING THE MULTIPLE LINEAR REGRESSION MODEL. Economics, 91-97.

Smyth, D. (1995). Inflation and Total Factor Productivity in Germany. Journal of EconomicResearch, 403-405.

Wulandari, D., Utomo, S., & Narmaditya, B. (2020). The relationship between economic growth and Macroeconomic indicators in Indonesia. Journal of International Studies, 139-148.