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Analyzing the Relationship Between Inflation and Unemployment in Afghanistan (2003-2021)

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Abstract: Inflation and unemployment are two key elements in any market economy, and their relationship significantly impacts socio-economic conditions. This study examines the connection between Afghanistan's unemployment and inflation, providing crucial information for macroeconomic policymakers. The study explores the applicability of the Phillips Curve in Afghanistan's specific economic context. This study employs the Ordinary Least Squares (OLS) method to analyze data gathered from 2003 to 2021, aiming to identify patterns and relationships that may guide economic policy decisions. The results indicate a positive relationship between inflation and unemployment. However, this relationship is statistically insignificant, and there is no proof to substantiate the presence of a Phillips Curve in Afghanistan. This lack of alignment with traditional economic models underscores the necessity for tailored economic policies to address the specific challenges faced by the Afghan economy. The study highlights the importance of understanding local economic dynamics and suggests that policymakers should explore alternative approaches to managing inflation and unemployment, ultimately fostering sustainable economic growth.

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INTRODUCTION

The relationship between inflation and unemployment has been a central topic in economic theory (Alisa, 2015). Historically, two competing views have emerged. One theory, known as the neutrality of money, posits that money is ineffective in influencing economic variables in the long run. The other, based on classical economic ideas, suggests that excess cash can eventually lead to inflation, increased production, and decreased unemployment (Lucas, 1996). Hume (1752) first articulated these ideas, setting the stage for later developments in macroeconomic theory.

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In 1958, economist A.W. Phillips introduced the now-famous Phillips curve, illustrating an inverse relationship between inflation and unemployment. This concept has been foundational in macroeconomics, suggesting that lower unemployment leads to higher inflation and vice versa(Phillips, 1961). However, the relationship between inflation and unemployment is not static. Economic policies can influence both variables in the short term, but their interaction may differ in the long run (Samuelson & Solow, 1960). Despite its widespread use, the Phillips curve faced criticism, particularly during the stagflation of the 1970s, when many economies faced both high inflation and high unemployment simultaneously (Friedman, 1968); economists like Milton Friedman (1968) argued that the Phillips Curve applies only in the short term and that there is no long-term tradeoff between inflation and unemployment

Subsequent research, including studies by Niskanen (2002) and Reichel (2004), has examined the applicability of the Phillips curve in various countries. For instance, Niskanen (2002) found that the inverse relationship between inflation and unemployment exists only in the short term, whereas Reichel (2004) observed no significant relationship in several advanced economies. Other studies, such as those by Zhang et al. (2008) and Karanassou and Sala (2009), have further tested the Phillips curve framework, contributing to a more nuanced understanding of the inflation-unemployment relationship. While these studies have provided valuable insights, they have primarily focused on advanced economies, with less attention given to emerging economies like Afghanistan.

This study investigates the connection between inflation and unemployment in Afghanistan from 2003 to 2021, marked by significant socio-economic challenges. Given Afghanistan's unique political and economic context, understanding this relationship is critical for effective policy-making. The study will use data analysis techniques to explore the nature of the inflation-unemployment correlation in Afghanistan and compare the results with global findings. This will provide valuable insights for policymakers, helping them navigate the challenges of inflation and unemployment to promote economic stability and growth in Afghanistan.

Previous research on inflation and unemployment has yielded mixed results. Studies by Gal and Gertler (1999) in the United States and Kitov and Kitov (2013) in Japan have highlighted the role of inflation expectations and long-term dynamics in shaping this relationship. Other studies, such as those by Ribba (2015) and Alisa (2015), found that the Phillips curve does not hold consistently across different national contexts, including Russia and the United States. Similarly, research by Furuoka (2007) and Reichel (2004) has questioned the applicability of the Phillips curve in the long run across several advanced economies.

Despite these extensive studies, the specific dynamics of inflation and unemployment in Afghanistan remain underexplored. This study aims to address this gap by analyzing the relationship between inflation and unemployment in Afghanistan's unique economic

environment, providing a clearer understanding of the forces at play and offering policy recommendations tailored to the Afghan context.

Research Objectives

1. To examine the connection between inflation and unemployment in Afghanistan from 2003 to 2021.
2. To assess the relevance of the Phillips curve in Afghanistan's economic context.
3. To recommend economic policies for managing inflation and unemployment in Afghanistan.

Research Hypotheses

Null Hypothesis (H0): Inflation and unemployment in Afghanistan from 2003 to 2021 are significantly related.

Alternative Hypothesis (H1): There is no significant relationship between inflation and unemployment in Afghanistan from 2003 to 2021

RESEARCH METHOD

This study uses a quantitative research design to explore the relationship between inflation and unemployment in Afghanistan. The analysis relies on secondary data collected from various reputable sources, including the World Bank, Da Afghanistan Bank annual reports, and other reliable economic databases. This secondary data includes annual economic indicators for Afghanistan from 2003 to 2021, covering variables such as inflation rates (obtained from World Development Indicators and Statista), unemployment data (sourced from Trading Economics), interest rates, and exchange rates (both derived from World Development Indicators).

The analysis used the ordinary least squares (OLS) technique to examine relationships between dependent and independent variables in macroeconomic studies. OLS is suitable when the data meet certain assumptions, such as linearity, homoscedasticity, and the absence of multicollinearity (Harrell, 2015). The OLS method allows for estimating the parameters of a linear regression model while minimizing the sum of squared residuals (Harrell, 2015).

A multiple linear regression model was formulated to assess the connection between inflation and unemployment, with the model defined as follows:

$\text{Inflation} = \beta_0 + \beta_1 * \text{Unemployment} + \beta_2 * \text{Interest Rate} + \beta_3 * \text{Exchange Rate} + \varepsilon.$

In this model:

Inflation is the dependent variable. U

Unemployment, interest rates, and exchange rates are independent variables Beta0 represents the intercept, Beta1, Beta2, and Beta3 are the coefficients to be estimated, and ε symbolizes the error term.

This model aims to examine how changes in unemployment, interest rates, and exchange rates influence inflation over the specified period. By incorporating multiple independent variables, the model aims to understand the economic factors driving inflation comprehensively. To perform the analysis, the data were input into SPSS (Statistical Package for the Social Sciences) software, which was utilized for regression analysis. SPSS is widely used in econometric research because it can efficiently handle large datasets and perform various statistical tests. After inputting the data, the OLS method was applied to estimate the coefficients and assess the statistical significance of each independent variable in explaining changes in inflation.

Descriptive Statistic

The descriptive statistics for Exchange, inflation, Interest, and unemployment rates are stated below.

Table 1: *Descriptive Statistics for the Exchange rate, inflation, Interest rate, and unemployment*

Variable	N	Mean	SD	Variance	Skewness	Kurtosis
Exchange rate	19	58.29	11.74	137.76	0.79	-0.95
Inflation	19	5.99	6.36	40.52	1.09	1.20
Interest rate	19	9.83	4.85	23.50	-1.72	3.65
Unemployment	19	9.16	1.55	2.41	1.17	1.58

Note: *N = sample size, Mean = average value, SD = standard deviation, Variance = variance, Skewness = skewness statistic, Kurtosis = kurtosis statistic.*

Source: *World Development Indicators, Trading Economics and Statista*

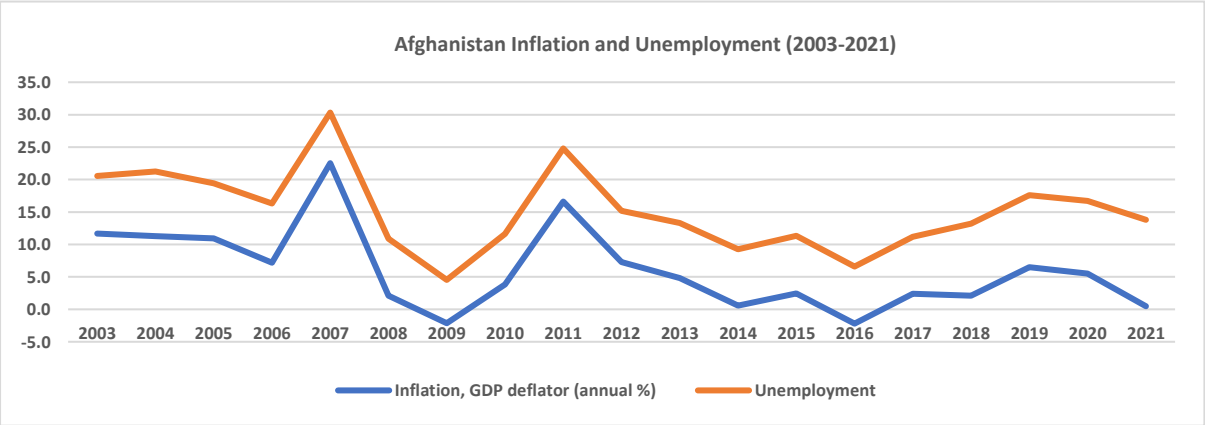

Figure 1. *Afghanistan inflation and unemployment*

Unit root tests

The Augmented Dickey-Fuller (ADF) test is primarily used to assess whether a time series has a unit root, which would indicate non-stationarity. The key objective of the test is to determine whether to accept or reject the null hypothesis based on the t-statistic and p-value. (Harris, 1992)

The null hypothesis (H0) of the ADF test suggests that the time series contains a unit root, indicating it is non-stationary and follows a random walk or trend.

The alternative hypothesis (H1) proposes that the time series is stationary and has no unit root.

The decision to accept or reject the null hypothesis is made by comparing the p-value with a pre-specified significance level (typically 0.05 or 5%). If the p-value is less than 0.05, we reject the null hypothesis, which suggests that the series is stationary. On the other hand, if the p-value is more significant than 0.05, we fail to reject the null hypothesis, indicating that the series is non-stationary and may require differencing or other methods to make it stationary. (Harris, 1992)

Table 2: *Unit root test for inflation*

Test statistics	**t-Statistic**	**P-value.***
Augmented Dickey-Fuller(ADF) test	-3.20	0.03

Test Critical Values

- 1% level: -3.86
- 5% level: -3.04
- 10% level: -2.66

Note. *MacKinnon (1996) one-sided p-values.*

The null hypothesis is rejected at the 5% significance level because the p-value (0.03) is below 0.05. This indicates that the inflation series is stationary and lacks a unit root. Moreover, the ADF test statistic (-3.20) exceeds the critical value at the 5% level (-3.04), providing additional evidence to support the rejection of the null hypothesis.

Table 3: *unit root test for unemployment*

Test statistics	**t-Statistic**	**P-value.***
Augmented Dickey-Fuller(ADF) test	-6.12	0.0001

Test Critical Values

- 1% level: -3.89
- 5% level: -3.05
- 10% level: -2.67

Note. *MacKinnon (1996) one-sided p-values.*

The unemployment p-value (0.0001) falls significantly below the 0.05 threshold, enabling us to dismiss the null hypothesis at the 5% significance level. This suggests that the unemployment data series is stationary and lacks a unit root. Additionally, the Augmented Dickey-Fuller (ADF) test statistic of -6.12 is more harmful than the critical value at the 5% level, providing further evidence to support the rejection of the null hypothesis.

Evaluating Autocorrelation Using the Durbin-Watson Test

The Durbin-Watson test is employed to evaluate the presence of autocorrelation among residuals in regression analysis. Generally, a Durbin-Watson statistic near 2 indicates an absence of autocorrelation, suggesting that the residuals are not sequentially correlated. Values below 2 point to a positive serial correlation, while those exceeding 2 imply a negative one. In this research, the Durbin-Watson statistic presented in Table 4 is 2.009. This value's proximity to 2 suggests that the regression model does not exhibit significant autocorrelation among its residuals.

FINDINGS

This segment showcases the findings from an analysis of data investigating the correlation between inflation and three independent factors: unemployment, interest rates, and exchange rates in Afghanistan from 2003 to 2021. The study employed ordinary least squares (OLS) regression techniques to evaluate the proposed hypotheses and investigate these relationships.

Model Summary

The model summary from the OLS regression study is shown in Table 4. The model's dependent variable is inflation, and its three predictors are unemployment, interest rate, and exchange rate.

Table 4: *Model Summary*

Model	R	R^2	Adjusted R^2	Standard Error of the Estimate	Durbin-Watson
1	0.93[a]	0.88	0.85	2.63	2.009

Note: *Predictors: (constant), interest, unemployment, exchange rate*

The correlation coefficient (R = 0.93) indicates a strong positive relationship between inflation and the independent variables. This implies that the value of inflation tends to fluctuate predictably and steadily in tandem with changes in the values of the independent variables.

With an R-squared of 0.88, the independent variables in the model can account for around 88% of the variation in the dependent variable, inflation. This high R-squared value shows that the model fits the data quite well, with changes in interest rates, unemployment, and exchange rates accounting for most inflationary swings.

The adjusted R-squared value, which accounts for the number of independent variables in the model, is 0.85, marginally less than R-squared. This change is crucial because, even if a predictor does not significantly contribute to explaining the dependent variable, adding more predictors to the model can artificially increase R Square. After adjusting for the number of predictors, the model's adjusted R-squared of 0.851 indicates that it explains around 85.1% of the variation in inflation. The significance of the chosen predictors further supports the good fit of the model.

Lastly, the average difference between the observed inflation levels and the regression model's projected values is 2.63, or the Standard Error of the Estimate (SEE). Stated differently, it represents the usual degree of inaccuracy in the model's forecasts. The model's predictions align with the observed values when the SEE is smaller. The number of 2.63 indicates that, on average, the actual observed inflation levels and the expected inflation values differ by around 2.63 units.

ANOVA Results

The regression model's ANOVA (Analysis of Variance) results, which evaluate the model's overall significance, are displayed in Table 5.

Table 5: *Anova(Analysis of Variance)*

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	613.85	3	204.61	29.59	0.000[b]
	Residual	82.98	12	6.91		
	Total	696.83	15			

Note: *a. Dependent Variable: Inflation*

b. Predictors: (Constant), Interest, Unemployment, Exchange rate

The ANOVA results show that the overall regression model is statistically significant, with an F-value of 29.59 and a p-value of 0.000, below the standard alpha level of 0.05. This indicates that at least one of the predictors—interest rate, unemployment, or exchange rate—significantly affects inflation. Additionally, the model explains a substantial proportion of the variance in inflation, as evidenced by the large regression sum of squares (613.85) compared to the residual sum of squares (82.98).

Regression Coefficients

Table 6 presents the Coefficients for each predictor in the regression model. These coefficients help interpret the relationship between inflation and each independent variable (unemployment, exchange rate, and interest rate).

Table 6: *Coefficients*

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	21.30	6.28		3.39	0.005
	Unemployment	1.56	0.80	0.22	1.93	0.078
	Exchange rate	-0.35	0.09	-0.42	-3.54	0.004
	Interest	-0.99	0.14	-0.77	-7.34	0.000

Note: *Dependent Variable: Inflation*

Constant: The predicted inflation value when all independent variables are zero is represented by the constant term, which is 21.30. This value (p = 0.005) is statistically significant.

Unemployment: The coefficient for unemployment is 1.56, meaning that for every unit rise in unemployment, there is a corresponding 1.56-unit increase in inflation. However, this association may not be statistically robust at the 0.05 level, as it is only marginally significant (p = 0.078).

Exchange Rate: The exchange rate's coefficient is -0.35, meaning that for every unit increase in the exchange rate (likely due to a devaluation of the local currency), there is a 0.35 unit drop in inflation. There is statistical significance in this link (p = 0.004).

Interest Rate: The coefficient for interest is -0.99, indicating a 0.99-unit drop in inflation for every unit increase in the interest rate. There is a strong inverse relationship between interest rates and inflation, as evidenced by this highly significant relationship (p = 0.000).

DISCUSSION

With a particular emphasis on the functions of unemployment, interest rates, and exchange rates, the Ordinary Least Squares (OLS) analysis in this study offers important insights into the relationship between inflation and important economic variables in Afghanistan. The results provide implications for future research and policy-making, and they highlight some intriguing findings, particularly in light of Afghanistan's distinct economic environment.

Unemployment and Inflation

In Afghanistan, there is a positive correlation (coefficient = 1.56) between unemployment and inflation, indicating that when unemployment rises, so does inflation. This outcome deviates from the traditional Phillips curve, which suggests that unemployment and inflation are inversely related. The Phillips curve predicts that lower unemployment should result in higher inflation since a greater demand for goods and services will exist. This disparity calls for more investigation into Afghanistan's particular macroeconomic circumstances.

In contrast to findings in advanced economies (e.g., Niskanen, 2002; Reichel, 2004), where a clear inverse relationship between unemployment and inflation has been observed, Afghanistan’s economy behaves differently. Studies conducted in the United States and

European countries show that rising inflationary pressures typically accompany low unemployment. However, in Afghanistan, the rising inflation in the context of high unemployment could be attributed to several unique factors. These include external shocks, such as fluctuations in foreign aid flows, political instability, and supply chain disruptions, which might obscure the usual demand-side inflationary mechanisms.

Additionally, Afghanistan's reliance on agriculture and the informal economy—often less responsive to conventional economic signals—may explain why unemployment does not correlate negatively with inflation. In economies with well-developed industrial sectors, such relationships hold more firmly. However, inflation may persist in Afghanistan despite high unemployment due to structural issues, such as low labor force participation and inadequate job creation.

While the marginal significance of this positive relationship ($p = 0.078$) suggests that further investigation is warranted, it is clear that Afghanistan's context—characterized by weak institutional frameworks, external dependency, and political volatility—plays a pivotal role in shaping these dynamics.

Exchange Rates and Inflation

The study discovered a significant and negative correlation between inflation and exchange rates (coefficient = -0.35, $p = 0.004$), indicating that inflation falls as the exchange rate rises (usually accompanied by a local currency depreciation). This is an unexpected outcome because a declining currency is typically linked to higher inflation, especially through the transmission of higher import costs. Nonetheless, the study's negative correlation suggests that there may be additional factors affecting inflation in Afghanistan.

One plausible explanation for this finding could be the role of remittances in Afghanistan's economy. The country receives significant remittance inflows, typically sent in foreign currencies (such as the U.S. dollar or Pakistani rupee). When the Afghan currency depreciates, the value of remittances in local currency increases, potentially boosting the purchasing power of Afghan households and dampening inflationary pressures. This effect could be powerful in a country where remittances constitute a large portion of household income, cushioning the impact of inflation on consumers.

Additionally, the relative price elasticity of imports in Afghanistan may be low. The Afghan economy is heavily dependent on imports of goods and services. However, if these imports come from neighboring countries (such as Pakistan or Iran), the cost of these imports may not increase significantly with currency depreciation. In such a context, the inflationary effects of a weaker currency might not manifest as strongly as they would in economies where imports come from distant, more expensive markets.

This finding contrasts with the conventional view that exchange rate depreciation typically drives inflation due to higher import costs. However, it is consistent with other studies, such as Kitov & Kitov (2013), which argue that exchange rate depreciation may not

always lead to higher inflation in developing economies, especially when remittance inflows or other external financial support significantly stabilize domestic prices.

Interest Rates and Inflation

According to classical economic theory, which holds that raising interest rates lowers inflation by reducing aggregate demand, there is a negative correlation between interest rates and inflation (coefficient = -0.99, p = 0.000). The findings imply that Afghanistan's monetary policy, which the central bank manages through interest rate changes, significantly affects the country's inflation rates.

This result lends credence to the idea that interest rates are an essential instrument for containing inflation, especially in an economy like Afghanistan that may be subject to pressure from both internal and external sources. Although monetary policy is a key tool for the central bank to control inflation, its efficacy may be limited by the degree of capital mobility, financial inclusion, and the central bank's capacity to carry out policy in a nation with a weak institutional foundation.

The interest rate variable's high statistical significance highlights how crucial it is to tighten monetary policy—that is, raise interest rates—to contain inflation. It also emphasizes the necessity of a coordinated policy approach that incorporates structural reforms and fiscal policy to promote economic stability in Afghanistan. Excessive interest rates may deter growth and investment, worsening unemployment and other economic issues. Raising interest rates can, therefore, aid in containing inflation, but policymakers must counteract this with initiatives to encourage investment and job growth.

CONCLUSION

This study investigated the connections between inflation and unemployment in Afghanistan from 2003 to 2021, employing the Multiple linear regression method to analyze the interconnections between key macroeconomic variables, including interest and exchange rates. The findings provide important insights into Afghanistan’s unique economic environment, contributing to the broader field of macroeconomic research, particularly in post-conflict economies.

In contrast to the conventional Phillips Curve theory, which generally implies an inverse relationship between these two variables, the analysis showed a positive relationship between unemployment and inflation. The positive coefficient (1.56) suggests that rising unemployment in Afghanistan is linked to rising inflation, even though this relationship was not statistically significant at the traditional 5% level (p = 0.078). This implies that despite the current unemployment crisis, structural problems like limited industrial capacity, outside economic pressures, and supply chain disruptions may be causing inflation. These findings cast doubt on accepted macroeconomic theories and highlight the complexity of Afghanistan's economy, which may not operate following conventional models.

Moreover, the study identified significant negative relationships between inflation and the exchange rate (-0.35) and interest rates (-0.99). Depreciation of the Afghan currency (exchange rate) and higher interest rates were associated with lower inflation levels, which aligns with classical economic theory regarding the role of monetary policy in controlling inflation. These findings suggest that monetary policy—explicitly managing interest rates and exchange rates—plays a crucial role in stabilizing inflation in Afghanistan. Furthermore, they highlight the importance of external factors such as currency fluctuations and remittances in shaping Afghanistan's inflationary landscape.

The implications of these findings are substantial for policymakers. To address Afghanistan's high unemployment and inflation, policymakers must take a comprehensive approach that includes monetary and exchange rate management and structural reforms to foster economic diversification and job creation. Specifically, targeted interventions such as job creation programs, vocational training, and industrial development should be prioritized alongside sound monetary policy to manage inflationary pressures. Furthermore, given the importance of remittances to the economy, policymakers must monitor the effects of exchange rate fluctuations and modify monetary policy as necessary.

By providing a contextual analysis of the relationship between inflation and unemployment in Afghanistan—a nation that faces particular difficulties because of its post-conflict recovery, political instability, and economic vulnerabilities—this study adds to the body of existing literature. The results imply that conventional models, such as the Phillips Curve, might not adequately represent the intricacies of inflationary behavior in these situations. Thus, this study lays the groundwork for future research to examine how other macroeconomic factors, like foreign aid, fiscal policy, and political instability, affect unemployment and inflation dynamics in Afghanistan and comparable economies.

Conflict of Interest: The author declares no conflict of interest.

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