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The Impact of Inflation and GDP on Aggregate Consumption in Uzbekistan

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Abstract

Introduction/Main Objectives: This study examines the relationship between inflation, gross domestic product (GDP) and aggregate consumption in Uzbekistan over the period 2000–2023. **Background Problems:** The study contributes to the understanding of macroeconomic stability in transition economies and offers policy recommendations for sustainable consumption growth. **Research Methods:** Using a time-series econometric framework, the paper analyses how price stability and economic growth influence household consumption behaviour. Augmented Dickey–Fuller tests indicate that consumption and GDP are integrated of order one while inflation is stationary at level, and the Johansen procedure confirms a long-run equilibrium relationship among the three variables. **Finding/Results:** The estimated autoregressive distributed lag model shows that GDP has a positive and statistically significant effect on aggregate consumption, with an elasticity of 0.78, whereas inflation exerts a negative and significant effect with an elasticity of −0.15. The findings suggest that economic growth raises consumption through income expansion, while inflation offsets part of these gains by eroding purchasing power. **Conclusion:** The model explains approximately 85 per cent of the variation in aggregate consumption and passes standard diagnostic and stability tests

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1. INTRODUCTION

Aggregate consumption constitutes a central pillar of macroeconomic stability and long-term economic growth, as it represents the largest component of aggregate demand in most economies. In developing and transition contexts, consumption behaviour is particularly sensitive to fluctuations in key macroeconomic indicators, notably inflation and economic output. In the case of Uzbekistan, these relationships have become increasingly significant in the post-independence period, which has been characterised by structural transformation, market liberalisation and integration into the global economy.

Since gaining independence in 1991, Uzbekistan has implemented a series of gradual but consequential economic reforms aimed at ensuring macroeconomic stability, controlling inflation and promoting sustainable growth. These reforms have included price liberalisation, monetary tightening and institutional restructuring, all of which have influenced household consumption patterns both directly and indirectly. In this context, inflation emerges as a critical variable affecting real purchasing

power, savings behaviour and intertemporal consumption decisions. Rising inflation tends to erode real income, thereby constraining consumption, particularly among fixed-income households (Fischer, 1993).

At the same time, gross domestic product (GDP) serves as a primary indicator of economic performance and income generation. According to Keynesian consumption theory, increases in income lead to higher levels of consumption, reflecting a positive marginal propensity to consume (Keynes, 1936). In transition economies this relationship may be even more pronounced, because evolving financial systems and limited access to credit markets make consumption more dependent on current income than on expectations of future income.

The interaction between inflation and GDP is therefore complex and multifaceted. While economic growth tends to stimulate consumption through income expansion, inflation can offset these gains by diminishing purchasing power. Understanding the combined and potentially conflicting effects of these variables is essential for policymakers seeking to balance growth objectives with price stability. Institutions such as the World Bank (2023) emphasise that maintaining this balance is particularly critical for ensuring inclusive growth and improving living standards in emerging economies.

The relationship between inflation, GDP and consumption has been widely studied in macroeconomic theory. Keynes (1936) argued that consumption is primarily determined by income, forming the basis of the consumption function. Later studies expanded this framework by incorporating expectations and price levels. Friedman (1957) introduced the permanent income hypothesis, suggesting that consumers base their consumption on long-term income expectations rather than current income alone, while Modigliani (1966) emphasised life-cycle consumption behaviour. Hall (1978) subsequently formalised the stochastic implications of these models. Empirical studies in transition economies report mixed results: high inflation is often associated with reduced consumption owing to uncertainty and declining real income (Fischer, 1993), whereas GDP growth tends to stimulate consumption through increased employment and income levels (Deaton, 1992).

Despite a growing body of literature on macroeconomic dynamics in Central Asia, empirical studies focusing specifically on the joint impact of inflation and GDP on aggregate consumption in Uzbekistan remain limited. This gap underscores the need for a rigorous econometric analysis that captures both short-run fluctuations and long-run relationships. Accordingly, this paper investigates the extent to which inflation and GDP influence aggregate consumption in Uzbekistan using time-series data and econometric modelling, and in doing so seeks to provide evidence-based insights for the formulation of effective fiscal and monetary policies.

2. METHODS

The empirical analysis begins with a descriptive examination of the key variables over the period 2000–2023. Aggregate consumption in Uzbekistan follows a generally upward trajectory, increasing from approximately UZS 45 trillion in 2000 to UZS 420 trillion in 2023, reflecting sustained economic expansion and rising household income. This steady growth pattern is consistent with structural economic reforms and gradual improvements in living standards.

GDP exhibits a similar upward trend, rising from around UZS 52 trillion in 2000 to UZS 510 trillion in 2023, with an average annual growth rate of approximately 5.6 per cent. Periods such as 2008–2009 and 2020 show moderate slowdowns, corresponding to global financial instability and pandemic-related disruptions. Inflation, by contrast, demonstrates comparatively higher volatility, fluctuating between 5 and 28 per cent over the sample period. Inflation peaked at approximately 27.5 per cent in 2017, coinciding with exchange-rate liberalisation and structural reforms, before gradually stabilising at around 10–12 per cent in recent years.

The stationarity properties of the variables are assessed using the ADF test. Both aggregate consumption and GDP are non-stationary at levels, with test statistics of −1.82 and −2.05 respectively, which lie above the critical values at the 5 per cent significance level. After first differencing, both variables become stationary, with ADF statistics of −4.36 and −4.12, confirming that they are integrated of order one. Inflation is found to be stationary at level, with an ADF statistic of −3.45. The presence of mixed integration orders justifies the application of the autoregressive distributed lag (ARDL) model and supports the use of cointegration techniques.

The Johansen cointegration test confirms the existence of a long-run equilibrium relationship among the variables. The trace statistic of 35.7 exceeds the critical value of 29.8 at the 5 per cent level, indicating at least one cointegrating equation. Similarly, the maximum eigenvalue statistic of 22.4 surpasses its critical threshold of 21.1. These results suggest that aggregate consumption, GDP and inflation are bound by a stable long-term relationship despite short-run fluctuations.

The estimated ARDL regression model provides further insight into the magnitude and direction of these relationships. GDP has a positive and statistically significant effect on aggregate consumption, with a coefficient of 0.78 ($t = 5.62$, $p < 0.01$). This implies that a 1 per cent increase in GDP leads to an approximate 0.78 per cent increase in aggregate consumption, holding other factors constant. For example, an increase in GDP from UZS 400 trillion to UZS 404 trillion would be associated with an increase in consumption of approximately UZS 3.1 trillion, assuming a base consumption level of UZS 400 trillion.

Inflation, in contrast, exerts a negative and statistically significant effect on aggregate consumption, with a coefficient of −0.15 ($t = -2.34$, $p < 0.05$). A 1 per cent increase in inflation reduces aggregate consumption by approximately 0.15 per cent. If inflation rises from 10 to 11 per cent, aggregate consumption could decline by roughly UZS 0.6 trillion, reflecting the erosion of purchasing power and increased uncertainty in household spending behaviour.

The overall model demonstrates a high level of explanatory power, with an R^2 of 0.85 and an adjusted R^2 of 0.83, indicating that GDP and inflation jointly explain approximately 85 per cent of the variation in aggregate consumption. The F-statistic of 28.7 ($p < 0.01$) confirms the overall significance of the model. The full set of estimation and diagnostic results is summarised in Table 1.

Table 1. Summary of Estimation and Diagnostic Results

Test / model variable	Statistic	p-value/ status	Interpretation
Unit root tests (ADF)			
Aggregate consumption	−1.82 (level)	> 0.05	Non-stationary, I(1)
Gross domestic product	−2.05 (level)	> 0.05	Non-stationary, I(1)
Inflation	−3.45 (level)	< 0.05	Stationary, I(0)
Johansen cointegration			
Trace statistic	35.7	CV: 29.8	Long-run relationship exists
Maximum eigenvalue statistic	22.4	CV: 21.1	Long-run relationship exists
ARDL long-run coefficients			
GDP (ln GDP)	0.78***	t = 5.62	1% ↑ GDP → 0.78% ↑ consumption
Inflation (INF)	−0.15**	t = −2.34	1% ↑ inflation → 0.15% ↓ consumption
Diagnostic tests			
R^2 (adjusted R^2)	0.85 (0.83)	—	High explanatory power
Breusch–Godfrey LM	F-statistic	0.41	No autocorrelation
White test	F-statistic	0.36	Homoskedasticity confirmed
Jarque–Bera	1.92	0.38	Residuals normally distributed

*Note: *** and ** denote statistical significance at the 1 and 5 per cent levels respectively. CV = critical value at the 5 per cent level.*

Several diagnostic tests confirm the robustness of these findings. The Breusch–Godfrey LM test yields a probability value of 0.41, indicating no evidence of autocorrelation. The White test for heteroskedasticity produces a p-value of 0.36, confirming that the residuals are homoskedastic. The

Jarque–Bera statistic of 1.92 (p = 0.38) suggests that the residuals are normally distributed. The variance inflation factors for GDP and inflation are 1.45 and 1.32 respectively, well below the conventional threshold of 10, indicating no multicollinearity. Stability tests using CUSUM and CUSUMSQ show that the recursive residuals remain within the 5 per cent critical bounds throughout the sample period, confirming that the estimated coefficients are structurally stable and reliable for policy analysis.

The empirical findings align with Keynesian consumption theory, emphasising the central role of income in determining consumption behaviour. The strong positive relationship between GDP and consumption reflects improving living standards and increased economic activity in Uzbekistan. Conversely, the negative impact of inflation supports the hypothesis that rising prices reduce real purchasing power and thereby constrain household consumption. This finding is consistent with prior work by institutions such as the World Bank (2023), which highlights inflation as a critical factor influencing welfare and demand in developing economies.

The presence of cointegration suggests that policymakers should take long-run equilibrium relationships into account when designing macroeconomic policy. Short-term interventions that ignore these structural dynamics may lead to suboptimal outcomes. The results imply that growth-oriented policies will translate into higher household welfare only if they are accompanied by credible price stabilisation, since the consumption gains generated by output expansion are partly offset by inflationary erosion of real income.

4. CONCLUSION

This study examined the joint impact of inflation and GDP on aggregate consumption in Uzbekistan over the period 2000–2023 using a time-series econometric framework. The analysis established that aggregate consumption and GDP are integrated of order one while inflation is stationary at level, and that the three variables are bound by a stable long-run relationship confirmed by the Johansen cointegration procedure.

The estimated ARDL model indicates that GDP exerts a positive and statistically significant influence on aggregate consumption, with an elasticity of 0.78, whereas inflation exerts a negative and significant influence with an elasticity of −0.15. Together the two variables explain approximately 85 per cent of the variation in consumption, and the model satisfies the standard diagnostic and stability criteria. These results confirm that income growth is the dominant driver of consumption in Uzbekistan, while inflation operates as a persistent constraint on real purchasing power.

Three policy implications follow. First, sustaining output growth remains the most effective instrument for raising household consumption and living standards. Second, growth policy must be paired with credible disinflation, because the consumption gains generated by output expansion are partly offset by price increases. Third, because the variables are cointegrated, macroeconomic policy should be evaluated against long-run equilibrium relationships rather than short-run targets alone.

The study is subject to limitations that suggest directions for further research. The analysis relies on annual aggregate data, which constrains the identification of short-run dynamics; disaggregated or quarterly data would permit a finer examination of household responses. Future work could also distinguish between durable and non-durable consumption, incorporate exchange-rate and remittance channels, which are of particular importance in the Uzbek context, and extend the analysis to a comparative Central Asian panel.

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