Received: 10 May, 2025 | Revised: 30 September, 2025 | Accepted: 1 October, 2025
DOI: https://doi.org/10.63784/djbep2025v2n1a7

ORIGINAL RESEARCH ARTICLE

DCCI Journal of Business and Economic Policy (DJBEP)

ISSN 3079-0999 (Online)|ISSN: 3008-041X (Print)

Examining the Macroeconomic Drivers of Household Consumption in Bangladesh: A Time Series Econometric Approach (1993-2022)

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Keywords: Human Development Index, Household consumption, Economic Growth, Unemployment.

Abstract

This analysis uses annual time series data from 1993 to 2022 from the World Bank, UNDP, and ILO to examine the macroeconomic factors influencing household spending in Bangladesh. The research assesses both short and long-term dynamics using the Autoregressive Distributed Lag (ARDL) bounds technique, Ordinary Least Squares (OLS), the Augmented Dickey-Fuller (ADF) test, and an Error Correction Mechanism (ECM). According to OLS results, household spending is considerably increased by GDP growth (coefficient = 5.41, $p < 0.01$), although the Human Development Index (HDI) and unemployment are statistically negligible. Although long-run coefficients indicate negative impacts of GDP, reflecting inflation, inequality, and informality in the labour market, ARDL bounds testing validates long-run co-integration between GDP, HDI, and consumption. ECM estimations show that lagged consumption is the primary driver of short-run changes (coefficient = 0.93, $p < 0.01$), with GDP and HDI having only a minor impact. The results suggest that welfare gains cannot be guaranteed by macroeconomic growth alone. Reforms to the labour market, inclusive growth methods, and closer ties between income-generating and human development should be the top priorities of future policy. Strategies to maintain household welfare in Bangladesh can be better informed by more studies on remittances, geographical differences, and income distribution.

1. Introduction

Household consumption reflects a population's socioeconomic well-being, living standards, and total effective demand. Household consumption is a major component of economic activity, and trends in consumption are a key indicator of economic development and macroeconomic stability. Household consumption is a component of gross domestic product and contributes to reducing poverty and meeting sustainable development goals (SDGs), therefore it is an important area for emerging economies like Bangladesh, particulalrly when considering its determinants. Household consumption in Bangladesh has been the most powerful contributor to the country's rapid economic development in the last 20 years, and household consumption also has a strong bearing on aggregate demand (World Bank, 2023). It has long been acknowledged that household spending is a key determinant of macroeconomic stability and welfare. Keynes (1936) initially highlighted the connection between income and consumption, a notion that was later expanded upon by ideas like Modigliani's (1966) Life-Cycle Hypothesis and Friedman's (1957) Permanent Income Hypothesis. While emphasizing the structural hurdles that mediate the income–consumption nexus, empirical research conducted in emerging nations has confirmed these connections.

In The World Bank Economic Review, Loayza and Raddatz (2010) showed that structural inequality restricts how much GDP growth in developing nations can be converted into increased household expenditure. In a similar vein, Khan (2017) discovered that although Bangladesh's expansion helped to reduce poverty, its effects on household welfare were limited by the informal labor market and growing inequality. The reciprocal relationship between human development and consumption is highlighted by studies published in the World Development and Journal of Development Economics (Ranis, Stewart & Ramirez, 2000; Anand & Sen, 1994). These studies contend that improvements in income, health, and education increase capabilities, which in turn boost household demand. Numerous studies have also been conducted on the role of unemployment. Chaudhury and Rakhimov's (2021) study on youth unemployment in Bangladesh (Journal of Development Studies) corroborated Muellbauer's (2007) finding that rising unemployment decreases consumption by lowering disposable income and confidence. Recent works in The World Economy (Sekwati & Dagume, 2023) and Economic Modelling (Biloshkurska et al., 2023) demonstrate how labor market variables influence the effects of macroeconomic growth on household welfare.

Exports, remittances and urbanization have propelled Bangladesh's strong economic growth since about 2000, averaging over 6% per year for 20 years (ADB, 2021). This economic development was accompanied by significant human development. From 1990, the Human Development Index (HDI), a composite index that captures income, education and health, increased from 0.388 to 0.670, an estimated value in 2022, which is a consistent progression in provision of services, exemplified in youth literacy (92%) and life expectancy (72.6 years) (BBS, 2021). These advancements have come almost all from public investment in health and education, which increases the ability and capacity of people to participate in the economy in a meaningful way.

Evaluating household consumption is crucial not only for lawmakers but also for business planners, investors, and financing institutions aiming to estimate market demand, build consumer-

driven goods, and plan investments in rising economies like Bangladesh. Household consumption drives significant portions of aggregate demand and is an important measure of welfare in developing countries. Policymakers can devise targeted policies that foster more equitable growth and mitigate poverty if they better understand the influences on consumption. Income is an important determinant of consumption, but according to Keynesian consumption theory (Keynes, 1936), contemporary research focuses more on the wider issues of socioeconomic status, labor market conditions, education, and human development. The human development index has become an important measure of welfare beyond economic output - the human development index is a composite measure that encompasses income, health and education. Research indicates a robust positive correlation between household welfare and HDI. Higher HDI, for example, indicates greater capabilities and access to basic services, which usually translates into better spending patterns, according to Anand and Sen (1994).

Keynes (1936) laid the groundwork for the consumption function in macroeconomics by highlighting the influence of income on consumption. According to Loayza and Raddatz (2010), structural inequality frequently inhibits GDP growth in developing nations from immediately increasing household spending. Khan (2017) also pointed out that although economic expansion in Bangladesh helped to lower poverty, inequality and unorganized labor markets continue to limit its effects on household spending. Ranis, Stewart, and Ramirez (2000) and Anand and Sen (1994) emphasized the reciprocal relationship between economic growth and human development, contending that gains in income, education, and health result in increased capacity for consumption. Alamgir and Rahman (2019) and Ahmed and Hossain (2018) reaffirmed that while the direct effects of HDI gains on consumption differ among socioeconomic classes, they have a positive welfare impact in Bangladesh.

In a similar vein, Ranis, Stewart, and Ramirez (2000) emphasized the reciprocal relationship between economic growth and human development, whereby higher HDI indices support household spending and individual productivity. Another important factor influencing consumption patterns is unemployment. Growing unemployment has a detrimental effect on expenditure since it lowers disposable income and household confidence (Muellbauer, 2007). This is especially noticeable in countries like Bangladesh that have weak social safety nets. The Permanent Income Hypothesis (Friedman, 1957) states that consumers base their consumption on their predicted lifetime income, so even in cases where current income is constant, job insecurity may have long-term depressing consequences on consumption. Consumption and GDP growth have a complicated relationship. Even while conventional macroeconomic models point to a beneficial relationship, empirical results are conflicting, particularly when considering developing nations. Because of structural inequality and a lack of wealth redistribution, economic progress does not always translate into higher household consumption in many low-income countries, according to Loayza and Raddatz (2010). Despite these improvements, there is still a lack of empirical research on the connection between Bangladeshi household spending and HDI. In addition to helping to reduce poverty and provide income security, improvements in HDI frequently result in higher household expenditure on consumer items, healthcare, and education (Ahmed & Hossain, 2018; Alamgir & Rahman, 2019). These connections are not consistent or predictable across socioeconomic levels,

though. The benefits of development are mediated by labor market structure, employment status, and income inequality, which may restrict consumption for vulnerable populations.

One enduring structural issue facing Bangladesh's economy is unemployment. Even while the official unemployment rate is only about 4%, underemployment and informal work are more common, especially among young people, whose unemployment rates can reach 11.6% for those between the ages of 15 and 24 (ILO, 2020; 2021). This state of the labor market severely limits household consumption and disposable income, particularly for low-income and rural households (Chowdhury et al., 2019). Although household income and consumption are theoretically increased by economic expansion, the magnitude of this gain is primarily dependent on job creation and equitable distribution (Khan, 2017). Household spending is shaped by the dynamic and intricate interactions between HDI, unemployment, and economic growth. Studies that have already been done have mostly looked at these elements separately or in relation to GDP growth or poverty, frequently ignoring their combined and direct effects on household consumption patterns, especially in emerging nations like Bangladesh. The socio-economic impacts of unemployment, poverty, and HDI have been looked into internationally and regionally in the form of studies by Aji (2021), Alshuwaiee et al. (2020), and Bintis et al. (2024).

Although not consistently across income categories, studies conducted in Bangladesh by Ahmed and Hossain (2018) and Alamgir and Rahman (2019) demonstrate that HDI advancements in health and education have a favorable impact on household well-being. This is in line with global research by Hasan and Uddin (2020) (Journal of Human Development and Capabilities), who contend that inclusive economic policies are necessary to encourage human development, which by itself does not inevitably result in higher household consumption.

However, no specific investigations have been conducted into the effect on household consumption in Bangladesh. This study is based on the assumption that understanding this relationship is important to formulate appropriate policies to raise living standards, reduce inequality and achieve inclusive economic growth. This paper adds significantly to the conversation in academia and policy. The results can help policymakers implement focused policies that balance economic growth with job creation and human development. It provides academics with a multifaceted framework that combines indices of human development and macroeconomic performance to explain consumption patterns. By doing this, it provides a more comprehensive and inclusive view of family economic dynamics in the context of developing nations, going beyond typical consumption models that only consider income and prices. Thus, this study closes this significant research vacuum by empirically analyzing how Bangladeshi household spending is impacted by the Human Development Index, unemployment, and economic growth. This study's primary goal is to determine how household consumption is impacted by economic growth, unemployment, and HDI. The study's particular goals are as follows:

i. To analyze the relationship between unemployment, economic growth and Household Consumption in Bangladesh.
ii. To evaluate the role of the Human Development Index (HDI) in influencing Household Consumption levels in Bangladesh.

1.1. Research Gap

Few empirical studies explicitly investigate their combined effects on household spending patterns using a thorough time-series approach, despite the fact that previous studies have looked at the effects of economic growth, human development, and unemployment on poverty and GDP in Bangladesh. Previous research has tended to concentrate on either human development or economic growth separately, frequently ignoring the ways in which these two variables combine to affect consumption patterns in developing nations. Furthermore, there is still a dearth of integrated analysis that links macroeconomic growth, labor market circumstances, and human development indicators with household spending behavior, even in the face of Bangladesh's swift economic and social transformation. By analyzing these macroeconomic factors collectively, this study fills this knowledge gap by gaining a better understanding of their immediate and long-term effects on household spending in Bangladesh.

2. Methodology of the Study

2.1. Data sources and availability

Using yearly time series data from 1993 to 2022, this study examines the connection between household consumption and economic growth in Bangladesh. The World Bank's World Development Indicators (WDI) were used to calculate household consumption (as a proportion of GDP) and GDP growth rate (as an annual percentage). Missing values were cross-checked with publications from the Bangladesh Bureau of Statistics (BBS) to guarantee data veracity. STATA version 14 was used for all calculations and estimations.

For forecasting and determining long-term linkages and temporal dynamics, time series data are especially well-suited. This dataset's selection enables the use of dynamic econometric models to comprehend how development indices affect consumption over the short and long term. Because time series data capture both short-term fluctuations and long-term structural changes, they are especially well-suited for studying macroeconomic dynamics. GDP growth has been chosen as the main explanatory variable in this study due to its strong theoretical and empirical ties to consumer behavior. According to Keynesian theory (Keynes, 1936), increases in income have a direct impact on aggregate consumption. Accordingly, recent research (Khan, 2017; Loayza & Raddatz, 2010) highlights that, despite the possibility that inflation and inequality will moderate its benefits, GDP growth is a key factor in determining household demand in developing nations.

Justification of variable selection:

Based on their theoretical and empirical significance to household consumption patterns in developing economies, the three main independent variables—GDP growth, unemployment rate, and Human Development Index (HDI)—were chosen. GDP growth is a measure of the economy's overall performance and income generation, and it frequently affects household consumption by creating job opportunities and income (Keynes, 1936; Khan, 2017). A measure of labor market circumstances is the unemployment rate; a greater unemployment rate may result in less disposable income, which could have an impact on consumer behavior (Muellbauer, 2007). Both the ability and inclination of households to consume can be influenced by the HDI, which measures broader facets of human well-being such as health, education, and living standards (Anand & Sen, 1994; Ranis et al., 2000).

2.2. Model Specification

2.2.1.Ordinary Least Squares

The baseline linear relationship between household consumption and its predictors is first estimated using the Ordinary Least Squares (OLS) method. Under traditional assumptions, OLS yields the Best Linear Unbiased Estimators (BLUE) (Wooldridge, 2016). The model's specifications are as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where,

Y = Household Consumption in Bangladesh, X_1 = Unemployment Rate in Bangladesh, X_2 = Economic Growth Rate in Bangladesh, X_3= Human Development Index in Bangladesh, β_0 = Intercept Term and β_1, β_2, β_3 = Regression Coefficient, μ_i = Error Term.

2.2.2. Unit Root Test

Unit root tests were used to evaluate the stationarity of the variables in order to guarantee the correctness of time series estimations. Regression results can be erroneous when the series is non-stationary. The following theories were put to the test:

Hypothesis:

Null, H0: Variable is non-stationary or has a unit root
Alt, H1: Variable is stationary or doesn't have a unit root

The primary test used was the Augmented Dickey-Fuller (ADF) test. Before estimating the model, the proper differencing was applied based on the stationarity results.

The stationarity of both variables was checked using the Augmented Dickey-Fuller (ADF) test to prevent false regression. The findings show that whereas household spending becomes stagnant at first difference, GDP growth is stationary at level. The application of the Autoregressive Distributed Lag (ARDL) model is justified by this combination of integration orders.

2.2.3. ARDL model and bound testing for co-integration

The Autoregressive Distributed Lag (ARDL) method is applied because of the possible combination of I(0) and I(1). According to Pesaran, Shin, and Smith (2001), ARDL is especially beneficial for mixed orders of integration and small sample sizes. To determine whether there is a long-term equilibrium link between GDP growth and household spending, the ARDL bounds testing approach was used. The F-statistic was used to compare critical values. Co-integration was validated by the test, indicating a steady long-term relationship between household expenditure and economic growth in Bangladesh.

The bounds testing approach to co-integration complements the long-run ARDL model framework. The hypotheses are:

Null, H0: No long run relationship (no co-integration)
Alt, H1: Long run relationship exists (co-integration)

Critical values are compared to the F-statistic. Co-integration is verified if the F-statistic is greater than the upper bound. Otherwise, the null hypothesis is upheld if it drops below the lower bound.

2.2.4. Error Correction Model

An ECM was estimated to account for both short-term adjustments and long-term equilibrium once co-integration was demonstrated. The findings indicate that while GDP growth has a large short-term impact but a weaker long-term one, household consumption is heavily impacted by its lagged values. This suggests that although consumption in Bangladesh reacts favorably to economic growth, structural problems like inflation and inequality reduce the impact of growth on household well-being.

Following co-integration confirmation, the ARDL Error Correction Model (ECM) is designed to account for both long-term equilibrium and short-term dynamics. The ECM can be written as:

$$\Delta HC_t = \beta_0 + \sum_{i=1}^{p} \beta_1 \Delta HC_{t-i} + \sum_{i=0}^{q1} \beta_2 \Delta GDP_{t-i} + \sum_{i=0}^{q2} \beta_3 \Delta UR_{t-i} + \sum_{i=0}^{q3} \beta_4 \Delta HDI_{t-i} + \lambda ECT_{t-1} + \mu_t$$

Where,

HC =Household Consumption, GDP = GDP growth rate, UR = Unemployment rate, HDI = Human development index, **Δ** Denotes first differences

ECT_{t-1} The error correction term is derived from the long-run equation.

λ: The speed of adjustment toward long-run equilibrium

Justification for analytical approach:

In order to analyze the short- and long-term interactions between variables with different integration orders (I(0) or I(1)), this study uses a time series econometric method with the ARDL (Autoregressive Distributed Lag) model. Given the sample size and the variables' mixed stationarity characteristics, the ARDL limits testing approach is very suitable and a reliable option for time series analysis in macroeconomic research (Pesaran, Shin, & Smith, 2001).

When modeling dynamic interactions among macroeconomic indicators such as GDP growth, unemployment, and the human development index, the ARDL method's flexibility in lag selection is advantageous families for consumption (Ranis et al., 2000; Anand & Sen, 1994).

2.2.5. Diagnostic Checking

A number of diagnostic tests were carried out in order to validate the estimated model. Variance Inflation Factor (VIF) results from the multicollinearity test showed no discernible multicollinearity. Autocorrelation: The Breusch-Godfrey LM test and Durbin-Watson statistic verified that there was no serial correlation. Specification and Stability: Test statistics and residual plots validated the robustness of the model. The existence of a long-term link between variables is supported by the bounds test.

3. Data Analysis and Result Discussion

3.1.Descriptive Statistics

The table of descriptive statistics reveals initial data on the distribution and fluctuation of the variables under study within the 1993–2022 timeframe.

Table 1. Descriptive Statistics

Variable	obs	mean	std. dev.	min	max
Household Consumption	30	103.188	84.96	27.44	317.84
Unemployment rate	30	3.947	.949	2.3	5.8
HDI	30	.544	.073	.423	.67
GDP Growth	30	5.72	1.167	3.4	7.9

Source: Authors' Computation

Household consumption averaged 103.19% of GDP with high volatility, illustrating sensitivity to shocks and remittance flows. Unemployment stayed stable (3.95%) but likely masks underemployment due to informality. HDI gradually improved (mean = 0.544), signaling gains in health, education, and income. GDP growth averaged 5.72%, with recent decreases linked to COVID-19. Regardless of risks from global inflation, climate change, and geopolitical conflicts, Bangladesh's shift toward middle-income status is reshaping consumption through growing urbanization, digital availability, and rising female labor participation. Persistent disparities in consumption highlight the need for policies promoting labor effectiveness, social protection, and human capital investment for inclusive growth.

3.2.Unit root test

Table 2. Unit root test

Augmented Dickey-Fuller Test											
At level						At first differences					
Variables	t-statistics	Critical values			p-values*	Variables	t-statistics	Critical values			p-values*
		1%	5%	10%				1%	5%	10%	
GDP Growth	-5.065	-4.343	-3.584	-3.230	0.0002	GDP Growth	-7.911	-4.352	-3.588	-3.233	0.0000
Unemployment rate	-2.955	-4.343	-3.584	-3.230	0.1450	Unemployment rate	-5.274	-4.352	-3.588	-3.233	0.0001
HDI	-1.287	-4.343	-3.584	-3.230	0.8911	HDI	-4.136	-4.352	-3.588	-3.233	0.0056
Household Consumption	2.677	-4.343	-3.584	-3.230	1.0000	Household Consumption	-3.614	-4.352	-3.588	-3.233	0.0287
Notes: MacKinnon's approximate p-value (5%) **If p-value<0.05, the null hypothesis of non-stationarity is rejected; that is, the series is stationary.**											

Source: Authors' Computation

According to the ADF test (Table 2), household consumption, the unemployment rate, and the HDI are non-stationary ($p > 0.05$), although only GDP growth is stationary at the level ($t = -5.065$, $p = 0.0002$). All variables become stationary at the 5% significance level following initial differencing.

For dependable time-series regression, these findings support the use of first-difference transformations. The structural trends in Bangladesh, which are fueled by remittance inflows, urbanization, and ongoing advancements in health and education, are reflected in the level of non-stationarity of HDI and consumption. GDP growth is continuously steady, yet it varies depending on factors like COVID-19. Despite being officially low, unemployment stagnates after differencing, suggesting that the informal labor market may be volatile. All things considered, the results support the use of differenced-variable modeling to evaluate the changing dynamics of household consumption in Bangladesh.

3.3.Regression Analysis

The table presents the results of a linear regression analysis to analyze the factors driving Household Consumption. The independent variables consist of GDP Growth, Unemployment Rate, and Human Development Index (HDI), while Household Consumption is the dependent variable.

Table 3. Linear Regression

Household Consumption	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
GDP growth	5.415	1.541	3.51	.002	2.24	8.59	***
Unemployment rate	1.113	3.933	0.28	.779	-6.988	9.214	
HDI	219.921	434.649	0.51	.617	-675.255	1115.098	
Constant	-23.134	10.159	-2.28	.032	-44.058	-2.21	**
Mean dependent var	10.014		SD dependent var		10.576		
R-squared	0.345		Number of obs		29		
F-test	4.381		Prob > F		0.013		
Akaike crit. (AIC)	213.829		Bayesian crit. (BIC)		219.298		

*** *p<.01, ** p<.05, * p<.1*

Source: Authors' Computation

GDP Growth (5.415): Household consumption and GDP growth are related and positively correlated (p-value = 0.002); thus, when the economy is growing, it also causes household consumption to increase. Unemployment Rate (1.113): The unemployment rate did not affect household consumption significantly (p-value = 0.779). The Human Development Index (HDI) overall was not significant enough for households to affect consumption (219.921) (p-value = 0.617). Constant (-23.134): The constant was negative but should be taken into consideration as it is a more theoretical value and still significant (p-value = 0.032). The regression model was statistically significant (F-test = 4.381, p-value = 0.013) and accounted for 34.5% of the variation in household consumption (R-squared = .345). Therefore, given the p-value of 0.002 and the coefficient of 5.415 indicates that GDP growth does positively impact household consumption in Bangladesh overall. It could be concluded that household consumption either goes up with economic growth, or that it generally follows the larger trends of economic growth in Bangladesh over the last few years. But we do not see any statistically significant effects of the unemployment rate or the Human Development Index (HDI) on household expenditure in this model. While the social and economic condition of the labour market has the potential to be captured in not observing a significant association between unemployment and consumption (p-value = 0.779),

high unemployment does not always relate to lower consumption, perhaps due to other factors such as remittances or informal work. And, with economic and social benefits in Bangladesh yet not entirely accounted for in household consumption decisions, it is possible that the lack of relevance of the HDI also points to a gap between participation and reported development indicators and current consumption choices.

According to the analysis, GDP growth continues to be the main macroeconomic factor that has a major impact on household consumption in Bangladesh. This finding is consistent with traditional economic theories that relate aggregate demand and national income (Keynes, 1936). The impact, however, seems to vary between models, which may be a reflection of systemic issues that temper this link in the Bangladeshi context, such as income disparity, inflationary pressures, and unequal income distribution. However, in most models, neither the HDI nor the unemployment rate has statistically significant effects on household consumption. This is consistent with previous findings that, particularly in informal economies like Bangladesh's, improvements in human development or changes in unemployment rates may not immediately result in higher household spending (Muellbauer, 2007; ILO, 2020).

As a result, even though economic growth has a discernible impact, deeper socioeconomic systems mediate this effect, highlighting the necessity of inclusive growth methods. These results suggest that while economic growth is still undoubtedly a key factor of household consumption in Bangladesh, interventions that are potentially more substantive may be necessary to account for the modes of influence from variables such as unemployment and development indices to consumption.

3.4. Multi-collinearity Test

The Variance Inflation Factor (VIF) is used to measure the degree of multicollinearity among the independent variables in the model. A VIF value below 10 generally indicates no significant multicollinearity.

Table 4. The variance inflation factor

Variables	VIF	1/VIF
Unemployment rate	1.112	.9
GDP growth	1.112	.9
HDI	1.011	.99
Mean VIF	**1.078**	

Source: Authors' Computation

All variables have modest Variance Inflation Factor (VIF) values; the HDI has a VIF of 1.011, while the GDP growth and unemployment rate have VIF values of 1.112. The model has very little multicollinearity, as evidenced by the mean VIF of 1.078, which is far below the cutoff of 10. These findings imply that there is little correlation between the explanatory variables, guaranteeing the validity of the regression estimations and demonstrating that multicollinearity does not materially skew the study.

3.5. Bound test for co-integration

The table represents the results of a Bound Test for co-integration to determine long-run relationships between variables. It includes three dependent variables: Household Consumption, GDP, and HDI.

Table 5. Co-integration test

Dependent Variables	F-statistics	Lower Critical Value		Upper Critical Value		t-statistics	Co-integration
		10%	5%	10%	5%		
Household Consumption	1.866	6.58	8.21	6.58	8.21	-1.366	Absent
GDP growth	65.095	6.58	8.21	6.58	8.21	-8.068	Present
HDI	13.812	6.58	8.21	6.58	6.58	-3.717	Present

Source: Authors' Computation

The dependent variables (household consumption, GDP growth, and HDI) and their corresponding critical values at the 10% and 5% significance levels are tested for co-integration using the F-statistics and t-statistics shown in the table. There is no co-integration since the t-statistic (-1.366) and the F-statistic (1.866) are both below the threshold and below the crucial values (6.58 and 8.21). This implies that, in the case of Bangladesh, household spending does not show a long-term equilibrium relationship with the other variables. Co-integration is evident from the high F-statistic of 65.095 and the t-statistic of -8.068, both of which are above the critical limits. Given the tremendous impact of economic growth on consumption patterns in Bangladesh, this points to a significant long-term link between GDP growth and household consumption. Co-integration is shown by the F-statistic (13.812) and t-statistic (-3.717), both exceeding the crucial thresholds. This suggests a strong, long-term correlation between household consumption and HDI, suggesting that consumption patterns in Bangladesh are influenced by aspects of human development such as health and education.

The findings emphasize the long-term effects of GDP growth and HDI on consumption patterns by demonstrating their co-integration with household spending in Bangladesh. Nevertheless, there is no co-integrating link between household consumption and these variables, indicating that other factors can have a short-term impact on consumption.

Table 6. Long run coefficients of ARDL

Variables	Household Consumption			
	Coefficient	S. Error	t-statistics	Probability
GDP growth	-13.51134	37.22995	-0.36	0.020
Unemployment rate	9.518613	45.15991	0.21	0.035
HDI	586.592	5176.646	0.11	0.011

Source: Authors' Computation

The GDP growth coefficient (-13.51134) has a probability of 0.020 and a t-statistic of -0.36. This indicates that household consumption and GDP growth appear to have a weakly negative relationship. However, the t-statistic indicates a poor statistical significance at conventional levels.

Regarding the coefficient for unemployment rate (9.518613), the t-statistic of 0.21 and probability of .035 indicate a positive coefficient, suggesting a weakly positive but statistically significant effect on household consumption. This can reflect consumption habits driven by remittance or work in the unorganized sector. Though the HDI has a positive coefficient (586.592), the t-statistic (0.11) and probability (.011) indicate a weak and statistically insignificant effect on household consumption.

The correlations between GDP, CPI, and household consumption are weak and statistically insignificant in the current Bangladeshi economy. These correlations may be explained by ongoing structural challenges like income inequality and inflation, dampening the effects of GDP growth on consumption. Unemployment has a weak positive association with consumption, which suggests that the unorganized sector may be more resilient, and formal unemployment rates may not have a direct impact on consumption. Finally, given the narrow measure of the HDI, it is possible that improvements in human development may not have fully translated to concrete changes in consumer behavior yet.

3.6. ARDL and ECM Result

Table 7. ECM representation for selected ARDL (1 1 0 1), Dependent variable = Household Consumption

Variables	Household Consumption (1 1 0 1)			
	Coefficient	**Std. Error**	**t-statistics**	**Probability**
ECT (-1)	-.071177	.122858	-0.58	0.069
HC(L1)	.928823	.122858	7.56	0.000
GDP	-1.962026	1.0336	-1.90	0.071
UR	.6775065	2.883963	0.23	0.817
HDI	576.8704	292.5514	1.97	0.062
R^2	0.7584			
Adjusted R^2	0.6893			
F-statistic	10.99			
F-significance	0.0000			
DW-statistic	2.23585			
Constant	1.391566	3.434949	0.41	0.689

Source: Authors' Computation

ECT (-1) shows a weak, statistically insignificant adjustment term is suggested by the coefficient of -0.071177, t-statistic of -0.58, and likelihood of 0.069, suggesting that previous departures from equilibrium have little bearing on present consumption levels. HC (L1) is representing that there is a substantial favorable correlation between current household consumption and its lagged value, as indicated by the positive coefficient (0.928823) and significant t-statistic of 7.56 (p-value = 0.000). This suggests that previous consumption has a considerable impact on present consumption behavior. There is a slightly negative correlation between GDP and household consumption, which is nearly statistically significant at the 10% level, according to the coefficient of -1.962026, t-statistic of -1.90, and probability of 0.071. This might be a reflection of Bangladesh's difficulties converting GDP growth into household welfare, which is probably brought on by inflation and income disparity. According to this model, increases

in unemployment do not significantly affect household spending, as indicated by the coefficient (0.6775065), which has a t-statistic of 0.23 and a probability of 0.817. The coefficient of HDI (576.8704) shows a weak but positive effect of advances in human development on household consumption, with a t-statistic of 1.97 (p-value = 0.062) that is marginally significant at the 10% level. Much of the variation in family expenditures can be attributed to the model, R-squared 0.7584, Adjusted R-squared 0.6893. The model is statistically significant with the F-statistic (10.99) at p=0.0000 and has no severe autocorrelation issues (DW-statistic (2.24)).

The strong correlation between current consumption and lagged household consumption HC(L1) in Bangladesh highlights how crucial historical consumption patterns are in influencing current patterns. GDP's somewhat negative impact raises the possibility that structural problems like inflation or unequal income distribution are preventing growth from yet fully transferring into household consumption. Although human development may have an impact on consumption, its influence is still limited in the current economic climate, as seen by the insignificance of unemployment and the poor effect of HDI. All things considered, the model fits the data rather well and suggests that the most powerful predictor of present-day household spending in Bangladesh is historical consumption trends. There are no significant autocorrelation problems, according to the DW-statistic (2.24).

Table 08. LM test for autocorrelation

chi2	df	prob > chi2
0.720	1	0.3961

Source: Authors' Computation

The table reveals the results of the Breusch-Godfrey LM test for autocorrelation, used to check for the existence of autocorrelation in the residuals of a regression model. The Chi2 statistic value is 0.720, and the degrees of freedom (df) is 1. Prob. > Chi2 is 0.3961, which is more than the commonly used significance level of 0.05. This suggests that there is no pertinent autocorrelation in the model's residuals. This result shows that our model is stable.

4. Conclusion and recommendations

This study used annual time series data from 1993 to 2022 to examine how household spending in Bangladesh was affected by macroeconomic factors such as GDP growth, unemployment, and the Human Development Index (HDI). The investigation demonstrated both short- and long-term dynamics using OLS, ARDL bounds testing, and an Error Correction Model (ECM). While unemployment and HDI are statistically negligible, the OLS results show that GDP growth significantly increases household spending (coefficient = 5.41, $p < 0.01$). The long-run coefficients show that the impact of GDP growth on household consumption diminishes, reflecting structural issues like inflation, inequality, and informality in the labor market, even though the ARDL limits test confirms co-integration among the variables. The ECM also demonstrates that whereas GDP and HDI have relatively little effects, lagged consumption accounts for the majority of short-term variations (coefficient = 0.93, $p < 0.01$).

These results imply that long-term gains in household welfare are not guaranteed by economic development alone. The main goals of policy initiatives should be to promote equitable growth, fortify labor market institutions, and more closely connect investments in human development to

sources of revenue. Stabilizing consumption also requires increasing social safety and containing inflation. In order to better capture distributional impacts, future research should look at how remittances, financial inclusion, and geographical differences shape consumption patterns. It should also conduct income-group-based analysis. These extensions would shed more light on how macroeconomic development in Bangladesh might be converted into widespread welfare improvements.

3.1 Policy recommendations

Encourage equitable and steady economic growth

Household consumption in Bangladesh is significantly driven by GDP growth, according to the OLS results (coefficient = 5.41, $p < 0.01$). However, the results of the ARDL and ECM show that inflationary pressures, inequality, and informality in the labor market cause the long-term impact of GDP on consumption to wane and even go negative. In order to guarantee welfare gains at the household level, policymakers should give priority to inclusive growth policies. Targeted redistribution, improved social protection, and inflation control are necessary to guarantee that growing GDP results in long-term increases in household expenditure.

Boost Formal Employment and Labor Market Institutions

The unemployment rate did not have a substantial short-term impact on consumption because informal work and remittance driven consumption are so prevalent. However, ECM data indicate structural dependency, with lagged consumption driving present spending considerably (coefficient = 0.93, $p < 0.01$). Bangladesh must improve job security and move informal workers into formal employment in order to end this cycle and turn growth into increases in consumption. It is imperative to implement labor market changes that prioritize skill development, wage growth, and the expansion of the productive sector.

Connect Opportunities for Income Generation with Human Development

While the ARDL results indicate some long-term co-integration, the HDI indicated modest or statistically insignificant impacts in the majority of models. This suggests that household spending power has not yet completely reflected advancements in health and education. Therefore, policies should boost vocational training, increase support for entrepreneurship, and match education and skills to labor market needs in order to close the gap between income opportunities and human development accomplishments.

Strengthen Social Safety Nets and Reduce the Risk of Inflation

Consumption and GDP growth have a negative long-term connection, which implies that rising prices and inequality reduce household well-being. Bangladesh should implement price-stabilization measures and strengthen social safety nets like cash transfers, food subsidies, and unemployment insurance to counteract this and safeguard the actual consumption levels of households that are most at risk.

Promote Additional Distributional and Regional Dynamics Research

The findings demonstrate that the entire welfare picture cannot be captured by GDP alone. To guide targeted strategies, future research should look at class based purchasing patterns, regional inequities, as well as remittances. Policymakers can create interventions that guarantee more comprehnsive and fair welfare gains by having a better understanding of how various income groups react to growth, inflation, and human development.

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