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THE DYNAMICS OF CONSUMPTION BEHAVIOUR: A TIME SERIES ANALYSIS OF INCOME AND PAST CONSUMPTION IN PAKISTAN

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Abstract

This paper examines the dynamic model of consumption, income and consumer price index in Pakistan based on the time series values between 1985 and 2023. This study has used the Autoregressive Distributed Lag (ARDL) model and impulse response analysis. The ARDL model results demonstrate that income is the most important determinant of consumption in both short and long run. Strong income elasticity of consumption is also confirmed by the fact that a 1 percent increase in income increases consumption by 0.63 and 1.64 in the short and long run respectively. Consumer price index has a weak but insignificant short run effect but positive and significant long run effect on consumption which means that inflation has a time lag effect on consumption behavior. The adverse and substantial error rectification term substantiates the existence of a steady long run equilibrium of the variables and approximately 38% of the imbalance is remedied every period. The impulse response analysis also substantiates these results because it demonstrates that a shock to income has a large and sustained positive impact on consumption, whereas price shocks do not have a large impact on consumption, but instead cause a positive impact that builds up with time. The responses also show that there are two-way interactions between income and consumption implying that there is a feedback mechanism in the economy. All in all, the findings prove that the role of income in the formation of consumption patterns is superior, and the impact of prices is comparatively small and lagged. The results highlight the need to have income-enhancing policies, price stability, and sustainable macroeconomic management to ensure a steady consumption growth and long-run economic stability in Pakistan.

1. INTRODUCTION

Consumption function has also raised a lot of controversy in the area of economics and econometric modelling. It is the correlation between income and consumption in that; consumption is the overall value of goods and services that individuals in the economy are willing to purchase so as to have an immediate use of it. It is among the significant elements of the aggregate demand of an economy (Khan et al., 2014). The economy of Pakistan has stood out in the new emerging market as a major macroeconomic success within the FY 2025. It has shown the general stabilization and is regaining confidence in the face of challenging world climate and geopolitical regional insecurity. In all major macroeconomic indicators, improvements have been observed and inflation has dropped to single digits, the current account deficit has transformed into a surplus, the fiscal deficit has diminished, the primary balance has also enhanced, and the Pakistan Stock Exchange is experiencing a bullish trend. The enhancement of essential macroeconomic indicators has promoted macroeconomic stability, which will propel the economy into the take-off stage in the medium term.

The real GDP growth is documented at 2.68 percent for FY 2025, encompassing household spending, Non-Profit Institutions Serving Households (NPISH), and general government consumption. Household consumption was the primary contributor to demand in FY 2025, accounting for 83.0 percent of GDP. The increase in household consumption declined to 7.99 percent in the current fiscal year 2025, down from 28.15 percent the previous year,

contributing the most to total growth at 6.70 percentage points (GoP, 2025). Consumption of NPISH was constant and low, however, it slightly increased to 1.04 percent of GDP, and this indicates a growth rate of 19.4 percent, which evidences the current assistance of philanthropic and development sector entities.

Even though government consumption showed a mediocre performance in FY 2024, in FY 2025, the performance was slightly better. It has also increased its GDP share to 9.4 percent, owing to the relaxation of budgetary limitation and the rekindling of administrative and developmental expenditure. The tight monetary policy and the diminishing impact of the previous growth which was supported by inflation have reduced the growth of the total consumption. As one of the most important economic concepts, inflation has a dramatic effect on the economic climate of a community.

This phenomenon impacts individuals' purchasing power, modifies the value of currency, and changes spending behaviours (GoP, 2025).

Purchasing power refers to the amount of goods and services that can be procured by a unit of money. The inflation weakens the buying capacity of money and this comes with a number of consequences to individuals, businesses and the economy in general. According to Aurangzeb and Haq (2012), inflation is even a more complicated process than mere price increase. It is also associated with reduction of the monetary value within a particular economic system. The effects that inflation can have on an economy at the same time can be both positive and negative, including raising the price of holding money, reducing the opportunities, and increasing the chances of the future inflation preventing investment and savings. On the other hand, the beneficial effects of inflation are that they allow central banks to adjust real interest rates that are aimed at mitigating recessions, and also encouragement of non-monetary capital investments. The primary aim of this study is to investigate the short and long-term impact of current income and past consumption on consumption within the framework of the Pakistani economy. The format of this article is as follows. The introduction section followed by the review of literature and methodology, data characterization and technique used in the study. The analyses and empirical findings are structured in segment 4. Ultimately, segment 5 summarises and finishes the research work.

2. LITERATURE REVIEW

The relationship between the macroeconomic variables and the performance of the stock market has been thoroughly studied by previous studies that all affirm the importance of money supply, interest rates, and inflation on the equity prices. In this pattern, Sheikh et al. (2020) used the ARDL model and show that money supply and interest rates have a tendency of having an inverse correlation with stock indices but inflation generally has a positive influence in the long term. Moreover, developments after the global financial crisis experienced in 2008 also reveal that such relationships have changed, which means that there are structural changes on the effect of macroeconomic variability on stock markets behavior.

In a manner akin to previous research, Gupta et al. (2025) investigated the effects of inflation and fluctuations in oil prices on stock prices and returns by performing a comprehensive review of scholarly articles published over the past 22 years. The research findings demonstrate that stock market volatility is predominantly influenced by uncertainties surrounding inflation variations and oil prices. Alamgir and Amin (2021) examined the relationship between oil prices and the stock markets of four South Asian nations utilizing the Nonlinear Autoregressive Distributed Lag (NARDL) model from 1997 to 2018. They demonstrated a favourable correlation between operating performance and stock market indices, characterized by asymmetric reactions to both positive and negative fluctuations in operating performance.

Similarly, Asmy et al. (2010) and Antonakakis et al. (2017) identify a positive association between inflation and the stock market. Ali et al. (2020) analysed the impact of inflation on Pakistan's economic development. The paper employs Pakistani time series 19812014. The variables are gross fixed capital creation, unemployment, Gross domestic product, inflation and child labor. The results are been computed by use of unit root test and ARDL. This is contrary to the possible notion that devaluation of currency will result in a steady decline of GDP in developing countries. War cannot be resolved single-handedly. Thus, the government needs to sanction such countermeasures. According to the policy principles, Pakistan needs to use the aggressive approach to stimulate the GDP growth through the help of excess channels (Ali et al., 2023). Ali et al. (2020) tested the connection between monetary policy, inflation, and economic growth. Inflation is a very important factor in the economic policy. Monitoring of inflation is fundamental in the development of effective economic policy since other issues will subsequently be followed. This paper illustrates the impacts of inflation on the Pakistani economic growth. ARDL is applied to assess empirical estimates of time series data in 1989-2020, ADF, and unit root test is used as the validation. Inflation is the dependent variable in this research, whereas, GDP, interest rate, money supply and exchange rate are the independent ones. The conclusion of the analysis was the finding of an antagonistic correlation between the inflation and GDP (Ali et al., 2023).

The authors of Halim et al. (2020) examined the effects of consumption credit and inflation on the purchasing power of West Java. In this study the quantitative data is provided by the use of data that can be measured. To conduct the study, it is required to have time series data of 2017 to 2020 and cross-section data of 27 cities. They were actually done in three tests: Common Effect Mode, random effect model and fix effect model, and Chow and Housman tests were applied. The researchers concluded that the price inflation and consumer credit have a significant impact on the purchasing power of people. The consumption credit that is variable has a positive influence on the purchasing power, whereas inflation influences it negatively (Quraishi et al., 2022). Ali et al., (2025) analyzed the socioeconomic effects of inflation showing that rising prices reduce the purchasing power of households and alter consumption patterns, particularly in the emerging countries like Pakistan. Studies have often shown that the poorer population groups are disproportionately affected by inflation due to an increase in the cost of living and a reduction in real wages. Moreover, the empirical data highlights the importance of the long-term policy measures that should regulate the inflation, ensure the consumption, and protect the general social welfare.

Kakar et al. (2010) examined the long-term association between money supply, prices and economic growth with emphasis given to the significant role of monetary policy on macroeconomic stability. The presence of a long run relationship between money supply, GDP and inflation is generally supported empirically in developing economies including Pakistan. It has been demonstrated in the results that good management of money is the key to the economic growth and control of price volatility.

3. METHODOLOGY

The current research examines consumption behavior dynamics in Pakistan by time series analysis of income and consumption in the past. The analysis uses the annual data on the GDP per capita (INC) and final consumption expenditure (CON) in constant 2015 US dollars, obtained in the World Development Indicators (WDI). The methodological model is based on the Keynesian consumption function in which it is assumed that the current consumption depends largely on the level of income and past consumption trends. Econometric methods, including unit root tests, cointegration analysis and Autoregressive Distributed Lag (ARDL) model are used to test the short-run and long-run relationships. It is a methodological approach that allows the study to adopt the dynamics of consumption changes as the income evolves and determine whether consumption behavior is permanent or not in Pakistan.

Table 1 Explanation and summary of variables

Variables	Description	Source
INC	GDP per capita (constant 2015 US$)	WDI
CON	Final consumption expenditure (constant 2015 US$)	WDI
CPI	Consumer price index	WDI

This paper examines consumption behavior dynamics in Pakistan, based on the correlation between income and historical consumption. In order to ensure that the data is suitable to be modeled using time series, it is important to note that the analysis would start with the Augmented Dickey-Fuller (ADF) unit root test that is used to determine the properties of stationarity of the variables. The Autoregressive distributed lag (ARDL) model is applied in the research to estimate the short and long-term relationships between income and consumption after determining the order of integration. In order to test the presence of cointegration between the variables, the bounds testing method is conducted in the ARDL framework. The mathematical and econometric formula is shown below in Equation 1 and 2.

$$INC = f(CON, CPI) \quad (1)$$

$$\mathrm{Ln(INC)_t} = \alpha_0 + \alpha_1 \mathrm{LnCON_t} + \alpha_2 \mathrm{Ln}CPI_t + \mathrm{e_t} \quad (2)$$

Lastly, the Impulse Response Function (IRF) is implemented to represent the dynamic effects of consumption in relation to changes in income and to identify how these effects change with time, therefore, giving more information on the behavioral adjustments in the Pakistani economy.

4. RESULTS AND DISCUSSION

Table 1 represents the descriptive statistics of the variable in terms of income, consumption, and consumer price index to give an idea of the statistical nature of the variables during the time of study. The means and medians of all three variables are very similar, which means that the data is roughly symmetrically distributed and it does not contain extreme outliers. In particular, the mean of income is 7.07 which represents stable income levels in Pakistan over the time of the study and consumption is 25.95 in nature which indicates a constant trend of consumption spending. The average figure of consumer price index is 4.11 showing average levels of prices and inflationary trends in the years of the sample. When it comes to variability, the standard deviations allow seeing that consumer price index (0.91) has

the greatest fluctuation, which indicates that it was more varied over the period of time than both income and consumption. The consumption level (0.46) is rather variable, whereas income (0.19) is by far the least variable, which proves the existence of rather steady income growth. The gap between the minimum and maximum values also contributes to the finding that the dataset has no atypical deviations or outliers. Concerning the form of the distributions, all the three variables have slightly positive values of skewness (0.26 on income, 0.05 on consumption, and 0.04 on consumer price index), which proves the fact that the distributions are almost symmetric. The kurtosis values of 1.87 to 1.91 are less than the normal values of 3 which means that the distributions are platykurtic, or flatter than the normal distribution, and have lighter tails. This means that there is no high concentration of the data around the means or the extreme values. All in all, the descriptive statistics imply that income, consumption, and consumer prices in Pakistan have stable behavior, normal distribution, and consistent trends and, thus, the data applies to the advanced time series analysis like unit root testing, cointegration, and regression estimates.

Table 1. Descriptive Statistics

	LINC	LCON	LCPI
Mean	7.07	25.95	4.11
Median	7.07	25.96	3.98
Maximum	7.40	26.74	5.84
Minimum	6.76	25.16	2.60
Std. Dev.	0.19	0.46	0.91
Skewness	0.26	0.05	0.04
Kurtosis	1.89	1.87	1.91
Jarque-Bera	2.37	2.04	1.89
Probability	0.31	0.36	0.39
Sum	268.82	986.07	155.99
Sum Sq. Dev.	1.29	7.88	30.53
Observations	38	38	38

Source: Author Computation

The correlation analysis presented in Table 2 examines the strength and direction of the linear relationships among the variables LINC (log of income), LCON (log of consumption), and LCPI (log of consumer price index). The results reveal exceptionally strong and positive correlations among all three variables, indicating a high degree of association within the dataset. Specifically, LINC and LCON exhibit a correlation coefficient of 0.99, implying a nearly perfect positive relationship between income and consumption. This finding aligns with fundamental economic theory, which posits that as household income increases, consumption expenditure also rises proportionally.

Similarly, the correlation between LINC and LCPI is 0.98, suggesting that income and price levels tend to move together over time. This may reflect the inflationary dynamics of the economy, where increases in income are often accompanied by rising consumer prices. Moreover, the correlation between LCON and LCPI, which is 0.99, indicates that consumption expenditure is highly sensitive to changes in price levels. This relationship highlights the cost-of-living effect—when prices increase, households adjust their consumption patterns accordingly, leading to parallel movements in both variables.

The overall results suggest that the three variables are highly interdependent, moving closely in the same direction over the study period. Nonetheless, the correlation results strongly support the hypothesis that income, consumption, and prices in Pakistan are closely linked, reflecting the interconnected nature of economic behaviour in a developing economy.

Table 2 Correlation Analysis

	LINC	LCON	LCPI
LINC	1.00	0.99	0.98
LCON	0.99	1.00	0.99
LCPI	0.98	0.99	1.00

Source: Author Computation

Three time series variables that were tested on stationarity on the Augmented Dickey-Fuller (ADF) unit root test include the log of income (LINC), the log of consumption (LCON), and the log of consumer price index (LCPI). The findings of this investigation are provided in Table 3. The results indicate that all three variables are non-stationary at their level forms, as their ADF statistics (−0.29 for LINC, −0.19 for LCON, and 0.99 for LCPI) are greater than the

critical values, and the corresponding p-values (0.91, 0.93, and 0.99) are statistically insignificant. This implies the presence of unit roots in the level data, suggesting that the mean and variance of the series are not constant over time. However, after taking the first difference, all variables become stationary, as evidenced by their significantly negative ADF statistics (−4.42 for LINC, −5.61 for LCON, and −5.19 for LCPI), each with a p-value of 0.00, significant at the 1% level. These findings validate the null hypothesis of unit root that the first difference of all variables rejects the null hypothesis and this measure shows that they are integrated of the first order, I(1). The fact that the differenced series is stationary indicates that income, consumption and price levels in Pakistan have long-run trends, but short-run variations are stable and mean-reverting.

The result can be attributed to the macroeconomic theory that indicates that economic variables including income and consumption will tend to have a period of long-run growth depending on the efforts of inflation and structural factors yet will remain steady in the dynamic aspects of the short-term. Thus, such findings support the use of cointegration methods and error correction modelling in the study of the long-run equilibrium and short-term adaptations of the variables in the further empirical research.

Table 3. Unit Root Test

Series	ADF			
	Level		1st Difference	
LINC	-0.29	0.91	-4.42	0.00***
LCON	-0.19	0.93	-5.61	0.00***
LCPI	0.99	0.99	-5.19	0.00***

Source: Author Computation

The results of the ARDL model presented in Table 4 indicate both short-run and long-run relationships between consumption, income, and prices in Pakistan. In the short run, the coefficient of income (D(LINC) = 0.63) is positive and statistically significant at the 1% level, suggesting that a 1% increase in income leads to a 0.63% rise in consumption. This finding highlights the sensitivity of consumption to short-term income fluctuations. The coefficient of the consumer price index (D(LCPI) = 0.07) is positive but statistically insignificant at the 5% level (p = 0.09), implying that price changes have a weak and insignificant effect on consumption in the short run. It is confirmed that there is a stable long-run equilibrium relationship among the variables because the error correction term (CointEq. (-1) = -0.38) is negative and highly significant (p = 0.00). There is a moderate rate of adjustment toward equilibrium, since this coefficient's value suggests that about 38% of the consumption imbalance is corrected within one period.

Table 4. Results of the ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Short Run Coefficients				
D(LINC)	0.63	0.13	5.02	0.00
D(LCPI)	0.07	0.04	1.76	0.09
CointEq(-1)	-0.38	0.10	-3.83	0.00
Long Run Coefficients				
LINC	1.64	0.31	5.37	0.00
LCPI	0.17	0.06	2.76	0.01
C	13.68	1.90	7.22	0.00

Source: Author (s) computation

In the long run, the results show that income (LINC = 1.64) has a strong and statistically significant positive effect on consumption, suggesting that a 1% increase in income results in a 1.64% increase in consumption. This demonstrates that income elasticity of consumption is greater than one, meaning that consumption grows more than proportionally with income. The long-run coefficient of the consumer price index (LCPI = 0.17) is also positive and significant at the 1% level, indicating that higher prices are associated with a moderate increase in consumption, possibly due to adaptive consumption patterns or inflationary expectations. The constant term (C = 13.68) is positive and highly significant, representing the autonomous level of consumption when income and prices remain constant. Overall, the ARDL results confirm that income plays a dominant role in determining both short-run and long-run consumption behaviour in Pakistan, while price effects remain relatively minor. It appears that income, prices, and consumption all

tend to converge on a stable equilibrium path over time, as the long-run cointegrating relationship is further supported by the considerable and negative error correction factor.

Table 5. Bounds test for co-integration analysis

Critical value	Lower Bound value I(0)	Upper Bound value I(1)
10%	3.17	4.14
5%	3.79	4.85
1%	5.15	6.63
F-statistic = 5.24, K= 2		

Source: Author (s) computation

Table 5 shows the results of the bounds test for co-integration, which shows if the model variables have a long-run relationship. Since the F-statistic (5.24) is greater than the upper bound value at the 5% significance level (4.85), it indicates the presence of a long-run co-integrating relationship among the variables in the model.

Table 6. Diagnostic assessments

Test	Statistics	Value	*df*	P-Value
'ARCH'	χ^2	(0.01)	(1,34)	(0.90)
'Ramsey RESET'	F	(5.99)	(1,32)	(0.02)
'Breusch–Godfrey Serial Correlation LM'	χ^2	(2.31)	(2,31)	(0.11)
'Jarque–Bera'	F	(5.52)		(0.06)

Source: Author (s) computation

Table 6 displays the outcomes of various diagnostic tests that were employed to assess the stability and reliability of the estimated ARDL model. Based on the ARCH test statistic ($\chi^2 = 0.01$, $p = 0.90$), it can be inferred that the residuals are homoscedastic and the error variance is constant, suggesting the absence of heteroskedasticity. The absence of serial correlation in the results of the Breusch-Godfrey Serial Correlation LM test ($\chi^2 = 2.31$, $p = 0.11$) validates the time-independent nature of the model's residuals. The residuals are roughly normally distributed, according to the Jarque-Bera test ($F = 5.52$, $p = 0.06$), since the p-value is marginally more than the 5% significance level. However, the Ramsey RESET test ($F = 5.99$, $p = 0.02$) is statistically significant, indicating a possible model specification error, which may arise due to omitted variables or incorrect functional form. Overall, the diagnostic results imply that the ARDL model satisfies most of the classical regression assumptions, though some adjustments might be needed to improve its functional specification.

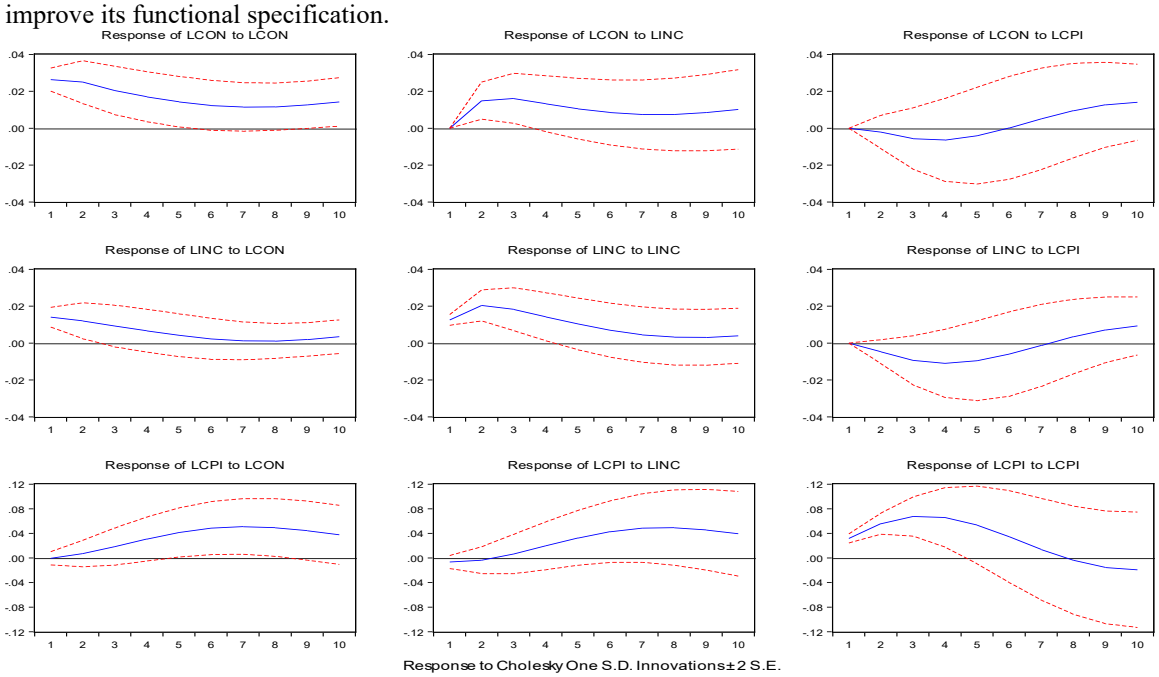

Figure 1. Impulse Response Function

Overall, the impulse response analysis supports the existence of dynamic interdependencies among consumption, income, and prices. The results emphasize that income shocks have the most pronounced and persistent effect on

consumption, while price shocks exhibit relatively smaller and delayed influences. This reinforces the ARDL model findings that income is the dominant driver of consumption behavior, and that the economic system gradually returns to equilibrium following short-term fluctuations.

These findings validate the Keynesian consumption theory and demonstrate that Pakistani consumers adjust gradually to income changes rather than instantly, consistent with the habit formation hypothesis.

5. CONCLUSION AND POLICY IMPLICATIONS

The findings of the ARDL model provide important insights into the dynamics of consumption behaviour in Pakistan. The results confirm that income is the most influential determinant of consumption, both in the short and long run. A 1% increase in income leads to a 0.63% rise in consumption in the short run and a 1.64% rise in the long run, indicating that consumption is income-elastic. This suggests that as income grows, households tend to increase their consumption spending by a greater proportion. In contrast, the effect of the consumer price index on consumption is positive but relatively weak and statistically insignificant in the short run, while it becomes significant in the long run. This implies that inflation has a delayed but positive impact on consumption, possibly reflecting adaptive behaviour where consumers adjust their spending patterns over time. The negative and significant error correction term demonstrates a moderate speed of adjustment, confirming the presence of a stable long-run relationship between income, prices, and consumption.

From a policy perspective, these findings underscore the critical role of income growth and stability in sustaining consumption and, consequently, overall economic growth. Policymakers should focus on implementing strategies that enhance household income, such as promoting employment opportunities, supporting small and medium enterprises (SMEs), and increasing productivity across key sectors. Since consumption responds strongly to income, such measures would stimulate domestic demand and contribute to economic stability. Furthermore, the relatively weak short-run impact of inflation suggests that moderate price increases do not immediately dampen consumption; however, maintaining price stability remains essential to protect purchasing power and prevent long-term inflationary pressures.

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