Article

MACROECONOMIC DETERMINANTS OF CONSUMPTION FUNCTION IN SELECTED DEVELOPING COUNTRIES: AN EMPIRICAL ANALYSIS USING ARDL APPROACH

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Abstract: *This study is focused on comparative analysis of consumption costs in Pakistan, India, China and Bangladesh. The data for this study has taken from the database of World Bank for period of 1987 to 2019. Final consumption expenditure is a dependent variable while GDP, exchange rates and personal remittances are independent variables. The unit root test is performed using the Augmented Dicky Filler test for consistency between variables. Further analysis is done with the help of ARDL model. Analysis unveiled that the negative impact of exchange rate on final consumption, and the positive and significant impact of income on consumer spending which supports Kenya's theory.*

INTRODUCTION

Consumption is always considered one of the basic concepts, at household and economic level. Domestic use is the cost of available resources to meet consumer's necessities and desires. All kinds of durable and non-durable goods belong to the category of household uses. For financial planning purposes, taking into account consumer spending, as it is an important component of GDP, policymakers determine how consumers respond to income fluctuations. In economics, total consumption which is the planned expenditure that depends on the actual level of income. Keynes (1946) explained the basic idea of disposable income and consumption and the positive correlation between consumption and disposable income. Any change in income brings small changes in its usage. This theory holds that there should be a long-term relationship between consumption and income.

The Cousin model was criticized by Koznets (1952), and its results confirmed the existence of terminology and short-term use. Kenya's short-term consumption function provides accurate results, but the long-term average utilization rate is very high (Mankiew, 2010). However, theory developed by James Disneyberry (1949) highlight, that consumption is the function of absolute income, and also confirms its status in the distribution of income. Modigliani and Berberg (1954) hypothesized that living income depends on current income levels, future income and wealth. Many researchers have pass judgment on Kenya's theory, in which Friedman (1957) set out to manage permanent income, saying that due change in income; individuals have faced both short-term and long-term fluctuations. However, consumption will not react to temporary fluctuations in income. Many environmental

measurement techniques have been used for legitimate purposes to estimate fixed income. Hall (1978) and many researchers investigate the revenue and consumption of the time series frame error correction model. Theoretical and practical facts confirm the error correction model of the consumption function: consumers create plans that cannot be achieved, and then plan to recreate some of the mistakes and increase revenue over the next period. The present study used Autoregressive Distribution League. The model (ARDL) examines the dynamic relationship between the final cost of consumption and its determinants. The works of Davidson, Hendry, Serbia, and Yu (1978) are widely recognized in consumer literature.

It used British time series data and estimated consumption. Later, generosity was studied using the DHSY method, but recently, Fakhrai and Mansoori (2008) proposed ARDL to estimate the performance of Iranian consumption. The approach is used. Similarly, Khan etc. (2014) and Khalid Khan etc. (2015) Estimate the actual private consumption model of Pakistan through ARDL. Therefore, policy makers should understand private use in Pakistan, China, Bangladesh and India. Kuznets (1946), Keynes (1936), Disney Berry (1949), Hall (1978), Campbell & Mankiew (1989), Davidson et al (1978) and Friedman (1957) all find and explained consumption function literature. Yuan tried the key factor which determines private consumption.

Similarly, taking Pakistan, China, Bangladesh, and India as examples, the key purpose of this study is to briefly describe the main factors which effect short-term and long-term final consumption. Figures 1-4 show the relationship between consumption expenditure and gross domestic product (GDP) for Pakistan, India, China and Bangladesh. Final Consumption Expenditure is abbreviated as FCE and Gross Domestic Product is abbreviated as GDP.
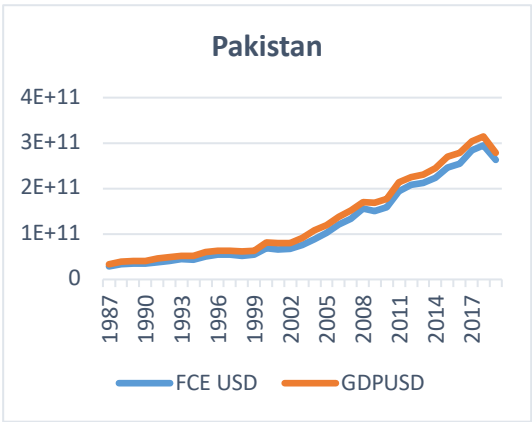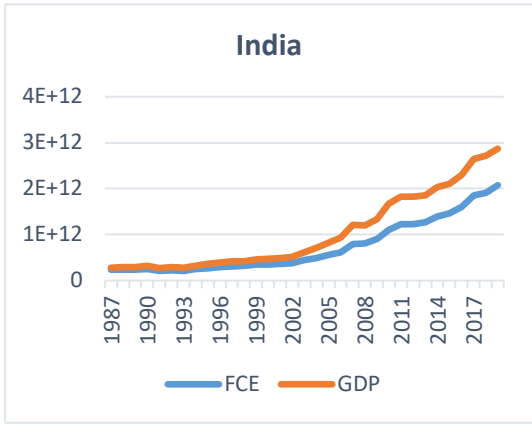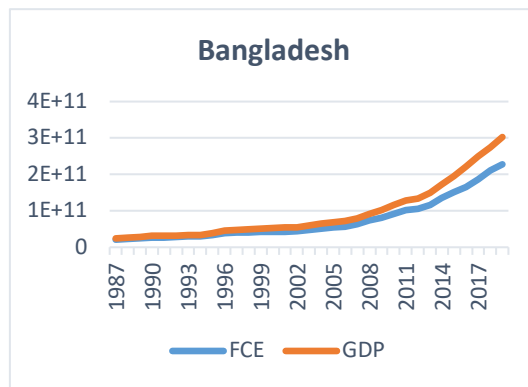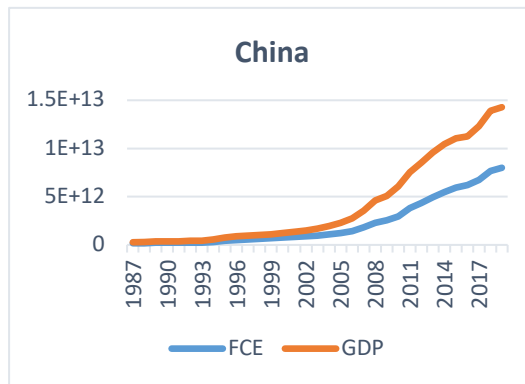

Figure 1

Figure 2

Figure 3

Figure 4

Fluctuations in consumption not only have close linked to economic growth but also have multiplier effect on the level of national income. In general, the importance of macroeconomics can hardly be overestimated. A comprehensive study of these determinants helps an economy achieve economic stability, high employment levels for factors of production and high overall incomes.

LITERATURE REVIEW

Ekong and Effiong (2020) studied the household consumption expenditures economic determinants in West Africa analyzing time series data from the period 1999 to 2018. Research shows that GDP and inflation have a significant positive, while savings and interest rates have a significant and negative impact on household spending. The kinetic position is supported by significant positive effect of income on consumption expenditure; however, interest rates negative effect on consumption supports interdisciplinary alternative effect. Akekere and Yousuo (2012) conducted an empirical study in Nigeria, on time series data set from 1981 to 2010 to analysis relationship of changes income on private consumption expenditures. A significant relationship is found between private consumption expenditures and GDP (gross domestic product) (as proxy of income). Similarly, Odo and Petersen (2012) by using panel data analysis the impact of expectations on consumption and consumer confidence in Nigeria. The results showed that consumer confidence, current earnings, revenue expectations, expected changes in food and sustainable prices and exchange rates are the key determinants for consumption spending in Nigeria. Ezeji and Ajudua (2015) explored the positive correlation between income and consumption expenditure according to the Keynesian consumption model. According to results, a significant change in interest rates, price levels and exchange rates affected consumer behavior in Nigeria. These findings tied with the conclusion of (Fabissa and Jensen, 2002) conclude that economic downturn affects household welfare levels through private consumption spending and that inflation can also influence welfare measures. However, low-income families react

gradually to Price level. Ikwuagwu, Ariwa and Onyele (2017) examined aggregate consumption expenditure determinants in Nigeria from 1981 – 2015. The ARDL approach was used and the results show significant and positive effect of gross domestic product GDP (income proxy) on aggregate consumption expenditure in both long and short terms. And interest rates showed significant effect on aggregate consumption spending. Policies which increase gross domestic product (GDP) should be practice such as encouraging and development of small businesses and friendly investment environment creating by foreign investors in the economy of Nigerian to boost efficiency which in turn accelerate consumption. In line with that, Arapova (2018) examines in Asian countries, private household consumption expenditures determinants - 3 East Asian countries - Republic of Korea and Japan in Asian countries, 9 ASEAN members –Malaysia, Philippines, Brunei Darussalam, Indonesia, , ,Singapore, Cambodia, Thailand, Vietnam and Laos – panel data is used from 1991 – 2015. The results discovered that, population growth, income, and government spending has a positive effect on consumption though interest rates have significant and negative effect. It is concluded that income stimulus policies can provide substantial results in boosting household final consumption expenditures. Ibbih and Peter (2018) try to analyze consumption determinants in Nigeria applying the ARDL approach. The findings reveal that individual's behavior is not consistent with the basic model of consumption. In addition, consumption patterns prioritize consumption and non-durable needs. This paper calls for economic policies and programmers that will shift consumption from the non-durable to the durable because it will increase saving, wealth creation, investment, and economic growth.

METHODOLOGY

The theory underlying this study originated from the nature and relationship between consumption and income. The most important phenomena of consumption function were first well thought out by J.M. Keynes. The following function expressed the relationship.

$$Ct = Co + (MPC)(Yd)$$

Where C stand for consumption and Co is for autonomous consumption (independent of income), MPC for marginal propensity to consume and Yd is disposable income. MPC range between 0 and 1, shows as income increases how much consumption increases and vice versa. Regular income speculation (PIH) is an important method used to predict this relationship. The simplest order of the consumption function is shown below based on the assumption of absolute income, the life cycle concept, and the bond hypothesis.

$$CONSt = f(Yt) \qquad (1)$$

If CON_t is the final expenditure and Y_t is the disposable income, then equation 1 represents the long-term domestic use efficiency. However, some empirical studies and alternative theories have proposed other factors for consumption, such as personal remittances and exchange rates. Hence complete functional form of consumption is:

$$CONSt = f(Yt, EXt, PRt) \qquad (2)$$

Where EXt official exchange is rate and PRt is personal remittance. Annual data taken from World Development Indicator (WDI) is used over a period of 1987 to 2019. Gross domestic consumption (GDP) is used as proxy for disposable income. The logarithmic line form of Equation 2 is used to estimate the coefficient of the consumption function based on experience.

The logarithmic forms of the consumption function are:

$$\ln CONSt = \beta_o + \beta_y \ln Y_t + \beta_{EX} \ln EX_t + \beta_{PR} \ln PR_t + E_t \qquad (3)$$

The regressor utilized in the model includes Final consumption expenditure, Personal Remittances, exchange rate and gross domestic product. Studies by Keho (2019), Ramcharran (2019), Muzindutsi and Mjero (2018), Mondal and Khanam (2018), Corsett et al. (2018), Mwangi and Atieno (2018), Bonsu and Muzindutsi (2017), D'Acuto, Hoang and Weber (2015), Ezeji and Ajudua (2015), Bouyon (2015), Taylor (2013), Mian et al. (2013), Heim (2010), Benigno and Thoenissen (2008), Choi and Devereux (2006) have taken up some of these variables in their studies.

Here $lnCONSt$ is the natural logarithm of the final consumption function, $lnYt$ is the natural logarithm of GDP, $lnEXt$ is the natural logarithm of the exchange rate, and $lnPRt$ is the natural logarithm of the personal remittances.

being. ε_t Interference term. This article uses data from the Spanish World Development Indicators from 1987 to 2019 to analyze total consumption, a very important factor. In Spain there is a short-term and long-term relationship between income and consumption.

The present study will analyze the relationship between consumption function, disposable income, personal remittancesand exchange rateto estimate the long run and short run relationship among the variables, Pessarn Smith (1998) and Pessern et al. Distributed autoregressive regression (ARDL) by. Corresponds to. (2001). The ARDL model was chosen because of its particular advantages. One is that time series variables can be applied to either I (0), I (0), or compression (Pesaran et al., 2001). Short-term and long-term parameters can be evaluated at the same time, and error-correction models can combine short-term corrections with long-term equilibrium without fear of long-term data loss (Jalil Mahmood, 2009). The equation of the ARDL model is as follows:

$$\Delta lnCONS_t = \beta_0 + \beta_1 lnCONS_{t-1} + \beta_2 Y_{t-1} + \beta_3 EX_{t-1} + \beta_4 PR_{t-1} + \sum_{i=1}^{\rho} \delta_i \Delta (lnCONS)_{t-1}$$

$$+ \sum_{i=1}^{\rho} \delta_i \Delta(Y)_{t-1} + \sum_{i=1}^{\rho} \delta_i \Delta(EX)_{t-1} + \sum_{i=1}^{\rho} \delta_i \Delta(PR)_{t-1} + \alpha_t \qquad (4)$$

Where Δ indicate the first difference operator, $lnCONS_t$ is a dependent variable, Y_t, EX_t and PR_t for explanatory variables, α_t is the error term and β_1, β_2, β_3 and β_4 correspond to the long run parameters while δ_i show short-run coefficients. The ARDL model starts first with investigating the unit root test to ensure that each variable is either I (0) or I (0 to satisfy the bound test assumption. The F-test or Wald test is performed to examine the presence of long-run link among the variables. The null hypothesis of having non-presence of co integration, H0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ is tested against the alternative hypothesis, H1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$, the variables are said to be co integrated if null hypothesis is rejected which means the presence of long-run association. Third, if a long-run correlation is established between the variables, an error correction model is estimated from the following equation:

$$\Delta lnCONS_t = \beta_0 + + \sum_{i=1}^{\rho} \delta_i \Delta (lnCONS)_{t-1} + \sum_{i=1}^{\rho} \delta_i \Delta(Y)_{t-1} + \sum_{i=1}^{\rho} \delta_i \Delta(EX)_{t-1} + \sum_{i=1}^{\rho} \delta_i \Delta(PR)_{t-1}$$

$$+ \theta ECT_{t-1} + \alpha_t \qquad (5)$$

The results of the error correction term will specify the speed of adjustment to reach equilibrium after a short-term shock. Stability and diagnostic tests will be carried out to guarantee goodness of fit for the chosen ARDL model, which comprise of serial correlation, heteroscedasticity, and CUSUM tests.

In the present study various tests, including serial correlation LM test also applied to check the autocorrelation, Ramsey Reset test for model functional form, Breusch pagan Godfrey test for heteroscedasticity of variables and CUSUM tests.

Unit Root Test
The unit root test is carried out to verify the integrity of the sequence of variables. The unit root finding strategies in the literature are complex. We take the ADF exam. ADF is used instead of link because ADF can handle larger and more complex shapes. The ADF stats are negative. The requirements for the ADF test are as follows:

$$\Delta X_t = \delta + \beta_t + \beta X_{t-1} + \gamma_i \sum_{i=1}^{\rho} \Delta X_{t-1} + \varepsilon_t \qquad (6)$$

RESULTS

The ADF test contains a delayed difference as a key component to counteract the auto correlation. This study also uses the ARDL approach to investigate the co integration among Consumption function, Income, personal remittances and Exchange rate for four countries, Pakistan, India, China, and Bangladesh. Table 1 shows the results related to the data stationery. The ADF root test unit is used to test steady-state.

Variable	Figures (at level)	Result	Figures (at difference)	Result
PAKISTAN				
Final consumption expenditure (FCE)	0.8490	Non-Stationary	0.0004	Stationary
Gross domestic product (GDP)	0.7801	Non-Stationary	0.0001	Stationary
Official exchange rate (OER)	0.8367	Non-Stationary	0.0206	Stationary
Personal remittance (PR)	0.9257	Non-Stationary	0.0001	Stationary
INDIA				
Final consumption expenditure (FCE)	0.9987	Non-Stationary	0.0003	Stationary
Gross domestic product (GDP)	0.9930	Non-Stationary	0.0002	Stationary
Official exchange rate (OER)	0.0119	Stationary	0.0053	Stationary
Personal remittance (PR)	0.6781	Non-Stationary	0.0011	Stationary
CHINA				
Final consumption expenditure (FCE)	0.9082	Non-Stationary	0.0368	Stationary
Gross domestic product (GDP)	0.8611	Non-Stationary	0.0447	Stationary
Official exchange rate (OER)	0.0381	Stationary	0.0009	Stationary
Personal remittance (PR)	0.5077	Non-Stationary	0.0017	Stationary
BANGLADESH				
Final consumption expenditure (FCE)	0.9999	Non-Stationary	0.0091	Stationary
Gross domestic product (GDP)	0.9999	Non-Stationary	0.0140	Stationary
Official exchange rate (OER)	0.4034	Non-Stationary	0.0030	Stationary
Personal remittance (PR)	0.9453	Non-Stationary	0.0000	Stationary

Table 1: Result of ADF Test

Table 2 shows the critical values of 5% and 90% of the bound test determined by Pesaran, Sheen, Smith (2001). The calculated F-State value is above the upper limit in all cases. These show that there is a long-term association among the variables in the model. After studying the long-term relationship, the ARDL method can be used to evaluate the short-term and long-term parameters of the model.

Country	F-Statistics	95%		90%	
		Lower bound	Upper bound	Lower bound	Upper bound
Pakistan	12.47539	2.79	3.67	2.37	3.2
India	5.756113	2.79	3.67	2.37	3.2
China	4.094356	2.79	3.67	2.37	3.2
Bangladesh	4.463333	2.79	3.67	2.37	3.2

Table 2: ARDL Bounds Test Results

The results obtained in Table 2 confirm that there is a co integration between them, and then proceed to the second stage to determine the long-term relationship. The ARDL co integration test was performed and the findings are shown in Table 3. The findings revealed a positive relationship between income (GDP proxy) and final consumer spending. However, the coefficients vary from country to country. Pakistan, India, China and Bangladesh have

GDP coefficients of 1.126, 1.188, 1.211 and 1.108, respectively, indicating that final consumption GDP has increased by 1.126%, 1.188%, 1.21 1, and 1.108%, respectively. In line with finding, (Ezeji and Ajudua, 2015, Arapova, 2018 Ariwa and Onyele, 2017, Akekere and Yousuo, 2012 and Ekong and Effiong, 2020) explored a positive relation between consumption expenditure and income. Similarly, the exchange rate is negative in case of Pakistan, India, China and Bangladesh, similarly found by (Ezeji and Ajudua, 2015).

Country	GDP	Exchange Rate	Personal Remittances	C
Pakistan	1.126***	-0.083***	0.002	-3.058***
India	1.188***	-0.327	-0.065*	-2.721
China	1.211***	-0.116	0.864	-5.793
Bangladesh	1.108***	-0.304***	2.325	-1.691

Table 3: ARDL Long Run

Table 4 shows the short term ARDL model. The Error Correction Term (ECT) ratio reflects the next period disequilibrium percentage. Therefore, the ECT value must be negative. The ECT value is negative in all cases in the calculated model, which shows stability of the model and the transition of final consumption from disequilibrium to equilibrium at the next stage.

Country	Pakistan	India	China	Bangladesh
DGDP	1.055***	0.583***	0.799***	1.047***
DER	0.157***	-0.608***	0.193*	-0.141
DPR	-0.008**	-0.009***	-0.002	-9.442
ECT (-1)	-1.658***	-0.390***	-0.159***	-0.974***
DW	2.387	1.730	2.372	2.340
R-squared	0.991	0.995	0.970	0.985
Adjusted R-squared	0.987	0.989	0.961	0.968

Note: *$p<0.10$, **$p<0.05$, ***$p<0.01$

Table 4: ARDL Short Run or Error Correction Model (ECM)

Diagnostic test results are displayed in Table 5 and Table 6 where information about diagnostic tests is reported. The results of the diagnostic test show that the model has no serial correlation problem and heteroscedasticity. All diagnostic tests show that the model does not have a suitable econometric problem. Cumulative sum (CUSUM) and total square sum (CUSUMsq) were used to check the stability of the sample coefficients.

Countries	F-statistic	Prob. F	Obs*R-squared	Prob. Chi-Square
Pakistan	0.8378	0.4564	3.5535	0.1692
India	0.0466	0.8362	0.2083	0.6481
China	0.7328	0.4970	2.5814	0.2751
Bangladesh	0.1667	0.8497	1.3187	0.5172

Table 5: Serial Correlation LM Test

Countries	F-statistic	Prob. F	Obs*R-squared	Prob. Chi-Square
Pakistan	0.7856	0.6711	12.7591	0.5456
India	0.8074	0.6691	18.5406	0.4866
China	0.5694	0.8278	7.80819	0.7304
Bangladesh	0.6335	0.8078	16.5940	0.6174

Table 6: Heteroskedasticity Test (Breusch-Pagan-Godfrey)

CONCLUSION

In this study, the authors used jointly integrated ARDL model method to clarify the performance of consumption function in Pakistan, India, China and Bangladesh and to determine the final consumption in Pakistan, Bangladesh India, and China. The results of this study show that income and exchange rates are the most important short-term and long-term end-user spending commitments in all countries. The diagnostic test illustrates that there is no

relation between asymmetry and series in the model, but error terms that indicate the stability of the model are generally distributed.

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