The Effect of Exchange Rate and Exchange Rate Uncertainty on Domestic Consumption in SAARC Member Countries from 2005 to 2020

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www.ijrah.com || Vol. 4 No. 1 (2024): January Issue

ABSTRACT

The exchange rate and its uncertainty are the key economic variables that influence other macroeconomic variables through various channels. Domestic consumption will be influenced by the exchange rate and its uncertainty. This research investigates the impact of the exchange rate and its uncertainty on the private sector consumption of the member countries of the South Asian Association for Regional Cooperation (SAARC) from 2005 to 2020. The data has been extracted from the World Bank websites, the Asian Development Bank, and the Ministry of Finance of Afghanistan. The uncertainty of the exchange rate data has been extracted using the ARCH method, and the research model has been estimated using the GLS method. The research results indicate that the exchange rate and its uncertainty have a significant and positive effect on private-sector consumption. The positive relationship between the exchange rate and its uncertainty with consumption is consistent with the theory of currency pass-through. Additionally, the impact of income on domestic consumption is positive and statistically significant, while the impact of government consumption expenditure on private-sector consumption is negative and significant.

Keywords- private sector consumption, exchange rate uncertainty, SAARC, panel data

I. INTRODUCTION

Consumption is one of the vital components of the GDP of every country, constituting a significant percentage of the national income and influencing the trade cycles. Economists believe that private sector consumption accounts for at least 70% of a country's GDP (Mankiw, 2012). As the largest component of GDP, domestic consumption has secondary effects on people's savings, future investments, and economic growth rates. Additionally, private-sector consumption reflects the standard of living of the residents of a country, indicating the economic position of a nation (Murase, 2013). This emphasizes the significance of investigating the factors affecting consumption. The Keynesian view of studying consumer behavior is

essential for understanding economic activities and the effects of government policies (Babangida et al., 2021).

With trade liberalization and globalization, all countries have turned to international trade to benefit from global market advantages (Khan and Syed, 2014). Accordingly, the exchange rate has become a fundamental variable that not only affects a country's trade but also influences other macroeconomic variables (Auboin and Ruta, 2011). When examining the impact of the exchange rate on inflation and consequently on consumption, attention must be paid to the increasing exchange rate and the distinction between the short-term and long-term effects of exchange rate shocks on inflation. Concerning the exchange rate's effect on consumption, two theories, namely the pass-through theory and the absorption theory, can be mentioned.

Exchange rate fluctuations and, subsequently, price changes highlight the exchange rate pass-through. The exchange rate pass-through reflects the degree of exchange rate changes reflected in the prices of traded goods; if the impact of the depreciation of the domestic currency is fully reflected in the prices of imports, then it is a complete pass-through. If only a portion of the currency devaluation is transferred to import prices, then it will be an incomplete or partial pass-through.

Alexander (1952) was the first to examine the effect of the exchange rate on private-sector consumption about seven decades ago. He concluded that if wages are not fully adjusted for inflation, increases in wages lag behind the inflationary effects of the depreciation of the domestic currency. Consequently, real incomes decrease, and domestic consumption is negatively affected (Chishti et al., 2019).

Exchange rate fluctuations affect both the aggregate demand (through net exports) and the aggregate supply (through intermediate imported goods) of the economy. This is because exchange rate fluctuations under a floating exchange rate lead to inflation rate fluctuations, which can have both negative and positive effects on consumption (Oskooee & Xi, 2012). Therefore, exchange rate fluctuations lead to instability in the inflation rate and may have a direct impact on consumption. Given the significance of private sector consumption in SAARC member countries, this research aims to investigate the impact of the exchange rate and its uncertainty on domestic consumption in these countries during the years 2005 - 2020. For this purpose, after the introduction, the theoretical issues and research background are addressed, and the research model is developed. Subsequently, the research model is estimated, and the results of the estimation are analyzed and interpreted. The concluding section is dedicated to the research findings.

II. THEORETICAL BACKGROUND

According to economists, consumption is considered the final purchase of goods and services by individuals (Oskooee & Xi, 2012). The consumption function provides a good example of the developmental stages in the field of economics. These stages began with the discovery of the important concept of "consumption" by Keynes (1936) and were then pursued by individuals such as Duesenberry (1949), Ando and Modigliani (1950), Friedman (1957), and Hall (1987). Most of these models emphasized income as a vital determinant of consumption. Keynes, the founder of modern consumption theories, defined consumption as a constant coefficient of income along with an autonomous component. Duesenberry emphasized the relative trend of consumption concerning income through social and cultural relationships. Ando and Modigliani believed in perpetuating the value of consumption and income over

time. Friedman defined consumption as related to income and consumption of the previous period, assuming adaptive expectations, while Hall, assuming rational expectations, considered consumption as a complete estimate of the previous period (Branson, 2014).

Decision-making regarding consumption and savings is a fundamental issue in the analysis of microeconomics and macroeconomics in the short and long run. Firstly, consumption affects business cycles and short-term monetary policies. Secondly, the total savings influence the size of the capital market, which in turn affects wages, interest rates, and long-term living standards (Carroll, 2006). Numerous studies have examined the determinants of consumption and savings. The theoretical issues highlight real income and interest rates as determinants of consumption. With most economies being more open, exchange rates have become an influential factor in macroeconomic variables, including consumption (Oskooee, Kutan, and Xi, 2015). Among those who have studied the impact of exchange rates on consumption, Alexander (1950) presented the modern theory of the balance of payments, or the absorption theory. The main objective of this theory is to search for a policy that can achieve internal balance (full employment of factors of production) and external balance (balance of payments equilibrium). This theory examines domestic reactions to balance of payments fluctuations, which are themselves the result of currency depreciation. According to this theory, a decline in the value of money can affect domestic consumption. Alexander argues that when prices increase due to currency depreciation, income is transferred from laborers with a high propensity to consume to producers with a low propensity to consume, based on the effects of inflation and the lagged adjustment of wages to inflation. Therefore, total consumption decreases.

Furthermore, exchange rate instability is a common phenomenon that affects domestic consumption through the prices of goods and consumer services. Exchange rate fluctuations can disrupt the international flow of goods and services (Tretvoll, 2018). The effects of exchange rate fluctuations on other economic variables, which themselves derive from the exchange rate's sensitivity to broader economic developments, are an important issue, particularly in developing or underdeveloped countries. Moreover, since exchange rate fluctuations ultimately lead to inflation, this can have a direct impact on consumption. Inflation fluctuations make consumers more cautious about their spending patterns by reducing their expenses and increasing their savings. Therefore, exchange rate fluctuations are also considered as a new explanatory variable for private consumption. In any country, 60-70% of the gross domestic product is purchased and consumed by domestic residents, so understanding the factors affecting consumer expenditures is very

important for policymakers, as they can stimulate consumption during recessions and limit it during inflation.

III. LITERATURE REVIEW

Ebrahimi (2018) analyzed the asymmetric effects of real exchange rate fluctuations on private sector consumption in Iran using the non-linear (ARDL) model between 1959 and 2016. In general, the results of the model indicate that private sector consumption behavior is not solely influenced by the absolute level of the real exchange rate but rather is a function of its fluctuations and uncertainties. Furthermore, the level of real exchange rate fluctuations (both decreases and increases) has different effects on private sector consumption, with the positive and negative shocks of real exchange rate fluctuations having symmetric effects on short-term consumption, but asymmetric effects on long-term consumption. Additionally, income and inflation variables are also influential factors in consumption, with income having a positive effect and inflation having a negative effect on private-sector consumption.

Mohsini Zanozi et al. (2017) addressed the impact of exchange rate and exchange rate uncertainty on domestic consumption in Iran in an article using annual data between 1988 and 2014. For this purpose, they employed the GARCH model to measure exchange rate uncertainty and utilized the Lag (ARDL) regression model with distributed lags for investigating long-run relationships, as well as the vector error correction model (VECM) to examine the short-run deviations of variables from their equilibrium values. The findings of this study indicate that the effect of exchange rate on consumption is positive and significant, while the effect of exchange rate uncertainty on consumption is negative and significant.

Iyke and Ho (2017) studied the impact of real exchange rate fluctuations on domestic consumption in Ghana, a country with an open economy and exchange rate fluctuations. Utilizing annual data from 1980 to 2015 and considering the variance of the real exchange rate as an indicator of exchange rate fluctuations, they employed the ARDL method and found that real exchange rate fluctuations have a short-term negative effect on domestic consumption, which is transmitted as a long-term negative effect.

Oseni (2016) examined the influence of exchange rate fluctuations on private sector consumption using quarterly data from 19 Sub-Saharan African (SSA) countries. By using the GARCH model to obtain the uncertainty index or exchange rate fluctuations and employing the dynamic S-GMM panel method, they concluded that exchange rate fluctuations have a negative relationship with private sector consumption in SSA countries. The primary limitation of this study is that its findings may not reflect the specific experiences

of individual countries, as the results are based on dynamic panel data methods.

Bahmani Oskooee et al. (2015) investigated the effects of exchange rate fluctuations on domestic consumption in emerging economies. Their sample consisted of 12 countries, and they utilized seasonal data and the error correction model (ECM) approach to differentiate short-term effects from long-term effects and also obtained an uncertainty index for the exchange rate. They found that exchange rate fluctuations have a short-term impact on domestic consumption in all countries, with the short-term effects only leading to long-term effects in six countries.

Khazari et al. (2015) focused on the examination of exchange rate instability on private sector consumption in Iran using annual data from 1973 to 2011. They first extracted the values of real exchange rate instability using the generalized autoregressive conditional heteroskedasticity (GARCH) model and then examined the impact of real exchange rate instability on private sector consumption using the autoregressive distributed lag (ARDL) model. The estimation results indicate that in the long run, disposable income, liquidity, real exchange rate instability, and the real interest rate have a positive impact, while the real interest rate has a negative impact on private sector consumption.

Mirzamohammadi (2015) focused on identifying the influential factors on consumption in Iran, with an emphasis on the effective real exchange rate fluctuations, utilizing the autoregressive distributed lag (ARDL) and error correction model (ECM) methods for seasonal data from 1988 to 2010. The study findings demonstrate that gross domestic product has a positive effect, but long-term bank deposit interest rates and real exchange rate fluctuations have a negative impact on consumption. Therefore, the application of effective real exchange rate stability policies is recommended to smooth consumption and reduce its fluctuations.

Hamano (2013). has investigated the consumption and abnormality of the real exchange rate from the macroeconomic literature under the title "puzzle of the real exchange rate". Using data from different countries and employing general equilibrium models, he confirmed a positive correlation between these two variables.

Bahmani Oskooee and Xi (2012) go a step further and argue that since fluctuations in the floating exchange rate led to fluctuations in the inflation rate, it can have negative and positive effects on consumption. Therefore, they propose a consumption function that includes income, interest rate, exchange rate, and measured fluctuations based on the GARCH model of the exchange rate. They estimated a model for Japan with quarterly data for the period 2008 -1970 using the panel ARDL method. All four variables had a significant impact on total consumption in the short and long term (except for the exchange rate variable) in Japan. Similar

results were obtained for the United States and Canada. They found that exchange rate fluctuations lead to lower consumption in Canada and higher consumption in the United States and Japan.

In conclusion, we can say that numerous studies have been conducted on the impact of exchange rate and exchange rate uncertainty on private sector consumption. The findings of the research indicate that the exchange rate and exchange rate uncertainty have a meaningful impact on private sector consumption, with both positive and negative effects. Considering that no specific study has been conducted under the title of the impact of exchange rate and exchange rate uncertainty on private sector consumption of SAARC member countries during this time period, this research is the first to examine the impact of exchange rate and exchange rate uncertainty on private sector consumption of SAARC member countries from 2005 to 2020.

IV.   RESEARCH METHODOLOGY

In the present study, the impact of exchange rate and exchange rate uncertainty on private consumption will be examined using Panel data. The EViews has been utilized for data analysis. In terms of time, the study covers the years 2005 to 2020, and in terms of location, it includes the SAARC member countries (India, Pakistan, Bangladesh, Nepal, Maldives, Bhutan, and Afghanistan). Data collection and statistical information are based on library research and exploration of the World Bank, Asian Development Bank, and the Ministry of Finance of Afghanistan websites. The theoretical issues and empirical studies have been used to formulate the model in this research. The econometric model can be written as follows.

$$LC_{it} = \beta_1 + \beta_2 LR_{it} + \beta_3 LEX_{it} + \beta_4 ULEX_{it} + \beta_5 LG_{it} + \beta_6 LY_{it} + u_{it} \ldots \ldots (1)$$

In the model:
LC: logarithm of domestic consumption
LR: logarithm of the interest rate
LEX: logarithm of the exchange rate
LUEX: logarithm of the uncertainty in the exchange rate
LG: logarithm of government consumption expenditure
LY: logarithm of income
U_{it}: represents the error term

V.   EMPIRICAL RESULTS

5.1. Obtaining Exchange Rate Uncertainty

There are different methods for measuring the fluctuations of a variable. However, by introducing (ARCH) models in 1972 by Engle, a suitable measure for calculating exchange rate uncertainty was obtained, which has greater efficiency in modeling fluctuations compared to other measures (Rasikhi, 2012). Before estimating the model to extract data related to exchange rate uncertainty, the ARCH model has been used, and then the stability of the variables has been examined.

5.2. Stationarity Test

The reliability and unreliability of a series of data can have a significant impact on their behavior and characteristics. If the variables used in estimating the model are unstable, while there may be no logical relationship between independent and dependent variables, the coefficient obtained may be very high by mistake and mislead the researcher. The unit root test is mainly done to prevent spurious regression.

Table (1): Results of unit root tests

Variables	Domestic Consumption	Income		Interest rate	Exchange rate		Uncertainty of exchange rate		Gov expenses	
Rank	Level	level	First difference	level	level	First difference	level	First difference	level	First difference
Levin, Lin &Chu	-3.9019	-3.3728	-0.9011	-5.8437	1.9145	-8.721	-0.3429	-4.740	-0.127	-5.2925
Prob. value	0.0000	0.0004	0.01837	0.0000	0.9722	0.0000	0.3658	0.0000	0.4490	0.0000
Im, Pesaran & Shin	-2.5833	-0.6723	2.0045	5.17401	3.9763	-6.251	0.8844	-5.113	1.3530	-5.331
Prob. value	0.0049	0.2537	0.3225	0.0000	1.0000	0.0000	0.8063	0.0000	0.912	0.0000
Fisher ADF	27.7443	16.1113	24.7154	46.5536	1.7977	56.407	9.5465	46.946	11.930	48/187
Prob. value	0.006	0.1862	0.0162	0.0000	0.9997	0.0000	0.6557	0.0000	0.4522	0.0000

In table (1), the unit root tests indicate that private consumption, interest rate, and income are stationary at the 5% significance level, while the exchange rate, government consumption expenditure, exchange rate uncertainty, and income are stationary with first difference.

5.3. Cointegration Test

The main idea in the analysis of cointegration is that although many economic time series are nonstationary, it is possible that in the long term, linear combinations of these variables are stationary (without a random trend). The Kao test has been used to investigate the cointegration of variables.

Table (2): Result of cointegration test

Test	t- statistic	Prob. value
Kao	-1.7105	0.0428

The Kao test shows that the null hypothesis of cointegration is rejected at the 5% level of significance. The result indicates that there is a long-term equilibrium among income, interest rate, exchange rate, government consumption expenditure, exchange rate uncertainty, and private consumption, which could be important in monetary and fiscal policy-making. Thus, these variables can be included in the model without differencing.

5.4. F- test

A F-test is conducted to determine whether the model is a fixed-effect model or a pooled least square model.

Table (3): Result of F-test

F-test	Statistic	Prob. value
	18.108896	0.0000

Table (3) is indicating that the F-test statistic is statistically significant at the 5% significance level, which shows the model can be fixed effect.

5.5. Hausman Test

Since the model could involve either a fixed effect or a random effect, Hausman test is conducted.

Table (4): Results of the Hausman test

Hausman	Statistics	Prob. value
	61.088208	0.0000

`   The Hausman test shows that null-hypothesis (H_0) is rejected at 5% significance level, so the model is a fixed effect model.

5.6. Heteroscedasticity Test

After constructing the fixed effect model, the heteroskedasticity test is conducted to test the heteroskedasticity of the residuals.

Table (5): Result of heteroscedasticity test

LR-test	Statistics	Prob. Value
	20.5992	0.0022

The result of the LR test shows that the null hypothesis, which represents the homoscedasticity of variances, is rejected and the existence of heteroskedasticity in the residuals of the model is approved.

5.7. Serial Correlation Test

It is also necessary to check the serial correlation in the panel data model, since its existence may lead to less efficient parameter estimations. The Wooldridge (2002) serial correlation test is used under the null hypothesis of no serial correlation.

Table (6): Result of serial correlation test

Wooldridge test	Statistics	Prob. value
	7.799209	0.0000

In table (6), the result indicates that there is autocorrelation among residuals, and OLS is no longer an efficient method of estimation.

5.8. Estimation and Discussion

In cases of autocorrelation and heteroscedasticity problems in the model, the estimations obtained by the OLS method are not efficient, so the model should be estimated using the generalized least squares method (GLS) method. The GLS assigns less weight to observations with greater dispersion and more weight to observations with less dispersion, while the (OLS) method considers equal weight for all observations. Given that the model has heteroscedasticity and autocorrelation problems, the (GLS) method is used.

Table (7): Result of generalized least squares test (GLS)

Variables	Coefficients	t-statistics	Prob
intercept (c)	-0.3287	-5.2124	0.0000
Logarithm of Exchange Rate (LEX)	0.9491	28.0255	0.0000
Logarithm of Interest Rate (LR)	0.0045	0.4049	0.6871
logarithm of exchange rate fluctuations (LUEX)	0.02844	5.5486	0.0000
Logarithm of Income (LY)	0.1214	4.1481	0.0001
The logarithm of Government Consumption (LG)	-0.155499	-4.677066	0.0000
R-Squared	0.946711		

The findings indicate that exchange rate (EX), exchange rate uncertainty (UEX), and income carry a significant and positive effect on private sector consumption at the 5% significance level. Further, government consumption expenditures (LG) have a

statistically significant and negative effect on private sector consumption in the SAARC member countries. On the other hand, the effect of the interest rate on domestic consumption is not significant.

Furthermore, a one percent increase in the exchange rate leads to a 0.949% increase in private-sector consumption. The positive relationship between the exchange rate and private sector consumption implies that with an increase in the exchange rate and a decrease in the national currency's value, imported goods become more expensive. To maintain their previous purchasing power, individuals increase their consumption of domestic goods, which is consistent with the theory of exchange rate pass-through. According to this theory, an increase in the exchange rate is accompanied by an increase in private-sector consumption. In fact, the devaluation of the currency creates higher prices for imported goods, leading to increased demand for domestically produced goods, which compete with imported goods (Mohsini Zanori, 2017).

Moreover, a one percent increase in exchange rate uncertainty leads to a 0.028% increase in private sector consumption. Since exchange rate instability leads to inflation rate instability (Bahmani Oskooee, 1991), consumers aware of this situation and their inflationary expectations, reduce their savings and increase their current consumption to protect themselves from higher future inflation risks.

On the other hand, a one percent increase in government consumption expenditures results in a 0.155% decrease in private sector consumption; this means that the impact of government consumption expenditures on private sector consumption is negative and significant. According to the real business cycle model, an increase in government expenses should lead to a decrease in consumption. The RBC model relies on the decisions of the Ricardian household's subject to temporary budget constraints. Higher taxes to finance increased government spending have a negative impact on private wealth and consumption (Benigno and Thoenissen, 2008).

Finally, a one percent increase in income leads to a 0.121% increase in private sector consumption in the SAARC member countries.

VI. CONCLUSION

Consumption is one of the components that make up the gross national product of any country, which accounts for a significant percentage of national income and, on the other hand, influences business cycles, thus shaping short-term monetary policy decisions (Carroll, 2006). Since the exchange rate can be a determinant of consumption itself, its fluctuations can also serve as one of the effective determinants, acting as an explanatory variable for private sector consumption. In this study, alongside the exchange rate and its

fluctuations, government consumption expenditures, income, and interest rates are considered. According to the research findings, the exchange rate and exchange rate uncertainty have a positive significant impact on the level of domestic consumption. A positive relationship between the exchange rate, exchange rate uncertainty, and private sector consumption is consistent with the theory of exchange rate pass-through. Furthermore, the impact of government consumption expenditures on domestic consumption is negative and significant which represents a crowding out effect.

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