THE IMPACT OF REMITTANCES ON INFLATION IN SOUTH ASIAN ASSOCIATION FOR REGIONAL COOPERATION (SAARC)COUNTRIES

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Abstract

This research investigates the impact of remittances on inflation in South Asian Association for Regional Cooperation (SAARC) countries, focusing on Afghanistan, Bangladesh, Bhutan, India, Maldives, Pakistan, and Sri Lanka. Remittances, defined as monetary transfers from workers residing abroad to their home countries, play a vital role in the economies of these nations. The study explores the relationship between remittances and inflation over the period 2008 to 2020, considering variables such as broad money supply, inflation, imports, government expenditure, GDP, and exports. The research employs a rigorous Panel Fixed Effects model, chosen based on the Hausman Test results, to account for individual-specific effects across cross-sectional units. The findings reveal that inflation, imports, government expenditure, and exports significantly influence remittance dynamics, with a high R-squared value of 0.998797 indicating strong explanatory power. The research contributes to the limited literature on the subject in SAARC countries, offering valuable insights into the economic implications of remittances on inflation.

Keywords: *Remittances, Inflation, SAARC, Panel Fixed Effects, Hausman Test.*

Özet

Bu araştırma, Güney Asya Bölgesel İşbirliği Teşkilatı (GABB) ülkelerindeki enflasyon üzerindeki göçmen transferlerinin etkisini incelemekte olup, özellikle Afganistan, Bangladeş, Bhutan, Hindistan, Maldivler, Pakistan ve Sri Lanka'ya odaklanmaktadır. Çalışmada, yurtdışında yaşayan işçilerden gelen parasal transferler olarak tanımlanan göçmen transferlerinin, bu ülkelerin ekonomilerinde kritik bir rol oynadığı gözlemlenmiştir. Araştırma, 2008-2020 döneminde göçmen transferler ile enflasyon arasındaki ilişkiyi geniş para arzı, enflasyon, ithalat, devlet harcamaları, GSYİH ve ihracat gibi değişkenleri göz önünde bulundurarak incelemektedir. Araştırma, Hausman Testi sonuçlarına dayanarak seçilen katı bir Panel Sabit Etkiler modelini kullanarak, çapraz kesit birimleri arasındaki bireysel etkileri hesaba katmaktadır. Bulgular, enflasyonun, ithalatın, devlet harcamalarının ve ihracatın remitans dinamiklerini önemli ölçüde etkilediğini göstermektedir; yüksek bir R-kare değeri olan 0.998797, güçlü açıklayıcı gücü işaret etmektedir. Araştırma, GABB ülkelerinde konuyla ilgili sınırlı literatüre katkıda bulunarak, göçmen transferin enflasyon üzerindeki ekonomik etkilerine dair değerli içgörüler sunmaktadır.

Anahtar Kelimeler: *Göçmen Gönderimleri, Enflasyon, SAARC, Panel Sabit Etkiler, Hausman Testi.*

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1. Introduction

Remittances are a new financial phenomenon and one of the main essential sources of income based on their size and economic impact in the world. Remittances has different definition, according to the definition of International Monetary Fund (IMF), workers' remittances refer to the value of monetary transfers that is sent from the workers residing abroad for more than one year to the home country and are recorded in different sections of the balance of payments(Sutradhar, 2020).The most accepted definition for remittances is "Migrant remittances are defined as transfers of money, which has been earned in a foreign country, from migrant workers to recipients in their home countries"(Nepal et al, 2018).In developing countries, remittances play an important role as a source of household income and are considered as a stable source(Alfieri et al, 2005).

Remittance flows are a major source of income for all countries in South Asia, larger than all other capital inflows combined. In 2019, India which is one of the members of SAARC countries received more remittances than any other country on dollar terms, and Nepal ranked third in the world in terms of remittances to GDP at 27 percent. Remittances seem to have been even more essential during the COVID-19 pandemic, increasing by 5.2 percent in 2020 in South Asia (COVID-19 Crisis, 2021). Prior to the COVID-19 pandemic, officially recorded remittances hit a record high $719 billion in 2019, including $548 billion to low-and middle-income countries, the World Bank estimates. The numbers fell in 2020, as the pandemic scrambled economic fortunes. Overall remittances fell to $702 billion in 2020, with $539 billion going to low- and middle-income countries.

Over the last decade, there has been an increasing trend in inflow of foreign remittances in South Asia. At the same time over the last few years, inflation rate has been extremely high in South Asia particularly in Afghanistan, Pakistan, and Bangladesh. A question arises is there any relationship between remittances and inflation or not. Several studies have generated empirical evidence indicating that remittances impact inflation. For instance, the studies of Bourdet and Falck (2006) and Amuedo-Dorantes and Pozo (2004) found that remittances give rise to Dutch disease, impacting an economy's tradable sector. To decrease the adverse impact of remittances on competitiveness, recommendations include moving from official aid towards growth-oriented aid complemented with domestic policies that are more export-oriented (Bourdet & Falck, 2006).

Theoretically, remittances may have an inflationary effect via increasing domestic demand or through an increase in money supply. Alternatively, foreign remittances may have a deflationary impact through an increase in goods or services if remittances are invested in productive sectors. However, what happens in South Asia is still a question that needs to be determined. Furthermore, based on the empirical literature in the following section, we are of the view that there is hardly any study that is supposed to examine the impact of remittances on infltion in SAARC countries.

1.1 Objective of the paper

This study aims to present remittances in the SAARC countries and determine the role of remittances on the inflation rate (long and short terms) in case of SAARC countries. The South Asian Association for Regional Cooperation (SAARC) was established by signing the SAARC Charter in Dhaka on 8 December 1985. SAARC comprises eight Member States: India Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. The Secretariat of the Association was set up in Kathmandu on 17 January 1987(Global Migration Database, 2022). Every year South Asian countries send out a considerable number of migrant workers, resulting in remittances becoming an important source of funds for economic development.(Sutradhar, 2020). In South Asia has been determined by large-scale international and internal movements (Migration Data Portal,2022). So, excessive migration makes a lot of remittances, and more remittance has significant role on income of low- and middle-income countries (Basnet et al, 2021). This study, therefore, attempts to investigate the short run as well as long run behavior of the inflation rate.

2. Literature

Narayan et al (2011) have examined the effect of remittances on the inflation rate in a panel of fifty-four developing countries for the period 1995–2004. They find that remittances generate inflation in developing countries, and the effect is more pronounced in the long run. Lim and Simmons (2015).The results show that there is no evidence of a long-run relationship between remittances and real GDP per capita or investment but some evidence of a long-run relationship between remittances and consumption. report that most remittance impacts are absorbed by inflation if remittances are used for consumption.

Rivera and Tullao Jr (2020) Investigating the link between remittances and inflation: evidence from the Philippines Showed that it was shown that remittances are not necessarily inflationary. There were other more dominant internal factors that can stimulate inflationary pressures. Nepal et al (2020) The purpose of this paper is to empirically assess the impact of remittances on the economic performance of the 16 Asian developing countries, The effect of remittances on economic growth is statistically significant and financial development have positive impact on growth.

Basnet et al (2022) The purpose of this paper is to examine whether remittances induce inflation in South Asian countries, namely, Bangladesh, India, Nepal, Sri Lanka, and Pakistan. The estimated results suggest that the inflationary impact of remittances in South Asia depends on the time length. The inflow tends to lower inflation in the short run, whereas it increases eventually. The findings highlight the regional peculiarity in the impact of remittances on the price level. The results are statistically significant and are confirmed by the Mean Group estimation as well. (Dilanchiev et al, 2021)Dynamic Analysis for Measuring the Impact of Remittance Inflows on Inflation, Evidence from Georgia. The paper revealed that long-run inflation is positively associated with the

leading variable remittance, and no relation is found in the short-run between remittance and inflation. The paper found that inflation's adjustment level to its equilibrium is 12% annually.

3. Data

Our comprehensive study relies on annual data spanning from 2008 to 2020 for the SAARC countries, namely Afghanistan, Bangladesh, Bhutan, India, Maldives, Pakistan, and Sri Lanka. We have collected data from two reputable sources, which is the World Development Indicator (WDI) and the International Monetary Fund (IMF). The data covers various aspects such as inflation, annual real economic growth rate, and personal remittances as a percentage of GDP, consumer price inflation, broad money as a percentage of GDP, and exports and imports of goods and services as a percentage of GDP.

4. Variables and Methodology:

4.1 Variables: The study's primary focus is on "Remittances," which serves as the dependent variable, representing the monetary transfers made by individuals working abroad. To determine the drivers of remittances, several independent variables were examined:

a. Broad Money (MS) : Broad money is a key indicator of the overall money supply within an economy, encompassing both physical currency and various forms of demand deposits, time deposits, and other highly liquid assets. It reflects the overall financial liquidity within the economy and is considered a crucial factor that may influence the flow of remittances.

b. "INF" (Inflation): Inflation refers to the rate at which general prices for goods and services rise and, subsequently, the purchasing power of currency falls. It is considered an essential economic factor that may impact remittances, as higher inflation could affect the value of remitted funds.

c. "IMPORT" (Imports): Imports represent the goods and services brought into a country from foreign nations. The volume of imports can be influenced by various economic conditions, and in turn, it can influence remittances, as higher imports could indicate greater economic activity in the home country.

d. "GOVT_EXP" (Government Expenditure): This variable reflects the total amount spent by the government on public goods and services. Government spending can impact the overall economy and, by extension, remittances, as it may affect the recipients' standard of living and economic conditions.

e. "GDP" (Gross Domestic Product): GDP is a measure of the economic performance of a country, representing the total value of all goods and services produced within its borders. It is a fundamental indicator for understanding the overall economic health of a nation and can be a key driver of remittances.

f. "EXPORT" (Exports): Exports denote the goods and services produced within a country and sold to foreign markets. The volume of exports can indicate economic

strength and can influence remittances, as a robust export sector may lead to higher remittance flows.

These independent variables were included in the analysis to explore their relationships with "Remittances" and to identify which factors have a significant impact on the dependent variable.

Table 1: Variable descriptions.		
Indicator name	Measurement	Source
Broad money	(% of GDP)	International Monetary Fund(IMF)
Inflation, average consumer prices (INF)	Percent change	International Monetary Fund(IMF)
The volume of imports of goods and services (imp)	Percent change	WDI & IMF
General government total expenditure	Percent change	International Monetary Fund(IMF)
Gross domestic product, constant prices	Percent change	International Monetary Fund(IMF)
The volume of exports of goods and services	Percent change	WDI & IMF

4.2 Methodology: This research employs a meticulous methodological approach to unravel the determinants of remittances, transitioning from the initial Panel Least Squares to a more fitting Panel Fixed Effects model based on the outcomes of the Hausman Test. The study spans a comprehensive dataset from 2008 to 2020, encompassing seven distinct groups and a total of 91 observations.

Panel Fixed Effects Model: The subsequent analysis utilized a Panel Fixed Effects Model through the panel EGLS (Cross-section SUR) method. The model incorporates cross-section fixed effects, represented by dummy variables, capturing unobserved heterogeneity across individual units. This inclusion ensures the analysis accounts for unique characteristics specific to each cross-section, thereby enhancing the robustness of our findings.

Equation:

$$y_{it} = a_1 y_{it-1} + a_2 y_{(it-2)} + \ldots + a_p y_{(it-P+1)} + a_p y_{(it-p)} + \beta_1 Inf_{it} + \beta_2 ms_{it} + \beta_3 Imp_{it} + \beta_4 Exp_{it} + \beta_5 G_{ti} + \beta_6 GDP_{it} + u_{it} + \varepsilon_{it}$$

We are collaborating with a standard model used in panel data analysis. This equation helps us understand how Remittances (the dependent variable) are influenced by numerous factors over both time and different countries (cross-sectional units).

This equation is a crucial tool in panel data analysis, allowing us to understand how remittances change over time and how they are influenced by their own history and a set of key economic variables, while also accounting for individual-specific characteristics of each country. It helps us explore and quantify the complex relationships within your dataset.

5. Empirical findings
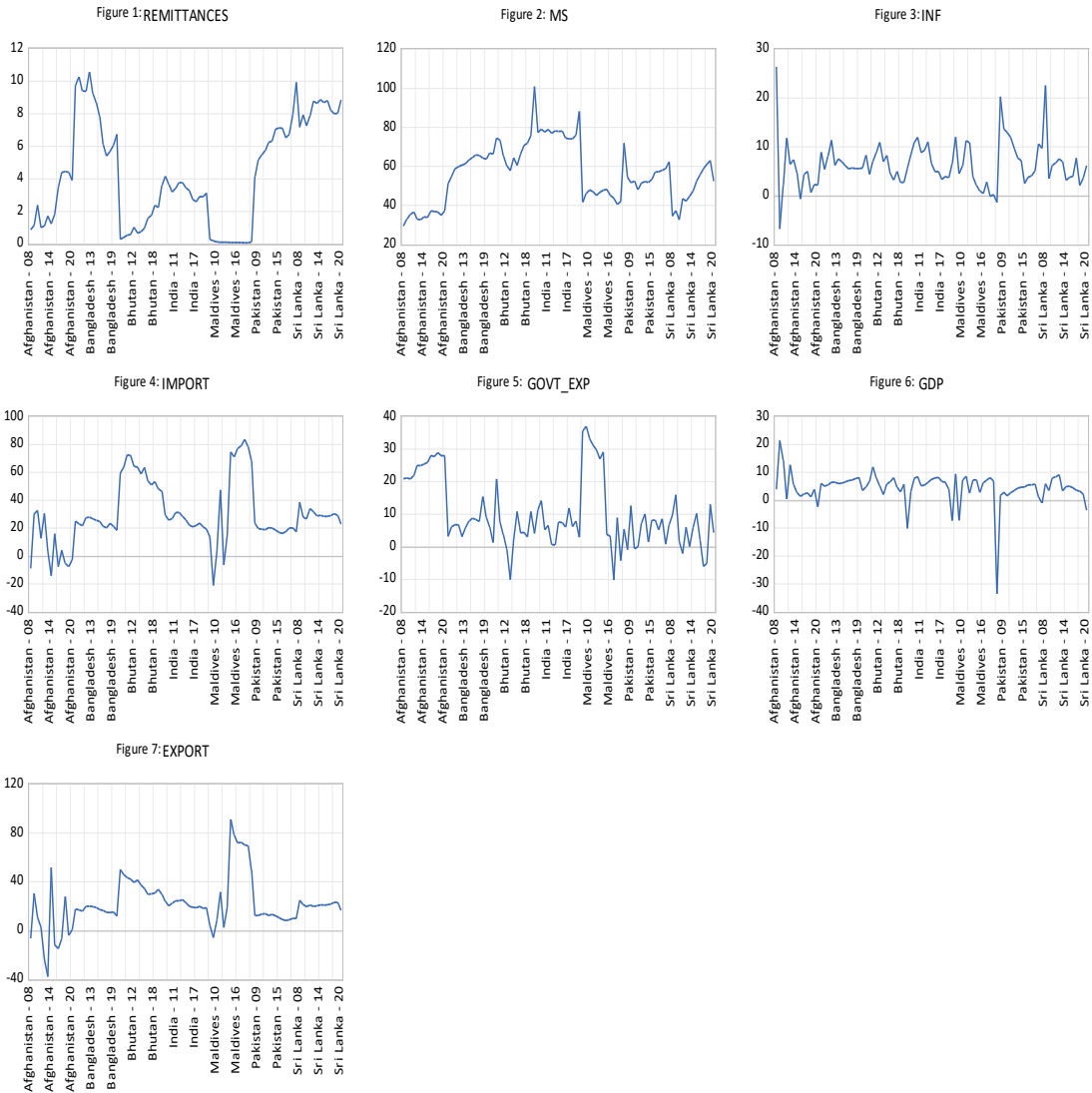
5.1 Panel unit root test results

Unit root tests are essential for assessing the stationarity properties of time series data, a critical aspect in econometrics to ensure the reliability of statistical analyses and model predictions. The stationarity of variables is pivotal for accurate parameter estimation and meaningful economic insights. In the context of panel unit root tests, which consider multiple cross-sections over time, these tests provide a comprehensive understanding of the collective stationarity of variables across diverse entities. Applying this methodology to the period 2008 to 2020, the panel unit root tests on differenced variables, including D(REMITTANCES), D(MS), D(INF), D(GOVT_EXP), D(GDP), and D(EXPORT), consistently reject the null hypothesis of a unit root. The corresponding statistics and probabilities range from -1.97627 to -10.1165 and from 0.0000 to 0.0241, respectively. These robust results suggest that the differenced variables are stationary, indicating stability over time. Additionally, graphical representations of these results, which can be provided upon request, visually emphasize the rejection of the unit root assumption, further supporting the notion of stationarity in the examined variables. The combination of statistical and graphical evidence enhances the credibility of the findings, reinforcing their importance for accurate economic modeling and analysis.

Table 2. Descriptive Statistics							
	Remittances	MS	INF	Import	GOVT_EXP	GDP	Export
Mean	4.360	0.569	5.744	0.270	9.313	-1.225	-0.062
Median	3.766	-0.024	5.629	-0.775	6.784	0.057	-0.548
Maximum	10.588	28.415	12.939	59.575	33.193	14.494	89.510
Minimum	0.079	-12.440	-1.370	-53.774	-10.227	-40.384	-63.559
Std. Dev.	3.231	6.080	3.300	13.432	10.351	6.254	17.618
Skewness	0.184	1.669	0.160	0.763	0.774	-3.227	1.943
Kurtosis	1.671	9.283	2.523	11.111	2.825	22.119	15.503
Jarque-Bera	6.100	162.391	1.057	218.555	7.779	1306.397	549.999
Probability	0.047	0.000	0.589	0.000	0.020	0.000	0.000

In table 3, unit root tests were conducted to assess the stationarity of various economic indicators, including remittances, money supply (MS), inflation (INF), imports, government expenditure (GOVT_EXP), GDP, and exports. The results, presented in the tables, include t-statistics and probabilities (p-values) for tests conducted at the original level of the data and after differencing the data once.

The significance levels (*, **, ***) provide insights into the confidence of the findings. A low p-value (typically below 0.05 or 0.01) indicates the rejection of the unit root hypothesis, suggesting stationarity. The tests were performed with and without considering a constant and trend in the models. These findings are crucial for understanding the long-term behavior of economic indicators, as stationarity is essential for making reliable predictions in economic analysis.

Table 3. Unit root test (PP)								
At Level								
		Remittances	MS	INF	Import	GOVT_EXP	GDP	Export
With Constant	t-Statistic	0.020	0.219	0.009	0.016	0.004	0.241	0.046
	Prob.	*0.203*	*0.104*	*0.041*	*0.141*	*0.005*	*0.848*	*0.038*
		n0	n0	**	n0	***	n0	**
With Constant & Trend	t-Statistic	0.003	0.158	0.042	0.058	0.002	0.314	0.169
	Prob.	*0.466*	*0.103*	*0.114*	*0.309*	*0.020*	*0.797*	*0.096*
		n0	n0	n0	n0	**	n0	*
Without Constant & Trend	t-Statistic	0.018	0.020	0.000	0.004	0.000	0.021	0.016
	Prob.	*0.018*	*0.012*	*0.003*	*0.017*	*0.000*	*0.447*	*0.002*
		**	**	***	**	***	n0	***
At First Difference								
		d(Remittances)	d(MS)	d(INF)	d(Import)	d(GOVT_EXP)	d(GDP)	d(Export)
With Constant	t-Statistic	0.000	0.003	0.000	0.000	0.000	0.037	0.004
	Prob.	*0.044*	*0.001*	*0.004*	*0.012*	*0.000*	*0.476*	*0.004*
		**	***	***	**	***	n0	***
With Constant & Trend	t-Statistic	0.000	0.034	0.000	0.000	0.000	0.190	0.044
	Prob.	*0.189*	*0.000*	*0.000*	*0.107*	*0.000*	*0.997*	*0.008*
		n0	***	***	n0	***	n0	***
Without Constant & Trend	t-Statistic	0.000	0.001	0.000	0.000	0.000	0.003	0.000
	Prob.	*0.003*	*0.000*	*0.000*	*0.001*	*0.000*	*0.161*	*0.000*
		***	***	***	***	***	n0	***
Notes: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant								

Figure 1: REMITTANCES

Figure 2: MS

Figure 3: INF

Figure 4: IMPORT

Figure 5: GOVT_EXP

Figure 6: GDP

Figure 7: EXPORT

5.2 Hausman Test

The Hausman Test is a statistical assessment used in panel data analysis to choose between fixed effects and random effects models. It evaluates whether individual-specific effects in a random effects model are correlated with the independent variables, which can affect the efficiency of parameter estimates. If the test indicates a significant difference between the two models, it suggests that the random effects model might be inconsistent, and the fixed effects model is more appropriate.

H_0: The Random Effects Model is appropriat.

H_A: The Fixed Effect Model is the appropriate.

So, if p-value < 0.05, we reject H_0 and accept the H_A meaning that the Fixed effect model is the appropriate Model and if p-value > 0.05, meaning that we can't reject the H_0, rather accepted H_0, meaning that the Random Effect model is appropriate

Table 4. Hausman Test Results

Correlated Random Effects - Hausman Test					
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	p-value	F- statistic	R-squared
Horizontal Section Random	330.758379	6	0.000	57.77	0.89

Based on the results, the rejection of the null hypothesis with a significant Chi-Squared statistic (330.76) and a p-value of 0.0000 indicates a clear preference for the fixed effects model. The evidence suggests that individual-specific effects are correlated with the independent variables, reinforcing the appropriateness of the fixed effects model for our analysis. The Hausman Test results, with a chi-squared statistic of 330.758379 and a p-value close to zero, strongly reject the null hypothesis of no correlation between individual effects and regressors, indicating a preference for the fixed effects model. Notably, the warning about the estimated cross-section random effects variance being zero suggests limited meaningful variation across cross-sections. Furthermore, when comparing coefficients between the fixed and random effects models for key variables, such as MS, INF, IMPORT, GOVT_EXP, GDP, and EXPORT, differences in variances were observed, indicating potential heterogeneity. The regression results for the panel least squares model with cross-section fixed effects revealed high explanatory power (R-squared = 0.89) and overall model significance (F-statistic = 57.77, $p < 0.0000$). These findings highlight the importance of accounting for fixed effects in our panel data analysis, suggesting that individual-specific effects significantly influence the relationship between the selected variables and REMITTANCES.

Table 5. Findings from a Rigorous Fixed Effect Model Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.459379	0.094575	47.15167	0.000
MS	-0.001345	0.001598	-0.841943	0.4024
INF	-0.020205	0.002558	-7.898816	0.000
IMPORT	0.009841	0.000429	22.92908	0.000
GOVT_EXP	-0.007997	0.000636	-12.56624	0.000
GDP	-0.009563	0.001166	-8.199656	0.000
EXPORT	-0.005592	0.000531	-10.5339	0.000
R^2	**0.998797**			

The results of the fixed effect model investigating the determinants of remittances reveal compelling insights. Notably, variables such as Inflation (INF), Imports (IMPORT), Government Expenditure (GOVT_EXP), and Exports (EXPORT) exhibit remarkable statistical significance with p-values of 0.0000, emphasizing their substantial influence on remittance dynamics. The constant term (C) also holds significance with a coefficient of 4.459379 (p-value: 0.0000), indicating a robust

baseline impact. The exceptionally high R-squared value of 0.998797 underscores the model's remarkable explanatory power, explaining almost 99.88% of the variance in remittances. The F-statistic is notably high at 5395.855, with an extremely low probability (0.000000), further affirming the overall significance of the fixed effect model. While these statistical metrics suggest a strong and acceptable model, it's essential to complement these findings with a critical examination of underlying assumptions and an assessment of the economic implications of the coefficients in alignment with the research objectives.

6. Conclusion

In conclusion, this study sheds light on the intricate relationship between remittances and inflation in South Asian Association for Regional Cooperation (SAARC) countries. The findings reveal that variables such as inflation, imports, government expenditure, and exports significantly impact remittance dynamics, showcasing the complexity of economic interactions within the region. The employment of a meticulous Panel Fixed Effects model, supported by the Hausman Test results, ensures robustness in capturing individual-specific effects across diverse cross-sectional units. The exceptionally high R-squared value of 0.998797 underscores the model's remarkable explanatory power, indicating that the selected variables explain nearly 99.88% of the variance in remittances. The research contributes valuable insights to the limited literature on the subject in SAARC countries, offering a nuanced understanding of how remittances influence inflation. These findings have implications for policymakers, suggesting the need for targeted measures to manage inflationary pressures associated with remittance inflows. Overall, this study contributes to the broader understanding of the economic dynamics in the SAARC region and provides a foundation for further research in this critical area.

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