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The Effects of Devaluation of Currency on Economic Growth: The Mediating Role of Remittances

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Abstract: *This study looks into how the devaluation of the Pakistani currency affected remittances (REM) and economic growth (EG) in Pakistan. The study also looks at how REM affects the link between the devaluation of the currency and the growth of the economy in Pakistan Over the course of 45 years, from 1972 to 2016. The study uses Autoregressive Distributive Lag Model (ARDL) for examining the relationship. This study uses sensitivity analysis and chooses among different econometric techniques, which take into account the endogeneity problem. The results show that remittances partially mediate the relationship between the devaluation of currency and economic growth. Moreover, a one unit rise in REM leads to a 0.47 unit decrease in EG.*

Key Words: Devaluation, Remittances, Economic Growth, Autoregressive Distributed Lag Model (ARDL)

Introduction

Research Background

Devaluation has become a central growth issue for many developing countries. Its impact on EG is both expansive and contractive. Businesses will become more competitive as a result, leading to higher output and more domestically produced goods. There has been a lot of prior discussion on the topic of ER depreciation and EG. However, the greater part of the empirical literature is not stretch to a clear conclusion regarding the relationship between the devaluation of domestic currency and economic growth. Some authors like [Krueger \(1978\)](#), [Taylor & Rosensweig \(1984\)](#), [Kamin \(1988\)](#),

and [Connoly \(1983\)](#) concluded that devaluations have an expansionary effect on economic growth, while some other economists such as [Branson \(1986\)](#), [Sawyer & Sprinkle \(1987\)](#), [Nwanna \(1994\)](#) concluded that devaluations have a contractionary effect on EG.

The exchange rate affects economic growth through different channels is well explained by the study by [Frenkel and Taylor \(2006\)](#). According to them, “When implemented, it “normalises” domestic prices to reflect those seen in other countries. In other words, the exchange rate plays a decisive role in the growth of the economy by influencing the allocation of the recourses in the various economic spheres. Overvaluation of the

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currency negatively affects economic growth because it reduces the return in the manufacturing sector. By relocating resources to non-manufacturing sectors, the appreciation of currency reduces the dynamics of the total production of the country. Further, The close correlation between industrial output and economic expansion is not only due to returns to scale but also because the manufacturing output growth has an effect on export growth, then export growth has an effect on GDP growth. In other words, an appreciated currency not only reduces investment and growth in the industrial sector but also adversely affects the export growth of the industrial sector, which in turn leads to worsening the process of economic growth in the economy. Previous experience of the majority of developing countries showed that the GDP growth rate has been achieved by maintaining a lower exchange rate. According to the study of [Dollar \(1992\)](#), depreciated exchange rate leads to economic growth in less developed economies. Since then, the findings of [Aguirre & Calderon \(2006\)](#) showed the same outcomes. Precisely, the exchange rate affects the GDP growth of the economy, and it affects the relative prices of a country's mix of consumables and non-consumables. Further, it also affects investment decisions and resource allocation in the economy.

The issue of REM and EG has been extensively discussed in the early literature ([Ozden and Schiff, 2006](#); [Ratha, 2005](#); [Faini, 2002](#); [Edwards and Ureta, 2003](#)). According to [Ruiz Arranz & Giuliano \(2005\)](#), remittances are one of the crucial factors which significantly affect the country's overall investment and economic growth. Furthermore, remittances affect investment opportunities in different channels of the migrant country ([Stahl and Arnold, 1986](#)). According to [Faini \(2002\)](#), the amounts of remitted funds prevail over capital market imperfections and provide an opportunity for migrant households to accumulate positive assets. There is not much literature on the association between exchange rate and remittances. Few authors have discussed the relationship between exchange rate and remittances. According to the study by [Faini \(1994\)](#), there is little doubt that the RER has a significant role in determining REM. The author found the

relationship in the case of Germany. According to research by [El-Sakka and McNabb \(1999\)](#), currency conversion rates are a major factor in REM. There is a substitution effect and income effect of the devaluation of the domestic currency. Devaluation of domestic currency increases the remittances because of the substitution effect. However, According to El Mouhoub (2007), due to the devaluation of domestic currency, Migrants may be hesitant to send money home if they know they can get the same value in their home currency by exchanging less foreign currency.

Relationship between Exchange Rate, Remittances and Economic Growth

In developing economies, the exchange rate and the amount of money sent home by workers are related. Incoming remittances have an immediate impact on the value of the currency. However, the level of remittances may be affected by the currency rate due to substitution and wealth effects ([Bouhga-Hagbe, 2004](#))

In the currency devaluation process, the goods in the devaluating country become cheaper and thus for purchasing a given amount of goods, the migrant family now need a lower amount of money than before. So the migrant is able to consume more in their resident country by substituting some purchases in their home country. In contrast, depreciated home currency provides incentives to its migrant citizens to send back more money to the home country to accumulate more wealth by investing in real estate and building residences in the home country. Further, the depreciated exchange rate may also encourage the emigrants to send back more by taking loans or advances in order to gain from a favourable exchange rate in their home country.

Many studies investigated the relationship between exchange rate and remittances inflow in third-world countries. Such as the study by [Olubiya & Kehinde \(2016\)](#) illustrated that inferior currency back home indicated a worse economic scenario, that in turn discouraged the emigrants from sending back more to their home country. This leads to a fall in remitted inflow. [Chamon, et al., \(2005\)](#) showed that a volatile exchange rate of Samoa's currency has

a significant impact on remittances inflow. The authors showed that remittances increase more with the depreciation of Samoa's currency. [Barua et al. \(2007\)](#) showed a positive significant relationship between depreciation of the domestic currency and remitted inflow in the case of Bangladesh. [Gupta \(2005\)](#) found an insignificant relationship between exchange rate and remittances inflow in India. [Higgins et al. \(2004\)](#) illustrated that the immigrant's decision to remit is significantly affected by the level of uncertainty in the exchange rate, rate of unemployment and real per capita income in the home country. [Vargas-Silva \(2007\)](#) showed a bi-directional link between remittances and the exchange rate in Mexico. According to [Olubiyi & Kehinde \(2015\)](#), the motive for remitting and the nature of the exchange rate are the main determinants of the direction of the effect of the exchange rate on remittances. If exchange rate changes are anticipated and remittances are used for investment purposes, devaluation of currency will create an additional cost of the investment; In this case, remittances will be impacted adversely. Then again, if volatility in the exchange rate is unexpected, remittances will be impacted positively. According to Golberg (2008), devaluation of currency is expected to reduce remittances if remittances are altruistic in nature. That's why the relationship between exchange rate and remittances is uncertain and needs further assessment.

Remittances play a key role in a country's economic growth. It may have the potential to affect on economic conditions of a country. According to [Solimano \(2003\)](#), remittances may have a significantly positive effect on a country's GDP growth. The studies of Giuliano & [Ruiz-Arranz. \(2005\)](#) argue that remittances can boost the local economy by reducing the size of a recession in some countries to stimulate consumption and investment. Remittances can also be a substitute for financial institutions, which are lacking in most developing economies. It enables the households to take part in high-risk and profitable economic activities outer of the normal day-to-day consumption. [Ratha \(2013\)](#) illustrated that remittances are the major source of enhancing

domestic savings that can lead to economic prosperity in long term. The study of Yasseen (2012) also showed a positive relationship between remittances and the development of financial systems in emerging economies of the Middle East. Despite the fact of these positive views regarding the potential to sustain employment and economic growth of remittances seems to be inconclusive. [Stratan et al. \(2013\)](#) illustrated that in the case of Moldova, the relationship between remittances and economic growth is still vague, whereas in the period 2006 to 2011, the contribution of remittances to GDP varies from 14 per cent to 19.1 per cent. [Jadotte \(2009\)](#) illustrated the negative effects of remittances in Haiti that it may reduce the motivation of the recipients towards work if they consider it as a permanent source of income. Accordingly, recipients, instead of saving and investing that remit funds in some profitable projects, prefer to enhance their consumption of some precious imported goods.

[Alper & Neyapti \(2006\)](#) observed that the short-term motive of the Turkish remittances refers to consumption; the long-term investment motive may come much later. In the same way, Dehaas (2007) illustrated that the full positive outcomes of remittances on economic development might not be expected in the short run. Rather the full potential of remittances can be observed in the long run. In addition, Barajas, *et al.*, (2011) and [El-Sakka \(1999\)](#) have observed that due to the rise in consumption by the recipients the local market price will rise. So the exchange rate may appreciate in the home country. As a result, the macroeconomic mechanism may lead to the failing of the tradable sector, the rising current account deficit, and inflation in the domestic economy.

Meanwhile, [Kireyev \(2006\)](#) revealed that in the tradable sector, there is high stress on wages which may lead to creating job losses. On the other hand, in the non-tradable sector, the unexpected rise in prices would increase the labour costs, thus leading to the loss of domestic competitiveness. [Bourdet & Falck \(2006\)](#) have observed such findings in Latin America and Cape Verde. Given these adverse effects of remittances, the local governments need to put in place business opportunities and overcome

the danger induced by the consumptive behaviour of the recipients.

Remittances of the immigrant can have a positive impact on the economic growth of the home country as the remitted funds affect the economy through a widespread channel. On one side, the remitted funds are the major source of saving in the home country. When these saving amounts are deposited in the financial institutions, it leads to a significant rise in the resources of these financial institutions. It enables these financial institutions to grant more credit to the companies for short-term and long-term loans. This leads to the development of the financial and credit institutions of the home economy, which play a key role in the economic growth of the home country. Additionally, remittances enable the families of the emigrated workers to get out of the difficulties of credit rationing and finance their consumption needs. Surely, this effect will take place, when the remitted funds are determined to do that.

At the macroeconomic level, remitted funds raise the capacity for investment; if the migrant workers abroad are encouraged by the financial system of the home economy, and when they trust the local economic state of affairs. In contrast, remittances can play a counter-cycle role. It is the situation if the economic situation of the home country of migrant workers suffers from an economic crisis. In such circumstances, these emigrants are forced to send more to their families to overcome these hardships.

One of the most important and powerful contributions of remittances is their fight against poverty, especially in less developed countries. Remitted funds help emigrated workers' families to invest in human capital, which enables these families to spend more on education and youth training. Accordingly, in various countries, foreign remittances contribute to the accretion of human capital and further contribute to the growth of domestic countries.

In the literacy on the impacts of remittances on economic growth, there are many theoretical and empirical analyses which show the negative significant impact of remittances on economic

growth, especially in migrant countries located outside of MENA or the Mediterranean region. The main impact of the remitted funds is the rise in the general domestic price level as well as in the exchange rate of the domestic currency. The exchange rate can be defined as the price of the foreign currency where the migrant lives in terms of the local currency. Each increase in foreign currencies forces the monetary authorities to issue new local currency, which leads to mechanical inflation. Furthermore, the recipients of the remittances stimulate them to be out of the labour force. They use these remitted funds for luxury goods and imported items. Such kind of non-productive utilisation of the remitted funds can lead to the wasting of these funds. The study of Adams & Richard (1989) revealed that remittances might lead to local income distribution inequality. These inequalities among families lead to further negative incentives.

The empirical findings of [Van Dalen et al. \(2005\)](#) showed that the receiver of remitted funds has an eye-catching effect on emigration abroad, especially in the case of Egypt, Turkey and Morocco. This trigger-effect negatively affects the labour force participation in economic development in the home country. Additionally, The major part of the remitted funds of the migrants, Especially in less developed countries, are utilised in unproductive investments such as purchasing land and housing property, which carry massive prices. This type of non-productive use of remitted funds leads to an increase in the general price level in the economy. In addition to this, it is hard to know the actual amount of remitted funds that are utilised in these kinds of unproductive projects because of the fact that the majority of the remitted funds are transferred from abroad through unofficial sources.

Little attention has been paid by academics and researchers to the unique interplay between the ER and EG in Pakistan when other factors are taken into account. The primary purpose of this research is to analyse Pakistan's devaluation and EG from 1972 to 2016. Also looked at is the role of REM as a bridge between the ER depreciation and EG in Pakistan from 1972 to 2016

Table 1. Exchange Rate and Remittances

Period	Exchange Rate	Remittances (as a % of GDP)
1970s	9.759454	4.0533
1980s	14.73303	7.5195
1990s	33.2645	2.8889
2000s	62.39542	3.8075
2010-16	96.03763	5.4954

Source: *Economic Survey of Pakistan (various Issues)*

Remittances are one of the major and debatable issues of less developed countries around the world. After foreign direct investment FDI, a remittance is one of the key factors in foreign finance (Ratha, 2003). It has been recorded that after 1973, the majority of Pakistani settled in Europe, America and Arab to flight their remittances to their home countries have a significant role in the economic growth and foreign exchange reserves. (State Bank of Pakistan, 2011). Approximately 60 countries have a ratio of remittances of 1 per cent to GDP. Although the major portion of inflow (Remittances) supports living standards and consumption of family members, Similarly Pakistan provides incentives for increasing their remittances. It is found that remittances improve financial sectors as well as real exchange rate appreciates as inflow rises (Hassan & Holmes (2013).

The highest induced growth rate of the country was actually the snatching of remittances (7.5195) in the period of 1982-1983. The accurate estimation of remittances is difficult to identify because the official channel (Money Grams and Western union) should keep on the record, while non-official channels (Hawala and Hundi) coated approximately 50 per cent of our remittances (World Bank, 2010). Instability of foreign exchange rate and remittances can affect the Macro-variables like export ratio, unemployment, price, wages and interest rate. On the other hand, stability will reduce the risk to households and investors. Workers' remittances significantly affect economic growth by means of financial development as well as the appreciation of the exchange rate. Increasing the ratio of workers inflow affects the exchange rate significantly, but it causes the Dutch effect worsens the recipient trade competitiveness in the global

market. Pakistan is the 7th largest recipient of remittances in the world (SBP, 2011). Remittances were first recorded officially in the 1970s with the boom of gulf construction works. In the 1980s, remittances exceeded, and the government of Pakistan adopted a managed floating exchange rate and linked its currency to trading partners from 1982-1998. In 1992 Pakistan achieved 6.4 per cent growth in GDP by implementing Economic reforms like Privatisation, liberalisation, owned industrial units and holding on to foreign currency accounts. In 1999 state bank of Pakistan adopted a multiple exchange rate system. In the decade of 2000s, to attract foreign investors government launched a flexible exchange rate, and the flow of remittances increased in 2010. The significant figure outline between remittance and exchange rate shows that inflow to Pakistan in 2015 was 15 billion dollars while comparatively remittances to 2009 were recorded at 6 billion dollars (Economic survey of Pakistan, various issues).

Methodology

Econometric Model

This study employs a four-step methodology of Baron and Kenny (1986) by regressing different equations and checking their coefficients for significance. The indirect effect is calculated for the significance test via the difference between the coefficients obtained from steps 1 and 4. The following formula is used to obtain the indirect effect:

$$B_{\text{Indirect}} = \alpha_1 - \lambda_1$$

Analytical Technique

This study used a non-parametric unit root test, i.e.

Phillips -Perron's (1988) test. The test utilises the following equation:

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha_2 (t-n/2) + \mu_t \dots \dots \dots (1)$$

Where Y_t is the corresponding variable, and n is the number of observations.

2.1.1. Long Run Relationship Using ARDL Model

This study utilised the Autoregressive Distributed Lag model (ARDL) in order to estimate the long-run relationship and to obtain the corresponding long-run coefficients. ARDL provides better results if there is a problem of endogeneity (Pesaran, Pesaran and Smith, 1998). Since most of the time series variables are stationary at first difference hence; this study uses ARDL techniques for examining the link among the variables. ARDL technique can be applied if the variables are mixed order of integration.

ARDL technique considers the JJ approach and extends the VAR portion of VECM to SVAR. For actual application, Pasaron, Shin and Smith (1998) allow different lag lengths for different variables (extract the equation from the near VAR model). So, the final model (error correction version of ARDL model) becomes:

$$\Delta Y_t = \alpha + \beta_1 \sum_{i=1}^p \Delta Y_{t-i} + \beta_2 \sum_{i=0}^p \Delta ER_{t-i} + \beta_3 \sum_{i=0}^p \Delta X_{t-i} + \lambda_1 Y_{t-1} + \lambda_2 ER_{t-1} + \lambda_3 X_{t-1} + \mu_t \dots \dots \dots (2)$$

In this equation, Y stands for the real GDP growth rate, ER stands for the exchange rate variable, and X represents the control variables. α is the element of drift, and μ is the portion of white noise. β_i are the parameters representing short-run relationships (error correction dynamics). λ_i are the parameters representing the long-run relationship. In order to check for a possible long-run relationship, the Wald test is applied to long-run parameters λ_i . After obtaining the long-run relationship, in the next step, the long-run coefficients are obtained by utilising the following regression equation:

$$Y_t = \alpha + \lambda_1 \sum_{i=1}^p Y_{t-i} + \lambda_2 \sum_{i=0}^p ER_{t-i} + \lambda_3 \sum_{i=0}^p X_{t-i} + \mu_t \dots \dots \dots (3)$$

This study uses three mediation channels (current account balance, inflation rate and remittances) in the relationship between the devaluation of currency and economic growth. Following Baron and Kenny (1986), this study employs a four-step methodology by regressing different equations and checking their coefficients for significance.

Empirical Results

Results of Unit Root Tests

Before moving to apply long-run econometric techniques, the basic question is whether the underlying variables have the unit root or not. To answer this question, the study employs ADF, PP and NP unit root tests.

Table 2. Results of PP unit root test

	Level	1 st diff:
Y	-5.181***	-18.486*
ER	2.002	-4.027**
REM	-1.824	-5.603

*, ** and *** represents significance level at 1%, 5% and 10%.

The results presented in table 4.1 clearly demonstrate that the ER and REM are stationary at first difference while variables Y are stationary at level.

The results of unit root tests lead to applying ARDL econometric technique in order to

estimate the long-run relationship among the variables. ARDL is applied in three steps. First, the long-run relationship is estimated. For that purpose, the lag length of the error correction version model is obtained via Schwartz Bayesian Criteria (SBC). The optimum lag length is 2, as presented in table 3.2.

Table 3. Optimum Lag Length

Lag	SC	F-test Statistics
1	106.5278*	2.12

Lag	SC	F-test Statistics
2	107.7411	5.76**

Notes: * indicates optimum lag.

The significant F-statistics value at the optimum lag length of 2 indicates that there is a long-run relationship among the variables of the growth equation at a 5 per cent level of significance. The lag length of the error correction version model is

obtained via Schwartz Bayesian Criteria (SBC). The ARDL lag order of model 1 is (1, 0, 1, 2 and 1) for the variables in model 1 (equation 2). The results are given in table 3.3.

Table 4. Lags Length Order of Model

Lag Selected	Order VAR-SBC				
Variables Lag	Y	ER	GS	GFCF	CON
0	4.827193	41.20597	22.29043	50.87876	48.09887
1	4.240586	4.872078	5.140071	45.39709	47.26082
2	4.508860	5.199879	5.259476	45.34751	47.66747
Selected Lags	1	0	1	2	1

Notes: * indicates minimum Schwarz SBC.

Remittances as Mediator

Table 5 presents the long-run results of 4 step regressions followed by Baron and Kenny (1986).

Table 5. Results of Long Run Coefficients

Regressors	Dependent Variable			
	Real GDP Growth Rate (Y)	Remittances (REM)	Real GDP Growth Rate (Y)	Real GDP Growth Rate (Y)
ER	-0.18*	0.05**	----	-0.22
REM	----	----	0.47**	0.13*
GS	0.26**	----	----	----
GFCF	0.001*	-0.07*	----	----
CON	0.002**	0.004**	----	----
GNE	----	----	0.09*	0.14**
MVA	----	----	0.06**	0.38***
	R ² = 0.99	R ² = 0.85	R ² = 0.97	R ² = 0.99
	Adjusted R ² = 0.99	Adjusted R ² = 0.84	Adjusted R ² = 0.96	Adjusted R ² = 0.98
	F-stat: =6.584	F-stat: =53.01 (0.000)	F-stat: = 4.88 (0.00)	F-stat: =6.16 (0.000)
	Dh Stat = 2.21	Dh Stat = 1.95	Dh Stat = 2.30	Dh Stat = 2.24
	ARDL Order (1, 2, 0, 0, 1)	ARDL Order (1, 0, 3, 2)	ARDL Order (1, 3, 0, 2)	ARDL Order (1, 0, 2, 3, 2)

*, **, *** means Significant at 1%, 5% & 10% level.

Step 1: $Y = \alpha_0 + \alpha_1 ER + \alpha_2 X + U$

In the first step, economic growth (measured by real

GDP growth rate) is regressed on its determinants (exchange rate, gross savings, private investment and consumption). The results suggest that all these

variables significantly affect economic growth. Because the currency rate's coefficient is negative and statistically significant, it indicates that devaluation will have a negative impact on economic growth in Pakistan. The findings suggest that total monetary savings have a beneficial effect on economic expansion. A high rate of investment aids in the acceleration of growth in the economy, as indicated by the positive and substantial coefficient of private investment, which is measured by gross fixed capital formation. The sign of consumption is positive, and it is significant at the 5% level of significance; this suggests that overconsumption will enhance domestic demand, which will, in turn, accelerate growth in the economy.

Step 2: $REM = \beta_0 + \beta_1 ER + \beta_2 X + U$

In this model, the variable remittance is regressed on the exchange rate and other control variables. The results show that the exchange rate negatively affects remittances. A one-unit hike in ER leads to a 0.05 unit decline in REM. Further, gross fixed capital formation negatively and significantly affects remittances. The variable consumption positively affects remittances. The overall F-statistics is significant, which demonstrates the quality of model fit in general under consideration. There is no heteroskedasticity, autocorrelation or multicollinearity in the model. Moreover, the data is normally distributed.

Step 3: $Y = \gamma_0 + \gamma_1 REM + \gamma_2 X + U$

In step 3, economic growth is regressed on remittances and other control variables. The results show that remittances positively affect EG. A one-unit hike in ER leads to a 0.47 unit rise in EG. Further, gross national expenditures positively and significantly affect economic growth. The variable manufacturing value added positively affects economic growth. The overall F-statistics is significant; it proves that the model under examination is generally accurate.

Step 4: $Y = \lambda_0 + \lambda_1 ER + \lambda_2 REM + \lambda_3 X + U$

In step 4, economic growth is regressed on the exchange rate, remittances and other control variables in order to examine the full mediation or partial mediation. The results show that the exchange rate does not significantly affect EG after adjusting for factors like REM. REM positively affect economic growth. Further, gross national expenditures positively and significantly affect EG when additional factors are taken into account in the model. Manufacturing value is added positively and significantly affects EG when additional factors are taken into account in the model. The overall F-statistics is significant, which demonstrates the overall accuracy of the model under consideration.

The indirect effect is the difference between these two coefficients:

$$B_{\text{Indirect}} = \alpha_1 - \lambda_1$$

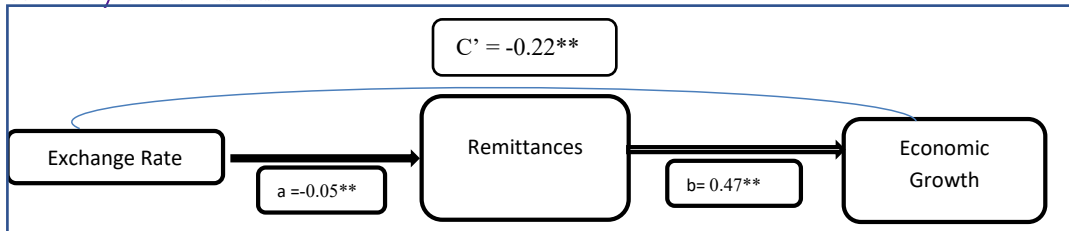
$$B_{\text{Indirect}} = -0.18 - (-0.22) = 0.04$$

Table 6. Summary of Mediation Channels and Coefficients

Hypotheses	Model Variables		Estimates	P	Results
H1	DEV → EG	c'	-0.18		Supported
H8	DEV → REM	A	-0.05**	0.05	Supported
H9	REMM → EG	b	0.47**	0.05	Supported
H10	DEV → REM EG →	$B_{\text{Indirect}} = \alpha_1 - \lambda_1$	0.04	---	Partial Mediation Supported

, ** and * means Significant at 1%, 5% and 10% level.*

Summary of the Results



Conclusion: Partial Mediation Supported

Conclusion

This research analyses how REM acts as a moderator between currency devaluation and the economic expansion of Pakistan over the period 1972–2016. In order to check the mediating relationship between Devaluation of Currency and EG, the annual data for devaluation of the currency, remittances,

economic growth, gross national expenditures, foreign direct investment, manufacturing value-added, gross fixed capital formation and consumption etc. for Pakistan are collected over the period of 1972 to 2016. The results clearly demonstrate that remittances partially mediate the relationship between the devaluation of currency and EG. Moreover, a one unit rise in REM leads to a 0.47 unit decrease in EG

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