Macroeconomic Determinants of Workers' Remittances: Pakistan, a Case in Point

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Abstract

Workers' remittances have become the second foremost source of monetary flows to developing countries. Pakistan has experienced fluctuations in economic indicators in the past that hindered the flow of workers' remittances. The study explores the economic determinants of workers' remittances of Pakistan using time series data spanning from 1975 to 2016. Long and short run relationship between workers' remittances and selected macroeconomic variables has been checked using multivariate regression and Error Correction Model (ECM). The analysis also considers granger causality and an impulse response function. Research analyses the extent to which multi variables impact the flow of workers' remittances in Pakistan. The quantitative substantiation of multivariate regression analysis shows that interest rate, exchange rate, real GDP, gold prices, development expenditures, stock market performance and political stability appeared to be important determinants of workers' remittances. In particular, workers' remittances increased with the increase in GDP, development expenditures, gold prices, depreciation of local currency and political stability. Whereas, rise in interest rate, as greater insecurity in relation to price changes in future period reduces the return on funds remitted. Stock market performance as a substitute of investment in gold has lowered the inflows of workers' remittances in Pakistan during the study period.

Keywords: Workers' Remittances, Error Correction Model, Impulse Response Function.

1. Introduction
1.1 Workers' Remittances in Volumes over the Years

Workers' remittances are defined as the part of cross-border earnings that migrants send to home nation state. Workers' remittances are believed to be as vital external source of investment for developing countries. According to IMF report developing countries have experienced steady growth in the flow of remittances during the previous 10 years and surpass $100 billion worldwide. Remittances are more consistent than other private flows and proved to be resilient during international financial crisis. As a result, researcher and policy makers have paid mounting concentration on workers' remittances over the past few years. Remittances are professed as an imperative component for growth in transitional economies, which encouraged policy makers to understand and promote remittances through formal financial systems.

In spite of the increased importance of workers' remittances, comparatively diminutive work has been done to develop the understanding of the macroeconomic determinants of remittances. The major reason for this is the scarcity and incorrectness of the concerned data. The majority of the previous researches have examined microeconomic determinants of remittances based on survey data. On the other hand few researchers have used international data published by IMF and World Bank to explore macroeconomic determinants.

However, the studies with these data have some shortcomings, specifically the high aggregation level and measurement problems. El Sakka (1999) has well recognized the fact that a large amount of the remittances are channeled through informal system into developing countries. But due to shortage of data on informal mechanism empirical analysis on remittances purely emphasize the "official" aspect.

Prosperous countries are the important source of international remittances, including USA as leading. Estimates showed that in South Asia, East Asia, and Sub-Saharan Africa, additional than two-thirds migrants of deprived countries moved to a state of similar region, and in South Asia and Sub-Saharan Africa, a large amount of workers migrate to another developing state. Upper-middle-income countries are imperative base of remittance surge. According to World Bank; Saudi Arabia, Malaysia, Russia and China are amongst the top 20 countries of worldwide remittances. India, China, Mexico and Philippines maintained their position as the top recipients of expatriate remittances. According to Acosta (2008) other large

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recipients amongst developing countries include Bangladesh, Poland, Pakistan, Egypt, Lebanon and Nigeria

Pakistan has received a considerable amount of workers' remittances during the last three decades, sent by millions of Pakistanis working in foreign countries. For capital deficient nation, similar to Pakistan, workers' remittances are thought-out a vital source of foreign exchange. According to State Bank of Pakistan (SBP) statistics workers' remittances reached level of $19.9 billion in 2015-16, showing a growth of 6.38% as compare to 2014-15. According to data of World Bank, Pakistan has turned into eighth leading developing country in receiving remittance in 2016.

Workers' remittances can be classified as fixed and discretionary remittances. Fixed remittance is the minimum amount the migrants send to their families in order to satisfy basic needs as identified by Lipton (1980) and Russel (1992), remittances are mainly spent for instantaneous expenditure whereas discretionary remittance is the transfer in excess of fixed remittances. Fixed remittances are influenced from the basic impetus for migration including sources of income, size of family, country and skills of workers. The flow of discretionary remittances on the other hand is determined by the relative attractiveness of increasing the value of the money. Factors that affect the relative attractiveness are real interest rates differentials in home and host countries, exchange rate differentials and macroeconomic stability. Ratha (2003) found that flow of remittances depends on the macroeconomic policies and concluded that in distinction to other capital flows, the remittances are significantly higher in countries that are epitomized by high risk and have a high level of debt relative to GDP.

1.2 Workers' Remittances Trends

Remittances do respond to the changes in economic activity and price instability in receiving countries. Pakistan has also witnessed the fluctuations in the flow of remittances during the period of economic boom and meltdown. From 1975 to 1982 Pakistan experienced significant inflow of remittances due to substantial outflow of Pakistani workers due to migration to work in other countries mainly in the Middle East which considerably attracted financial inflows of remittances. From 1983 to 2000 remittances have declined in Pakistan due to slowdown in economic activities. Specifically during the period of 1981 to 1986, the yearly surge of Pakistani workers reduced as of its lowest level as other Asian countries similar to Bangladesh, India, Indonesia, Sri Lanka, Thailand and Philippines started to compete with Pakistani workers in the Middle Eastern labor market. Additionally, the fall down in the international oil prices in the wake of 1983 scenario and besides that the completion of foremost infrastructural schemes declined the demand of Pakistani workforce in the Middle East.

In the beginning of 1990s, the Gulf adversity and slowdown in construction activities declined the earning opportunities for workers and also influenced supply of unskilled Pakistani workers to the Middle East which decreased the remittances flow. A rapid turn down in remittances can be noticed during 1998 to 2000, when Pakistan's foreign exchange accounts were detained subsequent to nuclear detonation.

The second stage of remittance growth began in 2001. Workers' remittances increased from 2001 to 2004 and reached to $4.23 billion for the first time in the comparable time period. The main reasons behind this growth in these inflows were the incident of 9/11 and incessant depreciation of Pakistani rupee which has attracted migrants to obtain the advantage of currency differences. Another reason of this surge in remittances was the tightening of informal money markets after 9/11 incident in 2001 which increased the inflow of remittances through bank channels. An increasing trend can also be observed in the later periods till 2016. According to SBP reports workers' remittances reached a record level of $20 billion in 2016. About one thirds of these remittances originated merely from Saudi Arabia. Another main source of remittances is USA and Middle East. Remittances from Middle East increased in 2009 due to asset crises bringing remittances close to the remittances from the USA. The rise in remittances from all expatriate countries during current years is attributed to many important factors including increase in skill composition of Pakistani workers as well as the ability of the young generation of Pakistani emigrants to enter into additional contemporary occupations in USA and UK (Abbasi 2010).

1.3 Statement of Problem

Over the past few years workers' remittances have shown the tremendous growth in Pakistan. The inflow of remittances is responsive to various macroeconomic factors. These facts need to be identified and focused for monetary benefits. This study therefore focuses on the determining the factors contributed for change in amount of workers' remittances over the time period. The research attempts to answer the following questions in the light of analytical evidence.

- What factors determine the behavior of workers' remittances in Pakistan?
- Which factor has the highest impact on workers' remittances?

The key objective of the research is to investigate about the macroeconomic determinants of workers' remittances in Pakistan. The particular objectives included in the research study were:

- To find out the economic determinants of remittances in Pakistan.
- To find out factors causing oscillation in the level of remittances over different periods.
- To establish empirical relationship between macroeconomic factors and remittance behavior in Pakistan.
- To examine the degree to which multi variables affect the remittances inflow in Pakistan.

2. Literature Review
2.1 Theory of remittances

The theoretical literature on the determinants of workers' remittances is quite large. Research on remittance advocate that several motives lie behind the decision to send remittances implying, that migrants send money home for a variety of reasons. The literature on remittance actions can generally be grouped into four main motives specifically altruistic motives, family and ties, self-interest motives and loan repayment motives.

a) Altruism: Altruism is defined as personal willingness to give benefits to others even if disadvantageous for himself. Altruism is based on the idea that the satisfaction of the emigrant is directly related to the satisfaction of family. Many researches including Johnson and Whitelaw (1974), Chami and Fisher (1996) and Agarwal and Horowitz (2002), Solimano (2003), Brown (1997) claim that as the migrants get stable employment and income, they feels satisfaction of transferring remittances to the home country for the welfare of their family.

b) Self-Interest Motives: Many theories have found that there are self-interest motives for remitting money to home country in which the migrant is generally motivated by economic and financial self-interest. Lucas and Stark (1985), Fidler (2001) and Alleyne (2008), found that to acquire wealth migrant send money in home country to the family members' for the sake of investing money into profitable place like in property or land on behalf of migrants. During that period, the family acts as an agent and takes care of those assets for the migrant.

c) Family and Ties (Loan Repayment): Remittances sent back in the home country for the sake of maintaining ties with family members. Stark and Bloom (1985), Russel (1986), Stark (1991), Agarwal and Horowitz (2002) and Gubert (2002) and Hunte (2004) have referred the family as key factor in the majority of the remittance theories. Migrants and the family members develop an unspoken and unofficial contract. In most of the cases the family invests in the education of migrants and also funds the traveling in return of the payment sent back by migrant as loan repayment.

d) Co insurance Motives: The theory of co-insurance assumes that family makes migration decisions not only to take advantage of good income, but also to diversify income sources of income and prevaricating risk by sending family workers to different counties. These migrants proved good strategy of hedging risk in the times of hardships as the economic environment in home countries are negatively or weakly linked, Massey (1999),Gubert (2002) and Sana and Massey (2005). Households not only send remittances in home country to work as strategy of risk divergence but to condense deprivation of the family members.

2.2 **Empirical Literature**

Similar to theoretical literature the relationship between remittances and several economic variables is well presented in the local and international empirical studies. Elbadawi (1992) analyzed the determinants of remittances. In order to estimate a model regarding determinants of workers' remittances paper used the data of five main labor-exporting countries of North Africa and Europe including Morocco, Tunisia, Portugal, Turkey and Yugoslavia using stock of migrant labor, share of females in migrants' population and length of stay as key variables. To observe the macroeconomic determinants study used inflation rate, black market premium and real income and interest rate disparity as explanatory variables. The study provides evidence that stock of migrant labor has a significant positive effect on remittances. The study found that the real income in the host state has an affirmative and considerable effect on remittances with en elasticity ranging between 0.6 and 0.8. Remittances have the tendency to decline with an increase in black market premium in the home country. The inflation rate of home country is also found to have a negative effect on remittances. No evidence had been found about interest rate differentials affecting remittance inflows.

Nishat (1993) examined the determinants of workers' remittances by taking the random sample of 7061 migrants registered in 1990-91. Study used Ordinary Least Square (OLS) regression technique. Research included self-interest, age, years of schooling, monthly income in home country, skills of workers, family status, and residence in Pakistan and potential development of business as explanatory variables to estimate the model of determinants of workers' remittances. The research concludes that migrants who possessing high skills, good education and/or belongs to urban areas tend to send more remittances as compare to uneducated, unskilled labors. The results also found that plan of own business as significant determinant of remittances. The amount of remittances was determined by the domestic rates of returns. As the interest rates found low as compare to the host country, migrants will send fewer amounts of remittances. In case of black market, the workers make choice whether to remit through official channels or other ways. It depends upon the distinction among the official and black market exchange rates. The workers will also adopt unofficial channels in case of taxed remittances by the government. It was also estimated that high wage rates were positively related to the level of remittances. The current level of remittances as well as the lagged remittances was positively related to the domestic GDP. The GDPs of home and host countries were important determinants of remittances.

Rahman (2003) examined the determinants of foreign worker remittances and its impact in Saudi Arabia by taking the time series data from the year 1975 to 2001. The error correction model was utilized to attain the connection among the variables incorporated in the research. The variables incorporated for the research included the real GDP, wages per worker, returns, and some multiple indicator of socioeconomic features and indicators of risk in the Kingdom. The study discovered that the wage rate has a direct impact on the level of per worker remittances. Another positive relationship was found among the level of per capita GDP and workers' remittances. The return in the country measured by nominal and real interest rates countries were negatively related with the remittances. The study indicated risk variables represented by lower index scores and resulted in higher remittance outflows from the country affected the remittances negatively. The models also utilized composite socio-political instability indices that showed a reverse association between the level of remittances and instability. It meant that higher the level of instability in Saudi Arabia the higher will be the flight of remittances from the country to other countries.

Silva (2006) in their research examined the determinants of workers' remittances by using the two data sets of 1981-2003 time periods. One considered flows of remittances between USA and rest of the globe and second Mexico remittance only. Vector error correction model (VECM) was used to test the hypothesis concerning the factors of home and host country which affect remittances. Variance decompositions, impulse response functions and granger causality test are resulting as of the model. Variables included in the model are CPI, GDP, M2, exchange rate and unemployment rate. Results point out that remittances are mainly responsive to change in the macroeconomic environment of the host country than the home country.

Gupta (2005) analyzed the macroeconomic factors that affect the flow of remittances to India taking data from 1990 to 2003. Author used regression and unit root test for econometric analysis. Economic circumstances in host country are estimated by taking U.S. employment rate, LIBOR, Oil prices. For

economic conditions in India GDP growth rates, industrial growth, number of migrants, a dummy for drought years (year with negative growth of the agriculture) and return on the Bombay Stock Exchange (BSE) were taken. Study found that remittances increases when economic situation abroad are benign; on the other hand, the home country economic activity has a negative effect on remittances. Remittances were higher in the period of economic downfall in India. With the raise in the number of migrants and the movement of highly skilled workers, private transfer to India have increased which have not been affected by the risk-return consideration.

Elkhider (2006) identified the macroeconomic determinants of migrant remittances in the perspective of Morocco using the data from 1970 to 2006. Study used co-integration and ECM technique between remittances and other economic indicators like agricultural GDP and exchange rates. Empirical analysis showed the co-integrating relationships between the variables. The ECM showed that stability association exists among variables. The shock analysis exposed the ongoing effect between remittances and changes in agricultural GDP. The exchange rate has a negative impact on remittances, while agriculture GDP has a positive influence. The negative relationship between exchange rate and remittances suggest that change in exchange rate policy does not have a significant impact on remittances sent by Moroccan resident. For the short-term trend under the ECM, the exchange rate has a positive effect on remittances. A change in agricultural GDP brings the change in remittances in the same direction. Study showed a positive relationship between agriculture GDP and remittances this is because of the support of Moroccans resident in agriculture in terms of investment. This confirms the altruism motives of remittances that are displayed by overseas Moroccans.

Lueth (2007) explained the determinants of workers' remittances by taking the data from 1995 to 2004. Paper used pooled Ordinary Least Squares (OLS) techniques, Variables for the study included real GDP, physical distance between two countries, oil prices, exchange rate, price level, investment climate and political stability. Results of the study revealed that remittances decline when exports grow weaker and growth of GDP gets slow. Remittances also decrease with the deteriorating domestic investment and political environment and with the depreciation of the residence country's currency, suggesting the limited insurance of remittances aligned with balance of payment crisis. Remittances also increase with the oil price. The distance among the two countries also determines the remittances; the flow of remittances will be less if the distance is greater among the two countries as the cost of monitoring remittances increases with increasing trips cost to home country and falling phone calls due to diversity in time zones.

Adams (2009) determined the factors those can direct the remittances inflows taking sample of 76 low- and middle-income developing countries. Study has utilized OLS regression method for the estimation. Exchange rate, poverty level, rate of interest, per capita GDP and skills of migrants were taken as explanatory variables. The paper revealed that migrant's skills is most important factor in influencing the remittances inflows. Inflow of remittance was greater in countries from where low skilled workers went abroad. Study also found that an inverted-U shaped curve exists connecting the level of per capita GDP and inflows of remittances. Exchange rate and rate of interest rate were also found important variables in determining the flow of remittances however poverty level in home country does not have positive impact on inflow of remittances in developing countries.

Another study is conducted by Kumar (2009) to explore the determinants of remittances in Mexican economy using data of national accounts from 1980-2006.Study estimates a vector auto regression (VAR) model using de-trended series of several economic indicators including Mexican GDP, US GNI, and access to financial services. Evidence advocates that remittances are pro cyclical with US income; an increase in US GNI has the tendency to increase the remittance inflows, whereas remittances are countercyclical with Mexican GDP, decreases with increase in Mexican GDP; however the extent of both effects is neither persistent nor significant. The study found that remittances do not respond to changes in home or host country income. The authors claim that access to financial services is a precondition for stable flow of remittances. The quality and quantity of financial services facilitates migrants to send more remittances to hoe country.

Lin (2011) investigated the determinants of remittances in Tonga from 1994 to 2009, from three countries including Australia, New Zealand, and the United States using regression analysis. The explanatory variables used for the study are GDP growth, unemployment rate, inflation rate, terms of trade, trade openness, financial openness and exchange rate. The result specifies that macroeconomic environment in host countries and fluctuations of exchange rate influence remittances. In particular the study found that the remittances declined with the appreciation of Tongan currency but have positive relationship with the growth of real GDP and rate of unemployment in the host countries. The effect of these determinants fluctuates with an appreciation of the Tongan currency and the interest rate differential between Tonga and remitting countries than remittances to households.

3. Research Methodology

The research is designed to cover the important aspects of determinants of workers' remittances in Pakistan. While designing the research methodology of this study, it is considered that it should practically serve the purpose to find out the answers of the research questions and it must be aligned with the objectives of the study. The research is explanatory in nature and pursues quantitative research design. Research attempts to describe the cause and effect and extent of relationship between dependent variable, (workers' remittance) and independents variables (including GDP, Interest Rate, Exchange Rate, Gold Prices, Development Expenditures, Market Capitalization, and Political Stability) using regression analysis carried out in E-Views. Sample of 42 years' time series data was used spanning from 1975-2016 for determining economic determinants of remittances in Pakistan. The data used for this study comprises of secondary data. These data series were obtained from the published sources, the departments concerned and other relevant agencies which hold statistical information.

The ADF test was utilized to determine the stationarity of the series incorporated in the research. The purpose is to assess the stationarity of series and transforming the original series into stationary data. For model specification the data series were transformed into log form. To test co-integration Johansen co-integration method was applied. Co-integration measured the long run relationships between the variables integrated in the model. The Co-integration theory explains that an individual data series might move independently but when this series were paired with other series, the pairs have a tendency to move collectively over time and show an association between them. The incorporated time series were modeled using an Error Correction Model (ECM). The ECM was utilized to estimate short run modification.

Figure 1: Theoretical Framework
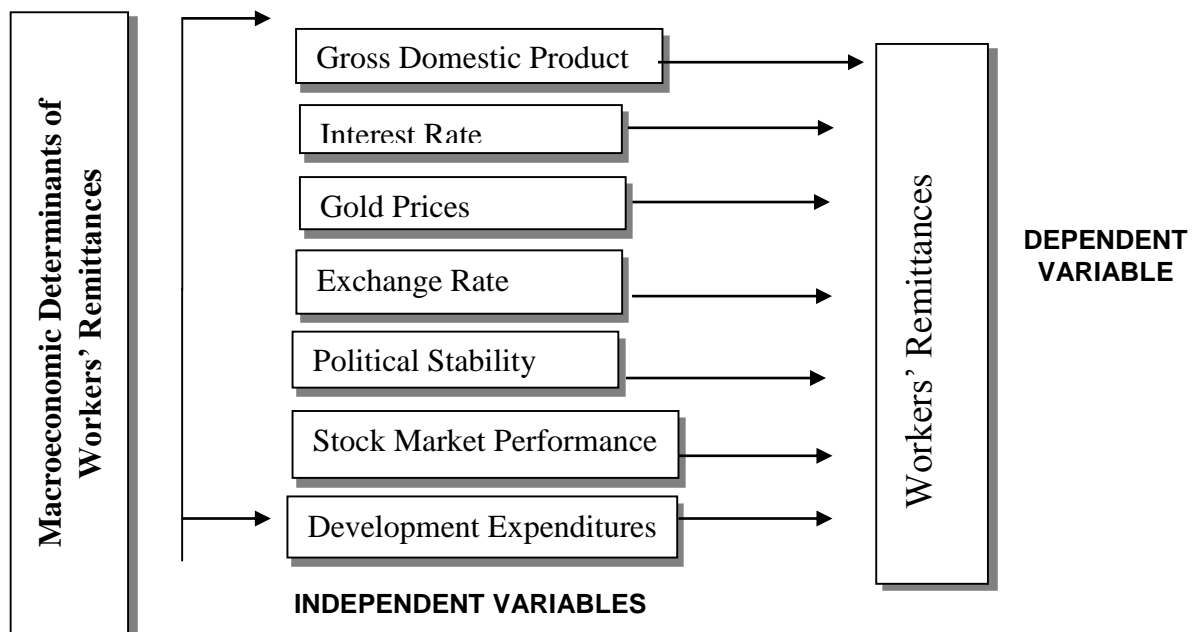
The econometric model formed for estimation is presented below:

$$WR_t = \beta_0 + \beta_1 GDP + \beta_2 INT + \beta_3 EXR + \beta_4 GOLD + \beta_5 DEXP + \beta_6 CAP + \beta_7 PS + e_t \text{------------------------}(1)$$

Where,
WR= Workers' Remittances, GDP= Gross Domestic Product
INT= Interest Rate, EXR=Exchange Rate (Rupee to dollar), GOLD =Gold Prices, DEXP= Development Expenditures, CAP = Stock Market Performance, PS = Political Stability, e_t = Random Error

3.1 Hypotheses
After reviewing the literature on determinants of remittances and empirical evidences, the research tests these hypothesis:

H_1: GDP has a significant positive impact on workers' remittances.
H_2: Interest rate has a significant negative impact on workers' remittances.
H_3: Exchange rate has a significant negative impact on workers' remittances.
H_4: Gold prices have a significant positive impact on workers' remittances.
H_5: Political stability has significant positive impact on workers' remittances.
H_6: Stock market performance has a significant negative impact on workers' remittances.
H_7: Development expenditure has significant positive impact on workers' remittances.

4. Data Analysis
4.1 Descriptive Statistics

Table No. 1: Descriptive Statistics

	CAP	EXR	GDP	INT	GOLD	DEXP	WR
Mean	759112.3	36.35244	61747.63	11.82854	138.1515	58628.41	2768.967
Median	214428.7	25.95000	44483.72	11.56000	120.8092	60384.00	1684.000
Maximum	4346800	95.35000	216611.1	15.42000	587.3099	266797.0	13200.00
Minimum	3546.100	8.680000	6298.733	6.990000	14.28571	5960.000	134.0000
Std. Dev.	1258119.	26.60694	53620.80	1.855115	108.3666	52833.26	2952.086
Skewness	1.700595	0.682046	1.383621	-0.308440	2.494036	1.832950	1.988761
Kurtosis	4.476115	2.204048	4.126433	3.061618	10.03410	7.558508	6.596634
Jarque-Bera	23.48448	4.261079	15.24940	0.656577	127.0306	58.45715	49.12562
Probability	0.000008	0.118773	0.000488	0.720155	0.000000	0.000000	0.000000
Sum	31123604	1490.450	2531653.	484.9700	5664.211	2403765.	113527.7
Sum Sq. Dev	6.33E+13	28317.17	1.15E+11	137.6581	469732.9	1.12E+11	3.49E+08
Observations	42	42	42	42	42	42	42

Source: Author's Estimation

Table 1 signifies descriptive statistics of all the variables selected for the study. Statistics of the table shows that for the series Exchange Rate (EXR), Interest Rate (INT) p-value of Jarque Bera test is more than 0.05 so, the null hypothesis of not normal distribution cannot be rejected. Whereas Market Capitalization (CAP), Gross Domestic Product (GDP), Gold Prices (GOLD) , Development Expenditures (DEXP) and Workers' Remittances (WR) have found normal distribution.

4.2 Econometric Methodology
4.2.1 Unit Root Test and Co-Integration Test
One of the most important tests for stationarity is the Augmented Dickey Fuller test (ADF).This test relies on a concept of random walk and considers the fact that a random walk has a unit root. When all or some of the variables are non-stationary, it is therefore important to carry out appropriate transformation (differencing) to make them stationary. The ADF test was applied in this research to test out the variable stationarity. Initially the variables carried out for the study were transformed into a log form. The log form of the variable was suggested by Schrooten (2005) for model specification and for smooth pasting of data and to get the more accurate estimates of the required parameters.

The existence of unit roots in the macroeconomic time series was tested, by the Augmented Dickey Fuller test and to get the more accurate estimates of the parameters log form of the variables were used. In the light of outcome of the table all series stayed non-stationary even after log transformation.

Table No. 2: Result of Unit Root Tests: Using Augmented Dickey Fuller tests (1)

Variables	Optimal Lag Length	ADF Constant	ADF Trend & Constant
LWR	0	-1.366863	-1.465704
LINT	0	-2.792108	-2.747147
LGDP	3	-1.647663	-2.766560
LEXR	5	0.187640	-1.969017
LGOLD	0	-1.732837	-2.071941
LDEXP	0	1.847654	-0.773389
LCAP	0	-0.045425	-2.738426
DPS	0	-2.054805	-1.975615

*At 1% Level of significance, ** At 5% Level of significance

Based upon ADF statistic the series were observed to be non-stationary. The null hypothesis was accepted as value of t-calculated was higher than the ADF critical value. Therefore, it confirms the existence of unit root and series were found as non-stationary in levels.

Table No. 3: Result Of Unit Root Tests: Using Augmented Dickey Fuller Tests (2)

Variables	Optimal Lag Length	Order of Integration	ADF Constant	ADF Trend & Constant
LWR	0	L(1)	-3.644647*	-3.624296**
LINT	0	L(1)	-5.492342*	-5.430062*
LGDP	0	L(1)	-5.071601*	-5.176568*
LEXR	5	L(1)	-5.402089*	-5.422654*
LGOLD	0	L(1)	-4.252963*	-4.186748*
LDEXP	0	L(1)	-5.243878*	-5.616609*
LCAP	0	L(1)	-6.090771*	-6.039782*
DPS	0	L(1)	-6.082763*	-6.125274*

*At 1% Level of significance, ** At 5% Level of significance

The unit root test was applied after differencing of one and after applying log transformation for each series. Outcome of the test for unit root are shown in Table 3 and it was observed that all series are integrated of order one. The stationarity test results reported in table confirms that the null hypothesis of unit root that all the variables are non-stationary (at different level of significance, on the basis of ADF test) cannot be accepted. All variables are transformed as stationary after first differencing.

4.2.2   Co-integration Test
Co integration has been tested using Johanson co integration test. Results of Johansen co-integration test are presented below in table 4.

Table No. 4: Johansen Co-Integration Results
Trend assumption: Linear deterministic trend
Series: LWR LNGOLD LGDP DPS LEXR LINT LNDEXP LCAP
Lags interval (in first differences): 2 to 2

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.834220	198.5237	159.5297	0.0001
At most 1 *	0.632295	130.2341	125.6154	0.0254
At most 2	0.586236	92.21616	95.75366	0.0854
At most 3	0.404039	58.68272	69.81889	0.2781
At most 4	0.390629	39.01468	47.85613	0.2597
At most 5	0.309757	20.19223	29.79707	0.4099
At most 6	0.130086	6.105217	15.49471	0.6831
At most 7	0.021078	0.809513	3.841466	0.3683

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.834220	68.28957	52.36261	0.0006
At most 1	0.632295	38.01798	46.23142	0.2870
At most 2	0.586236	33.53344	40.07757	0.2264
At most 3	0.404039	19.66804	33.87687	0.7792
At most 4	0.390629	18.82245	27.58434	0.4284
At most 5	0.309757	14.08702	21.13162	0.3579
At most 6	0.130086	5.295704	14.26460	0.7041
At most 7	0.021078	0.809513	3.841466	0.3683

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The table shows the long run co movement amongst the variables undertaken for study. The results shown in table explain that two co integrating equation exists at 5 % levels while the maximum Eigen-value test indicates that one co integrating equation exists at 5 % levels with linear trend and intercept assumption. Therefore on the basis of traced statistic and the maximum Eigen-value statistic the null hypothesis that there is no co integration amongst the variables is rejected at both the 5% and 1% levels of significance. The presence of more than one co-integrating vectors confirms the existence of long run equilibrium relationship among the variables. The results therefore disclose that co-integration exists and variables which explicate the workers' remittances have a stable long run relationship. The variables in the remittances model were found co-integrated demonstrating a long run relationship. The long run relationship was established through multivariate regression. The equation is:

$$LWR = \beta_0 + \beta_1 LDEXP - \beta_2 LEXR + \beta_3 LGOLD - \beta_4 LINT - \beta_5 LCAP + \beta_6 LGDP + \beta_7 DPS + u_t \text{ ---------------------- (2)}$$

The outcome of the regression estimate is presented in Table 5.

Table No. 5: OLS Regression

Variables	Coefficients
C	-7.194647
LEXR	-0.816901* (0.313806)
LGOLD	0.381394** (0.235824)
LGDP	1.546120* (0.455361)
LINT	-0.658026* (0.313390)
DPS	0.325027* (0.116149)
LCAP	-0.240226* (0.118700)
LDEXP	0.325724* (0.140456)
R-square	0.954629
Adjusted R-square	0.945005
Durbin-Watson stat	1.188832
F-statistic	99.19036
Prob(F-statistic)	0.000000

Note: Standard error in parenthesis
*At 5% level of significance, ** Insignificance

Results point out that the coefficient of development expenditures is 0.3257 and significant at 5 percent level of significance which indicates that remittances are positively related with development expenditures in the developing country like Pakistan. This finding is consistent with expectations. Increase in development expenditures indicates more opportunities to invest in real estate. Coefficient of gold price is found statistically insignificant. The value of F-statistics 99.1 is highly significant at 1% level of significance as shown by significant p value of F statistics. Thus, a significant linear relationship exists between workers' remittances and the regresses used.

Model has strong explanatory power indicated by value of R-square. R-square measures the goodness of fit also called as coefficient of determination, its value of 0.95 shows that about 95 percent variation in mean workers' remittances are explicated by GDP, interest rate, exchange rate, gold prices, stock market performance, development expenditures and political stability.

After the analysis of long run relationship among the workers' remittances and explanatory variables it is important to incorporate short run dynamics with long run equilibrium. The approach of Error Correction Model (ECM) developed by Granger (1981) and described by Engle and Granger (1987) deals with the matter of incorporating short run dynamics with long run equilibrium. Therefore an error correction model of the remittances is estimated. In the error correction model, the one and two period time lags of all the variables were applied.

4.2.3 Error Correction Mechanism

To confine the short-run dynamics of the model, error correction mechanism based on theorem developed in Engle and Granger (1987) was applied which implied following dynamic error correction representation of the data.

$$\Delta LWR_t = \alpha_0 + \alpha_1 ECT_{t-1} + \sum \beta_1 \Delta LWR_{t-1} + \sum \beta_2 \Delta LCAP_{t-1} + \sum \beta_3 \Delta LGDP_{t-1} + \sum \beta_4 \Delta LINT_{t-1} + \sum \beta_5 \Delta LEXR_{t-1} + \sum \beta_6 \Delta LGOLD_{t-1} + \sum \beta_7 \Delta LDEXP_{t-1} + \sum \beta_8 DPS_{1-t} + e_t \text{ -- (3)}$$

Dependent variable that is used in both models is the first difference of the logarithm of remittances. In these two models the first difference of variables were used, which turned out to be non-stationary in the unit root tests. ECT $_t$ is the lagged error correction term and is the residual generated from equation. The coefficient of α_1 shows the proportion of disequilibrium in workers' remittances corrected in the next period.

The outcome of the error correction model is presented in Table 6 that represents the results of the error correction mechanism of two models.

The regression analysis incorporated a sample of 42 observations from 1975 to 2016. In the model one year lag of the first difference of real GDP, interest rate, gold prices, development expenditures, political stability and exchange rate and one year lag of the first difference of real remittances was also included as independent variables.

Table No. 6 : Result of Error Correction Model

Variables	Coefficients	P-values
C	0.133172	0.1090
D(LWR(-1))	0.556466	0.0027
D(LGDP(-1))	-0.271168	0.7059
D(LINT(-1))	0.604583	0.0429
D(LGOLD(-1))	0.147010	0.5692
DPS(-1)	0.029150	0.7155
D(LCAP(-1))	0.006001	0.9581
D(LEXR(1))	-0.756320	0.2006
D(LNDEXP(-1))	-0.370973	0.0957
ECT(-1)	-0.361684	0.0398
R-squared	0.521964	
Adjusted R-squared	0.368310	
Durbin-Watson stat	2.634957	
F-statistic	117.1903	
Prob (F-statistic)	0.000000	

Source: Author's estimation

The value of ECT was found to be –0.36 and significant at 5 percent level of significance. The negative sign of this parameter specifies that level of the workers' remittances in the short run was above the level of workers' remittances in the long run. Hence, the remittances in the short run approaching to its long run equilibrium with the speed of 36 percent per year which suggest the validity of long run equilibrium.

The statistics of ECM discovered that in the short run the workers' remittances were positively linked with the one year lag remittances, gold prices, interest rates and capital market performance and political stability in Pakistan. The estimated coefficients of lag remittances and interest rate were found significant at 5 percent level and development expenditures were found significant at 10 percent level. The coefficient of lag remittances, interest rate and exchange rate are larger than coefficient of gold prices, political stability and GDP confirming that response of workers' remittances is quicker to lag remittances, lag domestic interest rates and lag exchange rate as compare to other variables. The workers' remittances are found negatively related with GDP, exchange rate and development expenditures in Pakistan.

Surprisingly the model found that the worker remittances are negatively related to the domestic production but lost its significance. Though, Sakka (1999) also established the positive relationship between remittances and domestic GDP but reported negative elasticity of remittances with respect to domestic GDP in the short run equal to -0.8. Table 6 shows the elasticity of remittances to GDP equals to -0.27. This negative relation with domestic production in a form of remittances is contradictory with El-Sakka and McNabb (1999), Lianos (1997) where they found the positive statistical relation of Greece remittances from Germany, Belgium and Sweden. It can be concluded from above findings that the variables determining

the macroeconomic volatility have negative signs, verifying that an unsteady macroeconomic policy situation will discourage inflows of workers' remittances into Pakistan.

4.3 Granger Causality Test

The study is carried out in order to empirically determine the effect of macroeconomic factors on the workers' remittances. The Granger causality test considers that the information related to the forecast of variables taken in the study is limited in the time series data. The test involves estimating the subsequent pairs of regressions. Mutual causality, is recommended when the group of coefficients are statistically significant and different from zero in all regressions and independence is considered when the sets of coefficients are not found statistically significant in all regressions. Granger causality test was carried out for remittances and all of the abovementioned macroeconomic variables. Following table summarize the test results.

Table No. 7: VAR Granger Causality/Block Exogeneity Wald Test

Causes Effects	LWR	LINT	LGOLD	LEXR	LGDP	DPS	LDEXP	LCAP
LWR		10.368 (0.005)*	6.2898 (0.043)	2.0745 (0.354)	3.9316 (0.140)	0.5141 (0.773)	7.9491 (0.018)*	3.3756 (0.184)
LINT	1.0461 (0.592)		1.1035 (0.575)	0.2761 (0.871)	0.5490 (0.759)	0.2123 (0.899)	8.3757 (0.015)*	9.3873 (0.009)*
LGOLD	1.1112 (0.573)	1.6822 (0.431)		4.8073 (0.090)*	9.1235 (0.010)*	2.1385 (0.343)	6.7331 (0.034)*	3.0415 (0.218)
LEXR	2.2240 (0.328)	4.7036 (0.095)**	0.9839 (0.611)		3.1382 (0.208)	0.0892 (0.956)	7.2860 (0.026)*	3.6996 (0.157)
LGDP	3.6304 (0.162)	1.5632 (0.457)	0.3715 (0.830)	0.1360 (0.934)		0.7475 (0.688)	1.4399 (0.486)	2.8025 (0.246)
DPS	3.9968 (0.135)	1.7102 (0.425)	0.0183 (0.990)	0.4185 (0.811)	0.7920 (0.673)		2.7919 (0.247)	1.8263 (0.401)
LDEXP	0.0307 (0.984)	0.0799 (0.960)	2.3180 (0.313)	2.0732 (0.354)	0.8954 (0.639)	0.0517 (0.974)		10.693 (0.004)*
LCAP	7.6760 (0.021)*	6.4777 (0.039)*	1.6756 (0.432)	1.7956 (0.407)	2.0537 (0.358)	2.3389 (0.310)	3.0075 (0.222)	

Note: *P*-values in parenthesis

The test outcome of granger causality/block exogeneity Wald test point out that WR does granger cause CAP but does not granger cause rest of the variables. There is also no indication of causation running from gold prices and political stability to other macroeconomic variables taken in the model. The null hypotheses that "Gold prices do not Granger Cause WR, INT, GOLD, EXR, GDP and DPS" and "Political stability do not Granger Cause WR, INT, GOLD, EXR, GDP, DPS cannot be rejected.

Some evidence found that INT cause EXR at 10 percent level of significance. Evidence also suggest that INT granger cause WR and CAP at 5 percent level of significance. No evidence is found for granger causality of INT towards other variables. Statistics for exchange rate (EXR) and gross domestic product (GDP) shows that exchange rate and GDP does granger cause GOLD but no causality is found towards other variables. Some evidence found DEXP cause WR, INT, GOLD, and EXR at 5 percent level of significance. No evidence is found for granger causality of DEXP towards GDP and DPS. Last column show that CAP granger cause INT and DEXP at 5 percent level of significance, but does not indicates any causality to other macroeconomic variables. It is uncertain to decide the degree of impact of an individual variable on other. To identify this extent, the impulse-response function is analyzed.

4.4 Impulse Response

To analyze the shocks to the variables and their effect on workers' remittances, impulse response function was applied using Cholesky innovations. The impulse response function using generalized impulse response function suggested by Pesaran and Shin (1998) shows the similar results of Cholesky decomposition (Figure 6).

The response of remittances to the shocks on different variables is shown in table no.16.The response of LWR to LCAP and LGOLD shows the negative relation, the shock to the capital market cause the workers' remittances to decrease up to fifth period whereas the shock to the gold prices and unemployment rate cause the workers' remittances to decrease up to sixth and forth period respectively. The response of LWR to LEXR shows the positive relation, the shock to the exchange rate at period two cause the workers' remittances to increase up to period seven later on decline. One standard error shock to the DPS represents an early response of -0.007 percent in LWR which somewhat rising to 0.04 percent in fourth period and declining to 0.02 percent in tenth period.
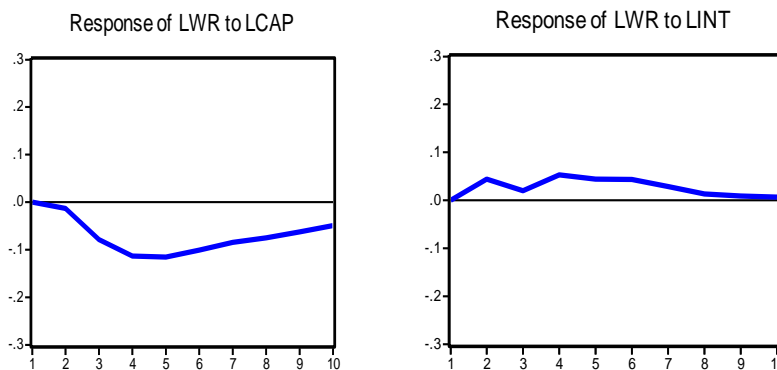
The response of LWR to INT and GDP is positive in the long run. The shock to the inflation rate and interest rate at period one cause the workers' remittances to increase. Similarly an initial response of 0.02 percent in LWR can be observed with one standard error shock and continuously declining and reached to 0.005 and 0.05 percent for tenth period to the LINT and LGDP respectively. Last column shows the response of LWR to LDEXP which shows negative relationship. One standard error shock to the LDEXP showed an initial response of 0.0006 percent in LWR which is declining to -0.026 percent in tenth period.
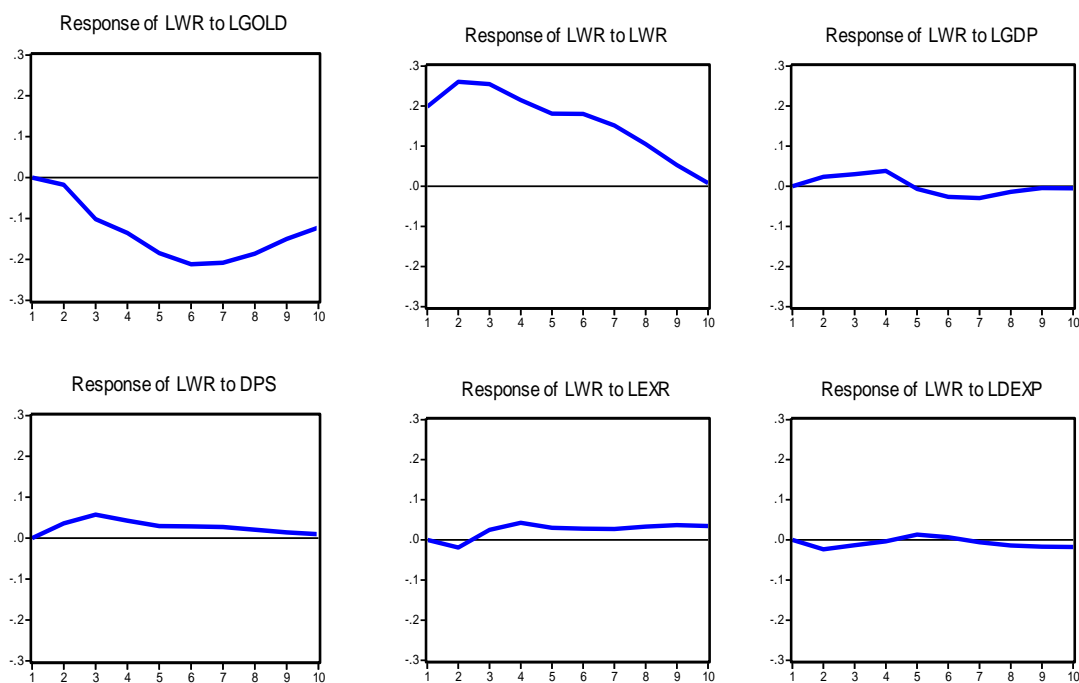
Table No. 8: Response of LWR to Cholesky (D.F Adjusted) One S.D Innovation

Period	LWR	LGOLD	LGDP	DPS	LCAP	LEXR	LINT	LDEXP
1	0.1987	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.2607	-0.0017	0.0287	-0.0078	0.0106	-0.0061	0.0287	0.0006
3	0.2550	-0.0697	0.0768	0.0340	-0.0528	0.0151	0.0043	0.0101
4	0.2147	-0.0927	0.1002	0.0478	-0.0657	0.0297	0.0297	0.0095
5	0.1807	-0.1585	0.0868	0.0357	-0.0736	0.0196	0.0268	0.0147
6	0.1802	-0.1928	0.0840	0.0331	-0.0718	0.0149	0.0314	0.0035
7	0.1516	-0.1922	0.0801	0.0321	-0.0651	0.0122	0.0202	-0.0089
8	0.1055	-0.1659	0.0826	0.0324	-0.0617	0.0171	0.0066	-0.0182
9	0.0529	-0.1303	0.0728	0.0327	-0.0545	0.0198	0.0044	-0.0231
10	0.0079	-0.1072	0.0578	0.0295	-0.0473	0.0183	0.0052	-0.0265

Source: Authors' estimation

Figure 2 : Response of LWR to Cholesky (d.f adjusted) One S.D Innovation

Response of LWR to LCAP

Response of LWR to LINT

Response of LWR to LGOLD

Response of LWR to LWR

Response of LWR to LGDP

Response of LWR to DPS

Response of LWR to LEXR

Response of LWR to LDEXP

5. Conclusion

Workers' remittances are believed to be a vital external source of foreign exchange for developing countries. Pakistan has received a considerable amount of workers' remittances during the last three decades making Pakistan as eight largest remittances receiving developing country. This research primarily focused on the question of whether macroeconomic variables are really imperative in determining remittances in Pakistan. Econometric model was specified to estimate the determinants of workers 'remittances which are found statistically significant. Most of the series were found non stationary after applying unit root test. The entire series were found stationary at same order I (1) after differencing. The long run relationship was determined among the variables in the model using regression method and error correction model (ECM) was used to observe the short run association.

Under the co-integration hypothesis, a co-integration relationship was found among all variables. The long-term relationship therefore appears to be clear and stable. To find out long run relationship ordinary least squares (OLS) method was applied. It was found from OLS regression that the main empirical determinants of workers' remittances were real GDP, unemployment rate, exchange rate, interest rate, development expenditures, gold prices, stock market performance, and political stability. In particular, workers' remittances increased with the increase in GDP, development expenditures, gold prices, depreciation of local currency and political stability. Unlike to this, an increase in interest rate, unemployment rate and oscillation in inflation rate decrease the remittances inflows, as uncertainty regarding price changes and job opportunities in future diminish the return on funds remitted.

On the basis of the above findings, it can be concluded that migrants will be more willing to send and invest funds in their home country if inflation is kept under control and exchange rate is reasonably stable. Stock market performance as a substitute of investment in gold has lowered the inflows of workers' remittances in Pakistan during the study period. In conclusion this study shows that remittances are largely explained by the variables specified.

The analysis reflects short and long-run connection among remittances and variables those are believed to influence inflows of remittances using error correction mechanism (ECM). The adjustment parameter ECT was found negative and significant indicating speedy adjustment of WR model towards long run equilibrium. In the analysis of ECM the coefficient of one year lag remittances, interest rate and exchange rate were found larger than coefficient of gold prices, political stability and GDP indicating a faster response of workers' remittances to lag remittances, lag domestic interest rates and lag exchange rate therefore indicating the existence of short run relationship as well among the remittances.

6.   Recommendations for Policy Implications

Keeping in view the migrants' motives for sending remittances, the utilization of remittance channels, and the economic factors affecting individual decisions on migration are crucial for increasing remittances in developing countries. Considering the numerous effects and probable benefits of remittances on the economic indicators, facilitating strategies need to be devised to promote remittances.

It was experience from the GDP data that Pakistan has experienced fluctuations in gross domestic production. Coefficient of GDP was found 1.7 and 1.5 in model 1 and 2 explaining that remittances are pro-cyclical rise with the increase in GDP. As a policy perspective a strategy of sustaining economic growth will stimulate remittances inflows and facilitate them to be directed for productive domestic investments.

The coefficient of development expenditure is 0.32 indicating that migrants respond to investment opportunities in the home country considerably to acquire wealth as a self-interest motive. As a substance of strategy to attract more remittances, the government should offer prominent investment ventures. These opportunities may comprise housing projects, microenterprises and new variety of development schemes. The coefficient of dummy variable for political stability is found significant suggesting that political stability is essential to attract the remittances inflows. Results also demonstrate that to magnetize remittances flow national policies must be compatible with other policies such as monetary and exchange rate policies. Favorable and stabilize interest and exchange rates have the tendency to increase remittances. Foreign policy of Pakistan should be diplomatic with bordering nations to reduce the obstacle from export of labor force in order to attain sustainable remittances inflows. However it has to be in line with policies of World Trade Organization and export policies of the country.

As an outcome of the discussion and conclusions from this research, a proposed model is given on next page (Figure 3) which provides a recommended policy framework for Pakistan. The model is woven around three fundamental parameters of remittances enhancement which are explained in the following paragraphs. The model gives broad guidelines for policy makers to consider these for enhanced inflows of remittances.

- **Supportive Domestic Environments**:
As elaborated in the model, it includes expanding development activities through development projects, bringing in socio-political stability in the country and domestic security including conducive law and order situation. This would create those environments which are not only essential rather pre-requisite for economic growth in this materialistic era of economic competitiveness and financial management. The environments would attract not only workers' remittances, foreign investments initiatives as well.

- **Obtaining and Sustaining Confidence for Sending Remittances**:
The determining factors under sustaining confidence for attracting remittances include improving gross domestic product, better performing stock market and investment credibility. Financial health, competitive management and economic activities in fact have complementing factors for economic activities, investment postures and enhancing profit margins. It would provide confidence to the workers to send their hard earned money for their financial gains at home countries.

- **Incentives for HR Sending Remittances**:
The three sub-factors under such incentives include tax recognition cum relaxation, family welfare incentives for workers and their insurance cum risk coverage. The workers basically expect recognition of their contributions in the economic growth of their mother land. There are numerous ways of such

recognitions like facilitating them at airports etcetera, admission to their children in the schools, colleges and universities and others alike.

Based on the discussion, model (refer to figure 3) funnels on three derivatives i.e. enhanced remittances, positive economic growth and enhance development and employment. The model links it with flourishing opportunities for business and trade which would encompass long term marketing opportunities, joint ventures, sharing knowledge and research, innovations and commercialization. It not only contributes in financial and economic wellbeing of the country, also enhances employment opportunities, social stability and commitment of youth for positive roles in the state system of Pakistan.

Figure 3: Proposed Model for Enhancing Remittances and Economic Growth of Pakistan
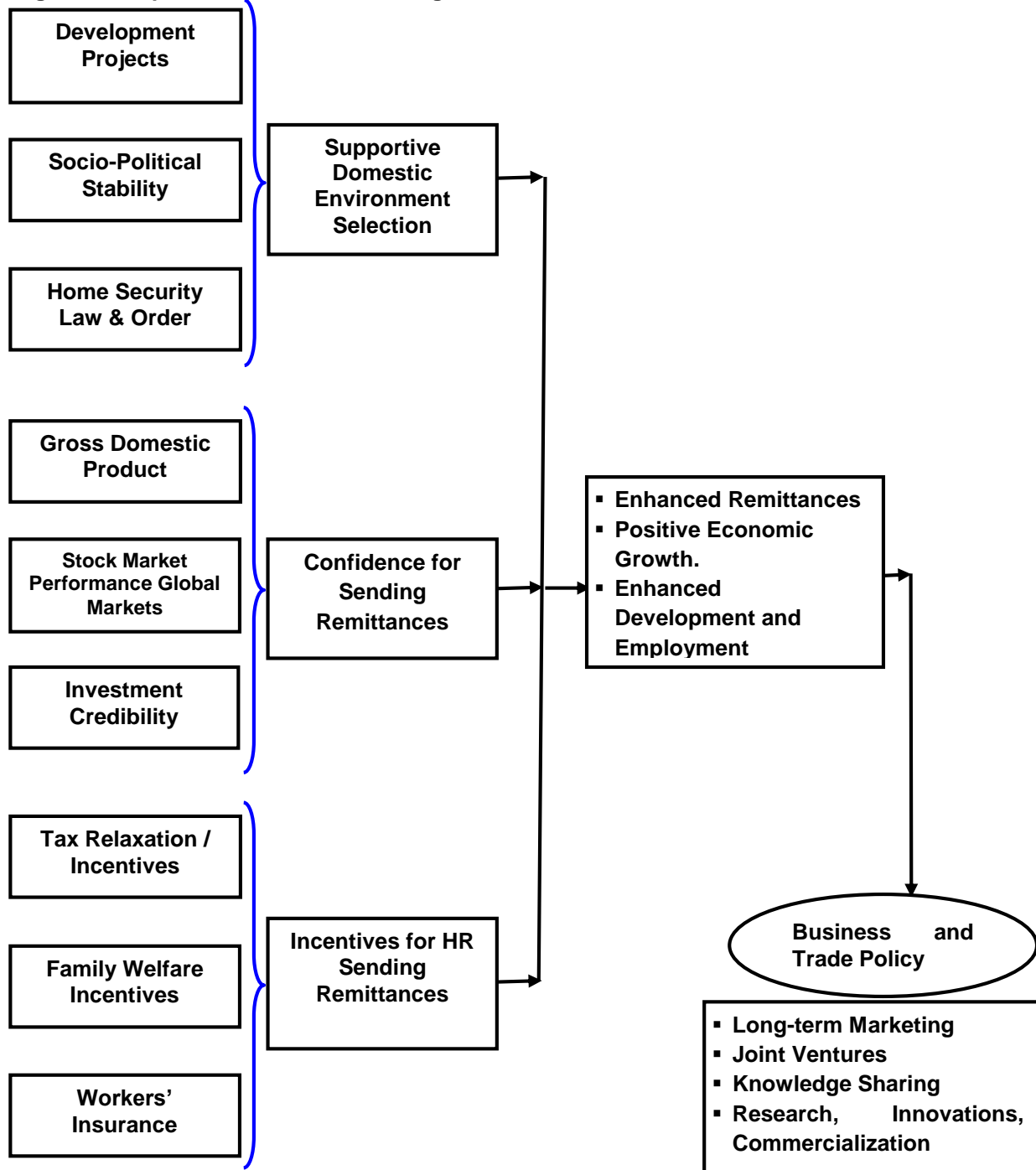
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