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Remittances, Financial Development and Economic Growth of Different Financial Systems: A Panel Data Analysis

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Abstract: This paper investigates the relationship between remittances and the development of a financial system in impacting economic growth by using a panel dataset of 44 countries from 2001 to 2019. The paper examines the effects of remittance and financial development on the economic growth of different financial systems by employing Pooled OLS, Fixed Effects, and Random Effects estimation methods.The results from the Fixed Effects analysis suggest a significant negative effect of remittance on economic growth and no significant effect of the different variables taken to represent financial development. System Generalized Method of Moments (SGMM) accounts for the endogeneity between remittance and financial development and any other endogenous errors created within the model. The SGMM findings show no significant effect of remittance or financial development. With the incorporation of financial systems into the equation, it is evident that the impact of financial development varied among the two types of financial systems.

Keywords: Economic Growth; Financial Development; Financial System; Remittances; SGMM

1.0 Introduction

The study on the effect of remittance on economic growth goes back many decades. However, the impact of remittance is yet to come to a consensus. Even though arguments for both positive and negative effects are quite strong and logical, the applicability of these views varies among different countries and even communities. Remittance requires both micro and macro-level studying. Moreover, this is where comes the discussion on financial development and remittance. The wide range of studies on remittance agree on one thing, the financial structure and efficiency of the system in channeling the remittance funds is one of the factors that can ensure a positive effect on the economy, even if that effect gets canceled out with the negative effects. This indicates a relationship between remittance and the development of a financial system in impacting economic growth. This relationship also has two faces: complementary and substitutional. The dependency on remittance income is not limited to the

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workers' families but also includes the country's overall economy. In 2019, the remittance flow to lower middle-income countries was around $554 billion, crossing the amount of foreign direct investments (World Bank, 2020). This fact itself proves the importance of remittance in an economy. So, research works on this issue have been going on for ages. However, these research have concluded with different types of results. The nature of the effect of remittance is still a question mark.

There is no doubt that remittances are additional funds flown to the economy through the migrant worker. However, this additional fund viewed from a narrowed-down perspective raises another question: whether it is an additional fund for the recipient households. This is where the difference in opinion comes in. Some studies have reported remittance as compensatory transfers for the recipient households (Chami, Fullenkamp, Jahjah, 2005). Other studies have concluded that remittance gives households access to better investments and improves the economy's profitability (Ratha, 2013). Here comes the discussion on how remittance and financial development affect the economy.

The impact of remittance and financial development on the growth of an economy has been studied for quite some time. However, the result of these researches is yet to reach a conclusion where the real scenario can be fully explained. On one side, research was done by Mundaca (2009), and Nyamongo et al., (2012) have noted a complementary relationship between remittance and financial growth positively influencing economic development. On the other hand, researchsimilar to Sobiech's (2019) has reported a supplementary relationship between the two variables. This lack of consensus among the prior literature has created the demand to view the dynamics of the relationship among remittance, financial development, and economic growth from a more comprehensive aspect. This indicates that to create the whole picture, a study needs to be done on every aspect of variability. A dominant financial system is one such aspect, and from time to time, this source of variability comes into macroeconomicresearch. For this reason, this paper has investigated the relationship between remittance and financial development on influencing economic growth from the perspective of varying systems in cross-country-based discussions so that it can be identified whether the different conclusions of different research can be attributed to the financial system of the countries.

2.0 Research Questions

The paper attempts to answer the following questions:

- What are the effect of remittancesand financial development on the growth of an economy?

- How does the relationship between remittance and financial development influence their effect on the growth of an economy?
- Does the dominant financial system of an economy play a role in understanding the combined effect of remittance and financial development?
- What role is the financial system playing in this aspect?

3.0 Literature Review

Considering the multiple focuses of this study, reviewing the previous literature has been done by taking on different perspectives. This has enabled the paper to understand the objective of the paper from both a narrowed-down and a comprehensive view.

3.1 The Remittance, Financial Development, and Economy

An earlier study on the relationship between remittance, financial development, and economic growth was conducted by Giuliano and Ruiz-Arranz (2009). With a sample of over 100 countries' data for 28 years, they applied both OLS and SGMM methods. Using the model proposed by Arellano and Bover (1995), they controlled the endogeneity between remittance and financial development. Theirs is the first study to address the complementarity and the substitutability of remittance and financial development affecting economic growth. Their conclusion indicates the substitutional relationship between remittance and financial development, as even though inward remittance has an impact on the economic growth of a country, the effect is more evident for countries with less financial development.

Mundaca (2009), Nyamongo et al., (2012), and Abida and Sghaier (2014), on the other hand, noticed a complementary relationship between remittance and financial development. Mundaca (2009) explained the complementarity by considering that remittance funds are invested in long-term investments like technology or capital investment. The author also noted that the influence of remittance is greater on poor economies, and a country's economic status matters while discussing the discussed relationship. Nyamongo et al., (2012) find that the effect of remittance is significant, and its volatility negatively affects the economy. In addition, Uddin and Sjö (2013) conducted a study solely considering Bangladesh's economic growth. Their findings suggest that remittance acts as buffer stock or compensatory transfers in the short run, which Chami, Fullenkamp, and Jahjah (2005) also found. In the long run, however, remittance has been found to accelerate economic growth, and it maintains a substitutional relationship with financial development in this

process. Studying 61 emerging countries and using quasi-maximum likelihood and SGMM, Sobiech (2019), on the other hand, determines that the substitutional effect only remains in the short run and that a complementary effect is needed in the long term to ensure economic growth. Olayungbo and Quadri (2019) confirm the substitutional effect by finding no causality between remittance and financial development. Employing pooled mean group estimation, they also find a positive impact on remittance and financial development in the short and long run. Their insights also reveal a causal relationship between economic growth to remittance and show the importance of using a refined econometric system like SGMM in such studies.

Chami et al. (2003) using OLS regressions in panel data of 113 countries from 1970 to 2008 find a Negative and significant relationship is found between workers' Remittances and economic growth in the long run.IMF (2005) using Cross-section data of 101 countries from 1970 to 2003 and applying OLS Regressions finds there is no statistically significant effect of Remittances on economic growth.Jongwanich (2007) using the GMM model in panel data of 17 developing Asia Pacific countries from 1993 to 2003 finds a positive and significant relationship is found between workers' Remittances and economic growth.Fayissa and Nsiah (2008) using Unbalanced panel data of 37 African countries from 1980 to 2004 and applying OLS Regressions and GMM modelfind a positive effect on economic growth in countries where the financial systems are less developed, by providing an alternative way to finance investment and helping overcome liquidity constraints.Gyan et al. (2008) using OLS Regressions in panel data of 39 Developing countries from 1980 to 2004 find the impact of Remittances on growth is not very large.Abdul Qayyum et al. (2008) using the Time series Data of Pakistan from 1973 to 2007 and applying the ARDL approach find remittance has a positive and significant contribution to economic growth and poverty reduction.

Adolfo et al. (2009) using OLS with instrumental variables and a fixed effects model in panel data of 84 countries from 1970 to 2004 finds remittances have contributed little to the economic growth in remittance-receiving economies and may have retarded growth in some.Giuliano and Ruiz-Arranz (2009) using panel data of 100 countries from 1975 to 2002 and applying OLS and SGMM methods find remittances have promoted growth in less financially developed countries by providing an alternative way to finance investment.Fayissa and Nsiah (2010) using OLS Regressions and the GMM modelin panel data of 18 LatinAmerican Countries (LACs) from 1980 to 2005find the positive and significant impact of workers' remittances on economic growth in the long run.Das and Chowdhury (2011) using panel data of the top 11 Remittances recipient developing countries from 1985 to 2009 and applying pooled mean group approach and panel co-integration methods find remittances have a positive and significant impact on

economic growth.Azam and Khan (2011) using OLS Estimation in Time series data of Azerbaijan and Armenia from 1995 to 2010 found a significant positive impact of workers' Remittances on economic growth.Ahmed et al. (2011) using the Time series data of Pakistanfrom 1976 to 2009, and applying the Bound testing approach and error correction model find remittances have a significant positive impact on economic growth in both the short run and long run. Olayungbo and Quadri(2019) using Pooled Mean Group and Mean Group/ARDL in Panel data of 20 Sub-Saharan African countries from 2000 to 2015 found no causality existed between remittances and financial development in the SSA countries.

3.2 Economic Growth and Financial Systems

Research on determining the influence of remittance and financial development on economic development has been done for many years. However, no previous research concentrated on the influence of the dominant financial system on the mentioned relationship. A reason behind this could be the prevalent existence of bank-based financial systems in developing countries (Deltuvaitė and Sinevičienė, 2014; Aggarwal, Demirgüç-Kunt and Pería, 2011). The findings of Fratzscher and Bussiere (2004) and similar past studies influenced researchers to analyze whether economic growth varies among different financial systems. Ergungor (2006) conducted such a study and found the existence of a nonlinear relationship. Choe and Moosa (1999) gathered similar insights. They concluded that economic growth is affected by financial development, mostly seen in bank-based or intermediary-based systems.

In contrast, Demirgüç-Kunt and Levine (2001) noted signs of the influence in external finance-based industries. On the other hand, Narayan and Narayan (2013) found a different type of effect in different parts of the world and concluded that bank credit has a significant negative effect on economic growth. Adding to these literatures and taking inspiration from the cross-country financial system assessment by Demirgüç-Kunt and Levine (1999), Deltuvaitė and Sinevičienė (2014) attempted to refine the indexing system and identify if the financial system of an economy plays a role in its growth. Their analysis revealed comparatively lower GDP ratios in the countries with bank-based systems and vice-versa for the market-based and mixed systems.By reviewing all of these papers, it is clear that there should be a significant effect of remittance and financial development on the growth of an economy. These also give hope of finding the influence of the financial system on economic growth as well.

4.0 Research Hypothesis

The following hypotheses have been developed based on the understanding of previous literature and the future scope of the study.

4.1 Remittance

H_{01}: Remittance inflows have no significant effect on the growth of an economy.

H_{a1}: Remittance inflows have a significant influence on economic development.

4.2 Financial Development

H_{02}: Financial development does not have any significant impact on economic growth.

H_{a2}: The development of the financial structure significantly influences the growth of an economy.

4.3 Financial System

H_{03}: The dominant financial system of a particular economy plays no pivotal role in the nature of economic growth factors influencing economic development.

H_{a3}: The dominant financial system significantly affects the nature of economic growth factors impacting the economy.

5.0 Methodology

5.1 Data

This study aims to understand the relationship among remittance, financial development, and economic growth. To do so, the research sees the importance of studying not only the developing countries, which are mostly at the receiving end of the remittance flows but also every other type of country in the world. The paper has been prepared by collecting data from secondary sources. The macroeconomic data was found in the World Bank Development Indicator database and the OECD database. The financial data has been collected from the Financial Structure Database of IMF.This study has taken the logarithm of GDP per capita and GDP per capita growth rate as dependent variables. In addition to that, for setting the independent variables, the study tried to consider the works ofGiuliano and Ruiz-Arranz (2009), Catrinescu et al., (2009), Mundaca (2009), Nyamongo et al., (2012), Próchniak and Wasiak (2017), and Sobiech (2019). Furthermore, after identifying the considerable economic growth determinants, the study concentrated on its additional focus on the financial system determinants. The works of Demirgüç-Kunt and Levine (1999), and Deltuvaitė and Sinevičienė (2014) were considered thoroughly for this part, and the revised financial system index modeling proposed by Deltuvaitė and Sinevičienė (2014) has been used in this paper to identify the dominant financial system in a country, in a particular time.Most of the variables in this paper are in percentage form. The independent variables used in this paper are mentioned in Table 2. In the table, the variables considered for this study have been presented. Here, fd represents

the financial development of a country, and several proxies have been considered for this variable. The financial development proxies used in this paper are liquid liabilities as a percentage of GDP (m2), credit to the private sector as a percentage of GDP (pvt_cred), and private sector credit provided by financial institutions as a percentage of GDP ratio (cred_fi). Another important part of the SGMM estimator is the dummy used for each year taken. In the table, the asterisk beside y_ represents the number of year in the particular model that has been used.

Table 2: List of Explanatory Variables

Variable	Symbol
Logarithm of GDP per capita	lngdp
GDP per capita annual growth rate	gdpgr
Remittance as a percentage of GDP	rem
Financial development indicator as a percentage of GDP	fd
Trade openness as a percentage of GDP	trade
Fixed capital formation as a percentage of GDP	capfm
Inflation	inf
Population growth rate	popgr
Lower secondary schooling completion rate	edu
Liquid liabilities as a percentage of GDP	m2
Credit to private sector as a percentage of GDP	pvt_cred
Financial institutions as a percentage of GDP ratio	cred_fi
Market capitalization	mkt_cap
Dummy based on financial system index	fs_ind
Dummy for each country	country_id
Dummy for year	y_*

**Number of the year in the particular model that has been used*

5.2 Sample Size Determination

The study initially wanted to analyze data of 65 countries from 1980 to 2019. However, in the data collection and curation procedure, due to the lack of necessary information and the requirements of the research tools, the paper had set a sample of 44 countries. It is also to be mentioned that the 44 countries have been selected based on the dominant financial system in that country. So, on an average, 22 of the countries mostly have the bank-based financial system, and the other 22 countries mostly have a market-based financial system in order to bring consistency among the data of 44 countries and avoid having an unbalanced panel, the period that has been considered for this paper from 2001 to 2019.

Table 3: Distribution of Sample Countries

World Bank Income Group		World Bank Region	
Low Income	1	East Asia & Pacific	9
Lower Middle Income	12	Europe & Central Asia	11
Upper Middle Income	17	Latin America & Caribbean	13
High Income	14	Middle East & North Africa	5
		South Asia	5
		Sub-Saharan Africa	1

5.3 Research Design

According to Temple (1999), the problem that is frequently faced in cross-county growth studies is the endogeneity between growth and the sources of growth, in this case remittance flows into a country. So, the study goes further to use Generalized Method of Moments (GMM) to deal with the endogeneityproblem. The study initially curates the collected data and tests the usability of it (Appendix A.1, A.2), considering SGMM requires a strongly balanced panel data. This helps the SGMM estimator to provide a robust finding about the relationship among the discussed variables.

The core two models are as follows, where the equation represents value for a particular country in a particular period:

$$lngdp_{it} = \alpha_{it} + \beta_1 (1_lngdp)_{it} + \beta_2(rem)_{it} + \beta_3(trade)_{it} + \beta_4(inf)_{it} + \beta_5(popgr_{it}) + \beta_6(edu)_{it} + \beta_7(capfm)_{it} + \beta_8(X)_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (A)$$

Here, α= intercept coefficient, β= coefficient of the variables, and = errors in the model

For the additional and special focus of this paper, we will consider the following equation, where the financial system indicator has been added:

$$gdpgr_{it} = \alpha_{it} + \beta_1 (1_lngdp)_{it} + \beta_2(rem)_{it} + \beta_3(trade)_{it} + \beta_4(inf)_{it} + \beta_5(popgr_{it}) + \beta_6(edu)_{it} + \beta_7(capfm)_{it} + \beta_8(X)_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (B)$$

6.0 Analysis

Macro-econometric modeling is an attempt to explain the empirical behavior of an actual economic system. The study used a panel data analysis.By using panel data sets, one can easily control for individual unobserved heterogeneity, obtain more accurate results because it provides more observations and information to work with, it allows following up individual dynamics and therefore, before and after -effects can easily be estimated like in this study.The above model can be

simplified as follows –

$$'_{it} = \eta_i + \delta_t + \beta(X)_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots \textbf{(C)}$$

Y_{it} = Natural logarithm of Real GDP per capita

η_i= Country specific, time invariant effect

δ_t =Time specific, country invariant effect

X_{it} =The vector of the explanatory variables

Subscript (*i*) = countries (i=1, 2, …. N)

(*t*) =time (t=1, 2, …T)

β = Scalar vector of coefficients of $\beta_1, \beta_2, \beta_3 \ldots \beta_8$

ε_{it} =Error term with $E(\varepsilon_{it}) = 0$ and $var(\varepsilon_{it}) = \sigma_\varepsilon^2$

$\varepsilon_{it} \approx IId(0, \sigma_\varepsilon^2)$

The model is tested by numerous panel data estimations in order to achieve a model which yields robust results and best fit data. The panel data regression is run for Pooled ordinary least square (OLS), Random Effects (RE) and Fixed Effects (FE) models.

In this study, one of the potential problems concerned with estimation of the impact of Remittances and Financial Development on economic growth is endogeneity. It is common in economic growth regression that some of the explanatory variables are endogenous. Endogeneity may bias estimates of how the independent variables in equation affect the dependent variable in model. There are two major sources of endogeneity such as- 'Unobservable heterogeneity' and 'Simultaneity'. Unobserved heterogeneity arises when some unobservable factors affect both independent and dependent variables and simultaneity occurs if the independent values appear to be the function of the dependent variables or expect values of the dependent variables. The greater use of panel data and fixed-effects estimator in the literature is due to the emphasis on unobservable heterogeneity as a major source of endogeneity. To eliminate the unobservable heterogeneity, conventionally Fixed Effects estimations are used. However, this estimation is consistent only when we assume that country characteristics or structures are strictly exogenous. That is, they are purely random observations through time and are unrelated to the country's history. But this assumption is unlikely to be valid in reality. So, while OLS estimation may be biased due to the fact that it ignores unobservable heterogeneity, fixed-effects estimation may be biased since it neglects endogeneity.

The problem of endogeneity can be resolved by choosing GMM estimator to estimate the impacts of remittance and financial development on economic growth in panel data model framework. The advantage of this methodology is that it eliminates any bias that may arise from ignoring endogeneity along with providing theoretically based and powerful instruments that account for simultaneity while eliminating any unobservable heterogeneity. It is best to use dynamic panel estimation in situations when there are some unobservable factors that affect both the dependent variable and the explanatory variables, and some explanatory variables are strongly related to past values of the dependent variable. These identified complications are addressed by using the Arellano and Bond (1991) generalized method of moments (GMM) estimator. The augmented version of GMM is proposed by Arellano and Bover (1995) and Blundell and Bond (1998), which is known as system GMM estimator. It builds a system of two equations: one is the original equation in levels and the other is the transformed one in differences. This allows the introduction of more instruments and can improve efficiency. Instruments for the differenced equation are obtained from the lagged levels of the explanatory variables, while instruments for the level equation are the lagged differences of explanatory variables. The consistency of the GMM estimator depends on the validity of the moment conditions, which can be tested using two specifications tests. The first test is the Arellano-Bond test for autocorrelation which tests if there is no second order correlation in disturbances. The second test, namely the Hansen (1982) J-test of over-identifying restrictions, tests the validity of the instruments. The 'joint null hypothesis' of the Hansen test is that the instruments are exogenous, i.e. they are not correlated with the error term, and the excluded instruments are correctly excluded from the estimated equation.(Roodman, 2009).To specify the dynamic GMM model, equation (C) can be written as follows-

$$\boldsymbol{Y_{it} = \rho Y_{it-1} + \beta X_{it} + \eta_i + \varepsilon_{it}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (\boldsymbol{D})$$

$\boldsymbol{Y_{it}}$ = Logarithm of GDP per capita

$\boldsymbol{Y_{it-1}}$ = Log of GDP per capita lagged one year

$\boldsymbol{X_{it}}$ = Set of explanatory variables

$\boldsymbol{\eta_i}$= Unobserved country-specific effects

$\boldsymbol{\rho, \beta}$ = Coefficients of parameters to be estimated

$\boldsymbol{\varepsilon_{it}}$ = The time-varying error term

Subscript (*i*) = countries (i=1, 2, …. N)

(*t*) =time (t=1, 2, …T)

6.1 Logarithm of GDP Per Capita

In the first instance, we estimated the parameters of equation (C) by the Pooled ordinary least square (OLS) assuming that country specific effects are constant across countries and there is no time specific effect. As a second step in the model, we obtained the parameter estimates of equation (C) using the Random Effects (RE) with the assumption that the country specific effects are uncorrelated with the regressors in equation (2). Evidently, it is not settled that the covariates are uncorrelated with . Therefore, we also ran the Fixed Effects (FE) model which allows for such correlations. As a common test in panel data estimation, we used the Breuch-Pagan LM test and the Hausman (1978) specification tests to discriminate among these three estimators. Breuch-Pagan LM test helps to compare Random Effects (RE) with Pooled ordinary least square (OLS). The null hypothesis of Breuch-Pagan LM test is that there is no significant difference across countries. In this study, the null hypothesis is rejected at P < .05 and concludes that there is panel effect and move to Random Effects (RE) is appropriate. In the third step, we obtained the parameter estimates of equation (2) using the Fixed Effects (FE) model.

Using Hausman (1978) specification test, we checked the suitability of using a Random Effects (RE) model over a Fixed Effects (FE) model. The hypothesis for Hausman specification test is –

$$H_0: \beta_{FE} \text{ and } \beta_{RE} \text{ are consistent, but only } \beta_{RE} \text{ is efficient}$$
$$H_1: \beta_{FE} \text{ is consistent and } \beta_{RE} \text{ is inconsistent}$$

Hausman (1978) Specification test rejects the null that both Random Effects (RE) and Fixed Effects (FE) are consistent at p-value < 0.05. The result of the Hausman test confirms that the Fixed Effects (FE) model is superior to Random Effects (RE) model for this study. The following Table 4 (columns 1,2 and 3) reports the estimation results for Pooled OLS estimation, Fixed Effects (FE) model and Random Effects (RE) model. The column (1) represents the Pooled OLS estimation, column (2) represents Fixed Effects estimation and column (3) represents Random Effects estimation results. The results disclose the expected relationship between the economic growth (logarithm of GDP Per Capita) and the sources of growth (explanatory variables). The R^2 shows that the Fixed Effects (FE) model explains 79.6 percent of the variation in the dependent variable (lngdp).

Our next consideration relates to an estimation strategy that can sort out the

problem of endogeneity and autocorrelation due to the presence of lagged dependent variable in the explanatory variable. According to economic theory, Remittances are endogenous to economic growth. The problem with endogeneity is that it can cause serious bias when estimating how the independent variables in the equation affect the dependent variable in the model. Thus, our preferred specification is the dynamic panel approach. Different specification tests have been conducted to achieve a model that yields robust results and best-fit data. Model 4 in Table 4 represents the dynamic panel models estimation results.

System GMM model is applied to correct the problem of endogeneity. The system GMM model is preferred because it provides more consistent results. In Table 4, column (4) represents the Arellano and Bover (1995) and Blundell and Bond (1998) two-step system GMM results. The first specification test of the system GMM model (column 4) is the Arellano-Bond test for second-order serial correlation in the residual, confirming that the moment conditions cannot be rejected. The result is consistent as there is no second-order serial correlation. The p-value of AR (2) is 0.564 which fails to reject the null hypothesis of no second-order autocorrelation. The second specification test is the test of over-identifying restriction to ensure the validity of the instruments. The null hypothesis is that the instruments are uncorrelated with the residual. The p-value result for the Hansen test gives 0.956. With this result, the null hypothesis cannot be rejected. The inference here is thatover-identifying restrictions are valid.

The following table summarizes the analyses conducted by taking the logarithm of GDP per capita as the dependent variable. Here, the influence of remittance is significant in the PooledOLS, Fixed effects and Random effects findings. Another interesting finding is that the significant effects of remittance show a negative pattern. In addition, the financial development proxies have not shown any significance on the natural logarithm of GDP per capita.Among the general economic growth determinants used in our model, population growth, level of education, and capital formation have shown significant effects in some cases. These discrepancies in the findings bring the question of whether sampling a diverse set of countries is a good technique or whether the study on the effect of remittance should only concentrate on a certain set of countries which majorly receive remittance funds.

Table 4: Analyses with "lngdp"

Dependent variable		lngdp		
Equation	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Method	**Pooled OLS**	**Fixed Effects**	**Random Effects**	**SGMM**
l_lngdp				0.926***
rem	-0.0178**	-0.0143*	-0.0142*	-0.0173
trade	0.00584*	0.00665	0.00697	0.00805*
inf	0.0760*	0.0615*	0.0677*	0.0623**
popgr	-0.0127**	-0.1455*	-0.148*	-0.114**
edu	0.0185***	0.0117***	0.0144***	0.0135*
capfm	0.0173*	0.0082**	.00084**	0.0023*
Constant	0.196***	0.234**	0.223**	0.139**
Observations	880	880	880	880
R-squared	0.584	0.792	0.792	
Hausman (p-value)			0.000	
AR (1) (p-value)				0.002
AR (2) (p-value)				0.564
Hansen Test (p-value)				0.956

**Significant at 10% significance level, **significant at 5% level, ***significant at 1% level*

6.2 Financial Systems

Continuing with gdpgr as the dependent variable, we dive into our special focus on a country's financial system to impact economic growth. Firstly, the financial system indicator has been used, which does not show any significant effect on the economic growth of a country. A reason behind this could be that when the dummy was taken, the dominant financial system, in most cases, remained the same over time. An alternative could be to use the index itself instead of the dummies. The index was not used here to avoid collinearity with the financial development variables.Here, the models show consistency with the previously described models.

Table 5: Analyses with gdpgr, considering different Financial Systems

Dependent variable			gdpgr	
Equation(version)	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Method	**Pooled OLS**	**Fixed Effects**	**Random Effects**	**SGMM**
l_lngdp				-0.412***
Rem	-0.185***	-0.0123*	-0.124*	-0.253
Trade	0.00435	-0.00637*	0.00635*	0.0348*
Inf	-0.0671**	0.844**	-0.0821**	0.0462
Popgr	-1.475***	-1.185*	-1.187***	-2.216**
Edu	0.00295*	-0.00286	0.00286	0.0135*
m2	0.00208*	0.00404	0.00441	0.0033
rem_m2	0.000736**	0.00293	0.00274	0.01023*
fs_ind	0.1963	0..1581	0.1546	-0.1624
Constant	18.23***	17..23***	17.34***	6.55**
Observations	880	880	880	880
R-squared	0.561	.684	0.685	
Hausman (p-value)			0.001	
AR (1) (p-value)				0.00203
AR (2) (p-value)				0.563
Hansen Test(p-value)				0.944

**Significant at 10% significance level, **significant at 5% level, ***significant at 1% level*

Noticing model specification problems in the previous part, the paper studied the bank- and market-based countries separately. The data could conduct OLS only with 22 sample countries in each category. The results brought some interesting findings to light. So far, remittance has had a significant negative impact on the previous findings. Here, for none of the categories, remittance has any significant impact. On the other hand, financial development has a significant negative effect in the case of market-based financial systems. Trade openness is also found to have a significant impact on economic growth. Moreover, the effect is the opposite in the two categories of financial systems.

Table 6: Separate OLS for the Two Financial Systems

Dependent variable	gdpgr	
Financial System	**Bank-based**	**Market-based**
Method	OLS	OLS
l_lngdp	-1.865***	-1.563***
Rem	-0.364	-0.259
Trade	0.316***	-0.413***
Inf	-0.0953	-0.0747
Popgr	0.0146*	0.00367
Edu	-0.00786	-0.00438
m2	0.0121	-0.0976**
rem_m2	-0.0428	-0.0395
Constant	-1.516***	-1.083***
Observations	440	440
R-squared	0.42	0.37

**Significant at 10% significance level, **significant at 5% level, ***significant at 1% level*

7.0 Discussion

The two focal points of this research were to identify the nature of the effect of remittance and financial development on economic growth and to detect if the difference in financial systems plays a role in this relationship. Based on these focal points, the findings of the analyses can be summarized in the following table:

Table 7: Acceptance and Rejection of Hypotheses

Hypothesized Issue	Variables	Models Rejecting the Hypothesis	Nature of effect
No effect of remittance	rem	Pooled OLS, Fixed Effects and Random Effects	Negative
No effect of financial development	m2	OLS with market-based countries	Mixed
No influence of the financial system	fs_ind	None	Mixed

This study attempted to add to the existing literature by adding the point of view of different financial systems into the picture and revealed some tricky findings. Remittance was found to be significant in only the pooled OLS, Fixed Effects and Random Effects analyses. In contrast, financial development was not significant in influencing economic growth other than in the analysis with a sole concentration on the countries with market-based financial systems. The negative effect of remittance goes to the findings of Chami, Fullenkamp and Jahjah (2005) and Chami, Hakura and Montriel (2009). The results on rem_fd, on the other hand, goes hand in hand with the work of Mundaca (2009), Nyamongo et al., (2012), and Abida and Sghaier (2014). The reasons behind these results could be that:

In most countries, using remittance funds in productive investments could be rare. The funds are solely used for the consumption of the recipient, which may have resulted in the insignificant effects reflected in the SGMM estimations. Another strong reasoning behind the negative effect of remittance was brought to light by Chami, Fullenkamp and Jahjah (2005), who explain how remittance could reduce the motivation for the recipient individual/household to be engaged in productive work.

The counter-cyclical nature of remittance-economic growth could be another reason here. The effect of the Global Financial Crisis of 2008 could also have an impact on the data. Multi-periodical studies could be done to look into this issue. The yearly data will not have to be averaged and then used for analysis, as this hides many aspects of the real scenario. Here, a supportive argument could be the strong association between the previous year's economic growth and the current year's growth. The previous period may have influenced the remittance funds to act as compensatory transfers.The significant positive sign in the combined variable of remittance and financial development represents the complementary relationship between remittance and financial development. So, a probable cause of remittance to have a negative effect and financial development to have no significant effect could be that the countries studied are in such a level of financial development where more needs to be made to encourage remittance inflows and ensure efficient mobilization of these resources. So, the lack of a sound financial structure could have driven the compensatory use of remittance to a boost.

One of the interesting findings from the determinants was the nature of the effect on the economy to be opposite in the two different financial systems. The positive effect of trade openness in the bank-based countries and the negative effect in the market-based countries could be driven by the global financial crisis when the market-based economies suffered the most and the trade openness created a domino effect for the other countries.

8.0 Conclusion

The relationship between remittance, financial development and economic growth is an interesting issue to study. The studies so far lack a consensus, which gave rise to the opposite concepts of the complementary and substitutional relationship between remittance and financial development in effective economic growth. The findings from this research show a variety of insights, where the robust model of SGMM was not found to be significant in affecting the economic growth of a country. In the static methods, it was found to have a negative influence. Some probable reasons behind this negative effect could be because of the timeline that has been chosen for this research. The timeline consists of the Global Financial Crisis time. This may have caused remittance to work in a compensatory nature instead of influencing economic growth. This may also be tagged with the strong significant influence of previous economic growth on the current economic growth. So, when SGMM accounted for the endogenous effect within the model, the compensatory transfer of remittance could have also removed the indirect effect of remittance, which is why the effect has not been reported to be significant. In the case of financial development, almost no significant effect was found from financial development to economic growth. This could be a result of the global financial crisis, as the crisis has pushed many countries to be more restrictive. The opposing effects of trade openness could support this argument noticed in the two different types of financial systems. The results show how using SGMM models brings more conformity in understanding the studied relationship. From this, the policymakers of different countries should construct policy measures in a customized sense, where they will not only implement policies similar to the other countries but also incorporate country-specific issues like the dominant financial system of that country. In addition to this, the study also indicates the importance of well-structured financial systems to facilitate the inflow of remitted funds, which is done mainly through banks or informal channels. The financial institutions from the market-based economies should concentrate on such issues so that the optimum allocation of funds can be ensured better.

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Appendix

Table A.1: Overall Descriptive Statistics

Variables	Mean	Standard Deviation	Minimum	Maximum
lngdp	767.8	6014.3	6..5	98012.1
gdpgr	2..79	3.7	-14.5	14.7
rem	3.72	2.98	0.004	23.4
m2	63.21	43.6	0.0	346.3
rem_m2	225.97	471.1	0.42	2624.6
depo	62.1	48.3	0.0	244.3
rem_depo	265.3	583.4	0.0	4828.6
pvt_cred	70.4	41.8	0.0	258.1
rem_pvt_cred	127.4	217.8	0.04	1741.1
trade	83.89	67.74	10.3	442.62
fs_ind	1.0	1.0	0.0	2.0
capfm	22.7	5.2	10.5	44.5
inf	4.09	3.7	-2.9	29.5
popgr	1.04	1.03	-3.84	7.34
cred_fi	42.4	41.6	0.0	327.4
edu	61.7	37.1	0.0	114.6

Table A.2: Correlation Matrix of The Variables

	Lngdp	gdpgr	rem	m2	rem_ m2	depo	r e m _ depo	p v t _ cred	rem_pvt_ cred	trade	c a p _ form	inf	popgr	cred_ fi	edu
lngdp	1.00														
gdpgr	-0.18	1.00													
rem	-0.37	0.09	1.00												
m2	0.36	-0.13	0.03	1.00											
r e m _ m2	-0.06	-0.02	0.70	0.44	1.00										
depo	0.38	-0.14	0.03	1.00	0.45	1.00									
r e m _ depo	-0.08	-0.03	0.70	0.47	1.00	0.45	1.00								
p v t _ cred	0.66	-0.19	-0.23	0.73	0.04	0.79	0.04	1.00							
r e m _ p v t _ cred	-0.13	-0.08	0.84	0.35	0.90	0.35	0.86	0.06	1.00						
trade	0.19	0.02	0.01	0.19	0.07	0.16	0.07	0.19	0.11	1.00					
capfm	0.06	0.37	-0.06	0.15	-0.04	0.15	-0.04	0.17	-0.11	0.03	1.00				
inf	-0.16	-0.01	0.01	-0.29	-0.08	-0.29	-0.08	-0.32	-0.07	-0.09	-0.02	1.00			
popgr	-0.32	-0.22	-0.03	0.17	0.22	0.17	0.22	-0.01	0.13	-0.11	-0.25	0.08	1.00		
cred_fi	0.23	-0.12	-0.06	0.25	-0.07	0.25	-0.07	0.37	-0.02	-0.14	-0.07	-0.17	-0.13	1.00	
edu	0.04	0.04	-0.02	-0.15	-0.15	-0.15	-0.15	-0.12	-0.08	0.10	0.07	-0.01	-0.10	-0.12	1.00

Table A.3: VIF Test

Dependent Variable	Independent variables	rem	capfm	l _ lngdp	depo	Pvt_ cred.	popgr	f s _ ind	m2	inf	trade	edu
gdpgr	VIF	1.82	1.22	2.07	1.99	1.82	1.14	1.21	1.9	1.34	1.42	1.07