P-ISSN: 2709-6254	Journal of Development and Social Sciences	Jan-Mar 2023, Vol.4, No.1
O-ISSN:2709-6262	http://dx.doi.org/10.47205/jdss.2023(4-I)29	[313-328]

Journal of Development and Social Sciences
www.jdss.org.pk

RESEARCH PAPER

Remittances and Female Financial Inclusion: A Global Perspective

[1]Dr. Saqib Bashir [2]Dr. Aamir Nawaz [3]Sana Nigar Ayesha*

1. Visiting Faculty Member, Department of Management Sciences, IQRA University, Islamabad, Pakistan
2. Assistant Professor, Department of Economics, Akhuwat Institute, Kasur, Punjab, Pakistan.
3. Department Manager, Department of Pharmacy, IQRA University, Islamabad, Pakistan

***Corresponding Author:** saqib.bashirswufe@gmail.com

ABSTRACT

The objective of this paper is to examine the significance of remittances for female financial inclusion. Female are among the most financially excluded segment of the society. Remittances can play a significant role in enhancing female financial inclusion. Remittances provide females with the necessary finances they require. To investigate the relationship, we used global data of females from GFI (2017) database. By using pooled OLS estimation technique, we find that remittances do improve female financial inclusion. This result is robust to controlling for the potential endogeneity of remittances using IVs. It also suggests remittances induce females to save and to borrow from financial institutions. Socio-economic and regional heterogeneity seems to influence the remittances-female financial inclusion relationship. Our results suggest that remittances can be an alternative source of finance that can be helpful in enhancing female financial inclusion. Therefore, policymakers should focus to ease out the process of remittances collection.

KEYWORDS Female Financial Inclusion, IVs, Regional Heterogeneity, Remittance, Saving and Borrowing, Socio-Economic

Introduction

In Recently, financial inclusion has attracted the focus of researchers due to its perceived role in aiding economic development. It is perceived an instrument for bringing improvement in the welfare of people and has been termed as an enabler in achieving seven goals of Sustainable Development (UNCDF, 2020). However, despite the recognition of its importance, there exists a large gap in global financial inclusion especially in the case of women. Statistics around the world depict that out of 1.7 billion unbanked adults, 56 percent are women (GFI, 2018). A high gender-gap connotes greater deprivation of females from the potential benefits that can be achieved such as personal empowerment as well as development of a society in general. What contributes in higher deprivation of females from financial inclusion holds great significance.

In the last couple of decades, remittance inflows have become an important source of financial inflows, overshadowing other usual sources such as foreign direct investment and foreign aid. According to the World Bank (2021), remittances inflows have increased from 531 billion dollars to 716 billion dollars from 2011 to 2019, while it reaches 547 billion dollars from 384 billion dollars during the same period in developing countries. Globally, females constitute the majority of remittance recipients. 63 percent of the remittance receivers are female while 37 percent are male. Despite a dominant receiver of remittances, females are more financially excluded. The question here is, what is the significance of remittances for female financial inclusion? In other words, can remittances be a remedy to increase female financial inclusion?

Existing literature has contrasting views on remittances-female financial inclusion relationship. While the dominant strand of literature suggests strong and positive

relationship between the two, the other one suggest inconclusive or even negative results. The prior one suggests that the higher the remittances, the greater the savings which leads to an increase in the demand for deposit accounts to deposit their savings (Yamada et al., 2017). The savings enables females to use for reducing the risk for rainy days such as health shocks, rainfall shocks, and employment vulnerability (Ambrosius, 2012; Ghosh & Vinod, 2017; Kokorović Jukan et al., 2020; Riley, 2018). It also enables them to use money for children's education, to start their own businesses, for old age, and smooth their household expenditures (Bashir et al., 2022; Klapper et al., 2016; Kokorović Jukan et al., 2020). More exposure to bank due to collection of remittances from banks familiarizes them with the financial services being offered which also increases financial inclusion. While the other strand of literature proposes that steady inflows of remittances reduce the reliance of households on loans from banks and other financial institutions in financing their basic consumption needs and other expenses. It can act as substitute for credit from financial institutions and thereby reduces financial inclusion (Ambrosius & Cuecuecha, 2016; Anzoategui et al., 2014; Chami & C.F, 2013).

Acknowledging the gap in the literature and the importance of the issue, we postulate three questions in this study. What is the relationship between remittances and female financial inclusion? How remittances are associated with saving and borrowing decisions of females? And how socio-economic and regional heterogeneity influences remittances-female financial inclusion relationship?

This study will contribute to the existing literature by: first, empirically examining the relationship between remittances on female financial inclusion at a macro-level, which is to the best of our knowledge, will be the first paper of this sort. Second, the saving and borrowing mechanism analysis and the heterogeneity analysis will provide a thorough understanding and the dynamics of this relationship. The findings from this study have implications for policymakers to devise policies based on the dynamic effects of remittances on female financial inclusion.

In the upcoming sections of this paper, first, an overview of the previous research as well as hypotheses development has been presented, then data and summary statistics have been explained. Main results, mechanism analysis, and heterogeneity analysis has been carried out subsequently. The study ends at the conclusion.

Literature Review

Literature on remittances and female financial inclusion relationship suggests an important role of remittances in inducing females to be a part of financial institutions. It helps in reducing the financial inclusion gender gap. The report by Yamada et al. (2017) has states that women with bank accounts outnumbered men by about 15 percent in 2011.The foremost reason for this gap reversal is the high remittance inflow in the country where a majority of the receivers were women. Similarly, UNCDF (2017) assessed the situation of remittances and female financial inclusion in the Mekong region. It is stated that women are the main and more frequent recipients of remittances of international and domestic remittances in this region. Being a direct recipient; they have more control over the usage of remittances.

For female remittance recipients, bank accounts enable them to receive their remittances with convenience. Not only this, having a bank account enables them to channel their saving into improving the lives of their family (Klapper et al., 2016).

Literature states several ways by which remittances influence financial inclusion. First, it might increase the demand for savings instruments by providing households with more cash for some period of time. Second, more exposure to banks by remittance recipients familiarizes them with the services the bank offers. This may also induce them to use

financial services more than before (Gemechu Ayana et al., 2014; Li et al., 2014). Particularly for females, bank accounts enable them to receive their remittances with convenience. Receiving remittances in their account increases their saving which can be used for children's education and to cope with financial shocks (Klapper et al., 2016).

The review of the literature above suggests remittances can provide the cushion for lack of finances issue and can be helpful in improving female financial inclusion. Remittances can be served as an alternative source to finances. Given the role of remittances in influencing female financial inclusion, we expect the following:

Hypotheses

Hypothesis 1: Remittance has a positive impact on female financial inclusion.

Hypothesis 2: Socio-economic heterogeneity does affect remittance-female financial inclusion relationship.

Hypothesis 3: Regional heterogeneity affects remittance-female financial inclusion relationship.

Material and Methods

For the purposes of this research, based on the availability of data, 148 countries have been selected for the analysis. The data of variables related to female financial inclusion included in our study are available in the Global Findex database for the periods 2011, 2014, and 2017.

Data for explanatory variables and other control variables have been taken from World Bank data sources for 2011, 2014, and 2017. Only the Coastline length data is taken from World Resource Institute for the same periods.

Female financial inclusion in the study is measured by 'Female account' (Girón et al., 2022; Li et al., 2014). For robustness check, two proxies of female financial inclusion have been introduced. First is 'Female institution account' and the second is 'Female debit card'. Both of these variables have been used in numerous research papers for example (Cabeza-García et al., 2019; Wellalage & Locke, 2020).

The explanatory variable of primary interest for this research is 'Remittances'. Additionally, country-level control variables have been considered. 'GDP per capita', 'GDP growth', and 'Inflation' depict the economic situation of a country. Better the economic situation of a country, the greater the likelihood of individuals using financial services. (Asuming et al., 2019; Evans & Evans O, 2017; Sha'ban et al., 2020; Xu, 2020). According to the literature, high inflation causes people to expand their demand for physical assets rather than financial instruments to compensate against their asset erosion (Inoue & Hamori, 2016; Sha'ban et al., 2020).

The other two control variables advocate capital inflows. Foreign capital inflows positively affect financial development which leads to improvement in financial inclusion. The higher the 'FDI/GDP', the greater the financial inclusion will be (Aggarwal et al., 2011; Evans O, 2017). 'Export to GDP' is also found to have an impact on financial inclusion (Aggarwal et al. 2011; and Kakhkharov & Rohde, 2020).

'Coastline length' and 'Island' are used as instrumental variables. Following Abdih et al. (2012) and Ahmed (2014), Coastline and Island are employed as geographical variables which are popular instrumental variables for numerous remittance-related literature. All the continuous variables are winsorized at the 1 % and 99% percentiles.

According to the description of the data given in table 1, a huge global difference in female financial inclusion is obvious. A minimum of 2 percent and a maximum of 100 percent of females are having account ownership with a mean value of around 50 percent and a standard deviation of around 30 percent in an institution and otherwise. The table also suggests the incidence of possessing no debit card at all by females. Minimum and maximum values of control variables also show the varying economic condition of the countries included. Complete statistics are given in Table 1.

Table 1
Descriptive Statistics

Variable	Obs.	Mean	SD	Min	Max
Dependent variables					
Female account (%)	394	51.632	31.641	2	100
Female institution account (%)	394	50.264	32.434	2	100
Female debit card (%)	390	35.718	30.619	0	98
Independent variable					
Remittance (log)	394	20.881	1.625	15.545	24.197
Control variables					
GDP Per Capita	383	13.269	17.032	0.385	89.275
GDP growth	385	3.928	2.682	-3.482	14.047
Inflation	371	4.657	4.416	-1.006	29.502
FDI/GDP	364	1.589	5.677	-46.055	41.081
Export/GDP	378	40.288	25.162	8.700	188.757
Other variables					
Coastline length(log)	381	6.101	3.668	0	12.489
Island	394	0.107	0.309	0	1

Empirical Strategy

In order to test our hypotheses, the following general equation has been used:

$$FFI_{i,t} = \beta\, Rem_{i,t} + \gamma\, X_{i,t} + \alpha_t + \varepsilon_{i,t}$$

Where *FFI* represents measures of female financial inclusion, *i* identifies the cross-section (country), *t* is the time period, *Rem* is the log of remittances received, *X* is the vector of control variables, α_t captures the year-specific effect, and ε is the error term.

We used OLS to investigate the remittances-female financial inclusion relationship. For robustness checking, firstly, the dependent variable has been replaced by Female institution account. Later, regression is run by using Female debit card as a dependent variable. The equation is also tested using a random-effect model. The expected issue of endogeneity and reverse causality is also dealt with using Instrument Variable approach. Heterogeneity is also introduced in the study to examine what is its effect on remittances-female financial inclusion relationship.

Results and Discussion

Effects of remittances on female financial inclusion

For our H_1 hypothesis, we regressed the equation using OLS. Table 2 summarizes the results of hierarchical regressions. For model 1, only the independent variable has been considered. According to the result, the coefficient of remittance has been positive (3.01) at 0.01 significance level. The positive relationship suggests that the inflow of remittances induces females to use more of the financial services offered by financial institutions. In model 2, one control variable has been added to test the relationship. GDP per capita has been added along with remittance. Results from the regression suggest both Remittance and

GDP per capita have been positively related to females having an account. The coefficient values suggest both variables encourage females to opt for financial services.

Table 2
Basic Results

	Female account			
	(1)	(2)	(3)	(4)
Remittance	3.010***	1.048*	1.007*	1.796***
	(0.910)	(0.578)	(0.578)	(0.615)
GDP per Capita		1.365***	1.265***	1.157***
		(0.077)	(0.083)	(0.087)
GDP Growth			-1.238***	-1.541***
			(0.469)	(0.511)
Inflation			-0.494*	-0.150
			(0.276)	(0.284)
FDI/GDP				-0.298**
				(0.122)
Export/GDP				0.241***
				(0.047)
Year Fix Effects	Y	Y	Y	Y
Cons	-18.004	5.710	15.506	-9.544
	(18.897)	(11.973)	(12.358)	(13.373)
N	394	383	358	332
adj. R^2	0.050	0.590	0.608	0.631

In model 3, two more control variables namely, GDP growth and Inflation have been added. The regression result of model 3 suggests significant and positive relationship between Remittance and GDP per capita with female account ownership while GDP growth and Inflation coefficients are significant but negative. Model 4 includes all the variables. The estimation results of model 4 suggest a significant positive relationship between remittance and female account ownership which infers that having remittance drives females to having accounts. As theory suggests, higher remittances reduce financial constraint and generate a need for safekeeping to be used for multiple purposes. This result is in line with numerous research articles (Anzoategui et al., 2014; Gemechu Ayana et al., 2014). GDP per capita is also found strongly and positively correlated to female account ownership. The value of GDP per capita coefficient (1.157) infers that higher GDP per capita drives females for having accounts. The same is concluded in the literature (Asuming et al., 2019; Sha'ban et al., 2020). Similar to model 3, the coefficient of GDP growth is significant and negatively related to GDP growth which concludes a negative relationship between GDP growth and the female account. GDP growth is found to reduce female account ownership which is against the expectations, which may be due to the inclusion of other country-level controls. This is in line with Asuming et al (2019) and Xu (2020). Inflation though found to be negatively correlated with female accounts as expected but is insignificant in this model. Gupta et al (2009) and Inoue (2019) also concluded insignificance of inflation on financial inclusion. The coefficient of FDI/GDP is negative against the expectations. The coefficient of Export/GDP is positive and significant as expected, same as Cooray (2012) and Fromentin (2017) which infers that trade openness drives women to have an account.

Numerous tests are carried out to confirm the robustness of the results. First, the study uses a number of alternative measures of female financial inclusion to validate the robustness of the results to the measure of female financial inclusion. The results are summarized in columns 1 and 2 in Table 3. The baseline model has been reconstructed by replacing the dependent variable with the percentage of female having account at a formal financial institution in the first column. The results are not different as compared to basic results. Remittance is significant and positively related to female institution account which infers remittance induce females to have an account at a formal financial institution. GDP per capita and Export/GDP ratio are both significant and positive. GDP growth and FDI/GDP are both significant and negative while inflation is negative but insignificant too in this case.

In column 2, female financial inclusion now is measured by the percentage of female having debit card. The coefficient of Remittance, in this case, is significant and positive. GDP per capita is also significant and positive. The coefficients of Inflation and FDI/GDP both differ from column 1 while no change occurred in other variables in terms of sign and significance.

Table 3
Robustness Check

	Female institution account	Female debit card	Female account	
	(1)	(2)	(3)	(4)
Remittance	2.102***	1.288**	1.276*	1.474*
	(0.623)	(0.508)	(0.712)	(0.870)
GDP per Capita	1.194***	1.231***	3.388***	1.003***
	(0.089)	(0.090)	(0.349)	(0.120)
GDP Growth	-1.866***	-1.701***	-0.162	-0.833**
	(0.515)	(0.480)	(0.546)	(0.323)
Inflation	-0.095	0.187	0.228	-0.413**
	(0.284)	(0.221)	(0.293)	(0.194)
FDI/GDP	-0.297**	-0.145	-0.407	0.050
	(0.131)	(0.181)	(0.291)	(0.128)
Export/GDP	0.274***	0.310***	0.132	0.104*
	(0.048)	(0.053)	(0.081)	(0.057)
Year Fix Effects	Y	Y	Y	Y
Cons	-16.650	-18.403	-17.812	2.434
	(13.476)	(11.238)	(14.995)	(17.834)
N	332	329	229	332
adj. R^2	0.647	0.695	0.413	

Second, several other measures have been taken to check the robustness of the results. In column 3 are the countries that are other than high-income ones, while in column 4 of the table, we estimated the equation using the random effect model. The dependent variable in these cases is the percentage of females having accounts. Results in column 3 suggest that in these countries too, remittance is found an important determinant of female financial inclusion. GDP per capita also positively affects female financial inclusion while other control variables are insignificant in affecting female financial inclusion.

In the last column, remittance is found positively associated with female financial inclusion. The coefficients of GDP per capita and Export/GDP ratio was also found significant and positive while GDP growth and Inflation coefficients are significant and negative. FDI/GDP turned out insignificant.

Third, we check the robustness by re-estimating the equation using the IV approach. Table 4 summarizes the results of controlling for endogeneity. At first, the reverse causality problem is dealt with by lagging the remittance variable. The significant results of the regression are mentioned in the table. Secondly, omitted variable biasness issue is dealt with using external instruments i.e., Coastline and Island. The results of the coefficients suggest the significance of Coastline while Island came out insignificant. Overall, IV estimations indicate an even stronger effect of remittances on female financial inclusion. Table 4 also provides some diagnostic tests for the validity of the instruments. Overall, the results are robust to the measure of female financial inclusion.

Table 4
IV Test

	Remittance	Female account	Remittance	Female account
	(1)	(2)	(3)	(4)
Remittance		1.724*		7.628**
		(0.895)		(2.993)

L3. Remittance	0.986***			
	(0.016)			
Coastline			0.119***	
			(0.027)	
Island			0.047	
			(0.269)	
GDP per Capita	-0.003**	1.203***	0.006	1.122***
	(0.001)	(0.108)	(0.005)	(0.106)
GDP Growth	-0.011	-2.033***	-0.070*	-1.368**
	(0.014)	(0.754)	(0.042)	(0.579)
Inflation	-0.000	0.150	-0.006	-0.126
	(0.005)	(0.387)	(0.027)	(0.330)
FDI/GDP	-0.004	-0.441	-0.006	-0.279**
	(0.004)	(0.334)	(0.014)	(0.128)
Export/GDP	0.001	0.295***	-0.005	0.317***
	(0.001)	(0.067)	(0.004)	(0.060)
Year Fix Effects	Y	Y	Y	Y
Cons	0.556	-4.197	20.463***	-134.436**
	(0.373)	(19.237)	(0.350)	(63.210)
N	206	206	320	320
adj. R^2	0.956	0.625	0.092	0.573
Under-identification Test P Value	0.000		0.000	
Weak Identification Test F statistic	4240.024		10.351	
Endogeneity Test P Value	0.126		0.040	
Hansen J Statistic			0.130	

Mechanism Analysis

For our H_2 and H_3 hypotheses, we have done the mechanism analysis. Table 5 depicts the reasons for saving and what influences the female saving decisions. According to the table, the relationship between Remittance and overall female savings, is significant and positive.

Table 5
Mechanism Analysis-Saving

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Female save	Female account	Female save for business	Female account	Female save for old	Female account	Female save for education	Female account	Female save for emergency	Female account
Remittance	0.954***		-0.623**		1.484***		0.761		-0.074	
	(0.331)		(0.315)		(0.390)		(0.603)		(0.438)	
Female save		1.139***								
		(0.084)								
Female save for				0.137						
business				(0.214)						
Female save for						0.885***				
Old						(0.106)				
Female save for								0.420**		
education								(0.180)		
Female save for										0.098
Emergency										(0.100)
GDP per Capita	0.869***	0.229***	-0.059***	1.119***	0.595***	0.563***	0.101**	1.115***	0.392***	1.071***
	(0.064)	(0.087)	(0.018)	(0.107)	(0.062)	(0.104)	(0.049)	(0.161)	(0.080)	(0.117)
GDP Growth	0.039	-1.597***	1.124***	-1.581**	0.187	-1.506**	1.544***	-2.751**	0.098	-1.432**
	(0.353)	(0.350)	(0.200)	(0.748)	(0.332)	(0.583)	(0.465)	(1.085)	(0.351)	(0.697)
Inflation	0.035	-0.149	0.082	0.058	-0.132	0.182	0.217	0.243	-0.011	0.070

	(0.109)	(0.230)	(0.149)	(0.389)	(0.118)	(0.358)	(0.238)	(0.632)	(0.187)	(0.382)
FDI/GDP	-0.166**	-0.126	-0.098	-0.397	-0.450**	0.039	-0.039	-0.488	0.142	-0.422
	(0.067)	(0.111)	(0.073)	(0.297)	(0.224)	(0.274)	(0.164)	(0.347)	(0.429)	(0.306)
Export/GDP	0.055**	0.163***	-0.033*	0.246***	0.144***	0.120**	0.008	0.361***	0.072	0.235***
	(0.024)	(0.039)	(0.018)	(0.066)	(0.042)	(0.057)	(0.056)	(0.102)	(0.050)	(0.067)
Year Fix Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cons	-15.766**	22.785***	20.920**	32.863**	-26.508**	29.437**	-4.705	25.381**	-3.997	34.459***
	(7.094)	(3.443)	(6.822)	(5.346)	(8.227)	(4.036)	(13.601)	(7.512)	(9.753)	(5.090)
N	329	329	220	220	220	220	110	110	220	220
adj. R^2	0.707	0.752	0.234	0.581	0.644	0.656	0.057	0.605	0.632	0.582

Remittance does induce females to save more. This result is in line with Kokorović Jukan et al (2020). Out of all the reasons as to why they save when they receive remittance, their saving is primarily to use for old age. Females usually are younger than their husbands and also are married at an early age. They are more likely to outlive their husbands and had to depend either on their savings or on their children or both. That is why they prefer to save more for old age (Kristin, 2013). Remittance is not driving females to save for business. The reason for this negative relationship is understandable as a financial provision in the form of remittance is channelized towards fulfilling basic needs instead of using the money for doing business (Dodson & Simelane, 2008). The relationship between remittance and female savings for education, and emergency purposes turned out insignificant.

Moreover, how different reasons for saving affect female financial inclusion is also summarized in the table. According to the results, overall female savings and females having accounts turned out significant and positive. Saving for old age and saving for education are also positively associated with female account ownership while it is positive but insignificant in cases of saving for business and saving for emergency purposes. This disaggregated analysis suggests that saving for old age and for education are important determinants of female financial inclusion. Thus, saving for old age and for education are the factors that derive women to opt for financial services. The results of control variables suggest that GDP per capita and Export/GDP drives female to save more.

Table 6 represents the reasons for borrowing and what influences female borrowing decisions. Remittance and female borrowing are positively related as it is evident from the value of the coefficient. Although the coefficients of reasons for borrowing are mostly insignificant (except borrowing for medical services) but they are negative suggesting financial provision in the form of remittance reduces female needs to borrow for whatever reason. This is due to the fact that remittances proved to be a substitute for credit in many cases. Borrowing usually is done for unforeseen circumstances. The provision of finances in the form of remittances for females may have less need to rely on lending when faced with any liquidity constraint (Ambrosius, 2016; Anzoategui et al., 2014).

Table 6
Mechanism Analysis-Borrowing

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Female borrow	Female account	Female borrow for business	Female account	Female borrow for medical service	Female account	Female borrow for education	Female account	Female borrow for emergency	Female account
Remittance	0.787*		-0.109		-0.742***		-0.021		-0.354	
	(0.418)		(0.291)		(0.262)		(0.431)		(0.434)	
Female borrow		0.916***								

		(0.121)								
Female borrow for				0.066						
business				(0.159)						
Female borrow for						-1.052***				
medical service						(0.247)				
Female borrow for								-0.025		
education								(0.316)		
Female borrow for										0.316
emergency										(0.328)
GDP per Capita	0.001***	0.000***	0.000***	0.001***	-0.000***	0.001***	-0.000***	0.001***	0.000***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP Growth	0.133	-1.025*	0.759***	-0.985	0.485**	-0.504	0.551*	-2.143*	0.013	0.106
	(0.292)	(0.582)	(0.223)	(0.708)	(0.242)	(0.598)	(0.299)	(1.086)	(0.242)	(0.881)
Inflation	0.115	-0.041	0.064	0.029	0.130	0.158	0.099	0.233	0.109	-0.170
	(0.181)	(0.284)	(0.120)	(0.391)	(0.123)	(0.352)	(0.131)	(0.633)	(0.136)	(0.419)
FDI/GDP	0.207	-0.485*	-0.105	-0.324	0.049	-0.278	0.178*	-0.462	-0.104	0.055
	(0.252)	(0.287)	(0.218)	(0.263)	(0.076)	(0.228)	(0.099)	(0.387)	(0.100)	(0.386)
Export/GDP	-0.025	0.174***	-0.002	0.130**	-0.073***	0.081	-0.083***	0.212**	-0.026	0.071
	(0.024)	(0.034)	(0.018)	(0.056)	(0.042)	(0.050)	(0.056)	(0.091)	(0.050)	(0.056)
Year Fix Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Cons	-5.859	25.412***	2.191	35.531***	30.186***	50.515***	10.718	36.113***	13.521	39.863***
	(9.356)	(4.074)	(6.178)	(4.597)	(5.641)	(5.247)	(9.657)	(7.389)	(9.034)	(6.271)
N	217	231	220	234	220	234	110	117	110	117
adj. R^2	0.640	0.660	0.273	0.564	0.353	0.615	0.131	0.576	0.019	0.542

As for the different reasons that affect female account ownership, it is observed that borrowing as a whole tempts females to have an account. None of the reasons for borrowing causes the female to have an account as the values of coefficients are either insignificant or negative. As for the control variables, Inflation and FDI/GDP are insignificant while GDP per capita, GDP growth, and Export/GDP have mixed results.

Heterogeneity analysis

In our hypotheses 2 and 3, we argued that the remittance-female financial inclusion relationship should vary depending on socio-economic and regional heterogeneity. Now, we empirically explore the importance of socio-economic and regional heterogeneity for remittance-female financial inclusion relationship.

Socio-economic heterogeneity

We start by testing the nature of remittances-female financial inclusion relationship in high remittance receiving countries. The results of the coefficient are mentioned in Table 7. High-remittance receiving countries have a positive but insignificant coefficient. This suggests that females in high remittance receiving countries will opt for accounts at financial institutions. When remittances are high, they tend to complement formal access and usage channels, that consequently enhances female financial inclusion

How remittances-female financial inclusion relationship is in countries with a high female illiteracy level is tested. The value of the coefficient is negative and significant suggesting countries where female illiteracy is high, remittances and female financial inclusion relationship is negative. When remittances are received, the illiterate females are finding it difficult to opt for the financial services available. Similarly, the lack of familiarity with the best use of technology also impedes them in using the best way to channel the remittances. Therefore, variation in illiteracy level does play the part.

The tests result of the relationship between remittances and female financial inclusion in countries with high female employment vulnerability. According the results, countries with high female employment vulnerability, remittances-female financial inclusion is negative which suggests that even with the provision of finances in the form of remittances, when there is high vulnerability of employment, females tend to spend the money to fulfill their basic needs. Savings become almost impossible as fulfilling the basic needs is the ultimate objective. Therefore, variation in vulnerability of female employment opportunities matters.

The coefficient of remittances receiving countries with a higher number of bank branches is significant and positive suggesting in countries with greater penetration of commercial bank branches, remittances encourage females to avail financial services. The proximity along with remittances increases female financial inclusion. Higher the number of bank branches, the convenient will be for females to open their accounts for collection of remittances and for savings. Variation in depth of bank branches also holds true in remittances-female financial inclusion relationship.

Table 7
Socio-economic Heterogeneity Analysis

	Female account			
	(1)	(2)	(3)	(4)
Group of countries having higher remittances x Remittance	0.151			
	(0.124)			
Group of countries with a higher rate of female children out of school x Remittance		-0.736***		
		(0.182)		
Group of countries with a higher proportion of vulnerable female employment x Remittance			-0.893***	
			(0.145)	
Group of countries having higher commercial bank branches x Remittance				0.642***
				(0.125)
Remittance	2.051***	1.788**	2.160***	0.636
	(0.634)	(0.858)	(0.607)	(0.625)
GDP per Capita	1.096***	1.021***	0.921***	1.045***
	(0.101)	(0.139)	(0.087)	(0.082)
GDP Growth	-1.519***	-0.599	-0.662	-1.182**
	(0.513)	(0.664)	(0.512)	(0.476)
Inflation	-0.419*	-0.108	0.088	0.087
	(0.250)	(0.398)	(0.269)	(0.268)
FDI/GDP	-0.304**	-0.562	-0.242**	-0.202*
	(0.128)	(0.420)	(0.098)	(0.116)
Export/GDP	0.252***	0.348***	0.162***	0.223***
	(0.048)	(0.074)	(0.041)	(0.046)
Year Fix Effects	Y	Y	Y	Y
Cons	-14.817	-9.133	-6.794	6.376
	(13.773)	(17.381)	(12.711)	(12.813)
N	329	156	329	321
adj. R^2	0.646	0.718	0.677	0.668

Regional heterogeneity

Regional heterogeneity analysis results are summarized in Table 8. The countries in the region are those that are other than high income. According to the results, remittance-receiving East Asia and Pacific region, and Europe and Central Asian countries have significant and positive coefficients. The coefficients of other regions are insignificant but positive suggesting remittances in these regions also induce female financial inclusion. However, the highest value of the coefficient is of East Asia and the Pacific region which infers the strongest relationship with female financial inclusion. The regional heterogeneity

suggests that the remittances-female financial inclusion relationship does vary with region. The reasons for this variation can be varying level of financial development in these regions. East Asia and Pacific, and Europe and Central Asian regions are relatively financially developed than other regions. Regions with higher financial development are observed to have lesser financial institution gender discrimination. Therefore, remittances inflow induces females to go for financial services in these regions (Delis et al., 2022; Ezeibekwe, 2020; Muravyev et al., 2009).

Furthermore, counties with high income have a high-value coefficient too. The difference between the impact of remittances in high-income countries and other countries may be due to the factors that are specifically observable in less developed countries such as a female role in a household, higher marginal propensity to consume, low level of financial development etc.

Table 8
Regional Heterogeneity Analysis

	Female account
East Asia & Pacific (excluding high income) × Remittance	1.694***
	(0.645)
Europe & Central Asia (excluding high income) × Remittance	1.507**
	(0.678)
Latin America & Caribbean (excluding high income) × Remittance	1.009
	(0.667)
Middle East & North Africa (excluding high income） × Remittance	0.528
	(0.656)
South Asia × Remittance	1.082
	(0.757)
Sub-Saharan Africa (excluding high income) × Remittance	0.963
	(0.743)
High income × Remittance	2.384***
	(0.664)
GDP per Capita	0.656***
	(0.098)
GDP Growth	-1.396***
	(0.472)
Inflation	0.185
	(0.299)
FDI/GDP	-0.221**
	(0.101)
Export/GDP	0.102**
	(0.040)
Year Fix Effects	Y
Cons	5.537
	(14.446)
N	332
adj. R^2	0.693

Conclusion

Based on the data of Global Financial Index 2017, this study examines the relationship between international remittances inflows and female financial inclusion. It also investigates the effect of remittances on different reasons for saving and borrowing and their effect on female financial inclusion. Furthermore, socio-economic and regional heterogeneity analysis has also been done. The results suggest that remittances influence

females to opt for financial services. Robustness checks also validate the results. The mechanism analysis of saving and borrowing suggests remittances do influence females to save for old age. Saving for old age and for educational purposes are found primary determinants of female financial inclusion. The relationship between female borrowing and financial inclusion also turned out positive. Socio-economic factors such as high remittances, illiteracy, employment vulnerability, and bank branch penetration also seem to affect female financial inclusion. Remittances-female financial inclusion relationship was also found to be varying with the region and with the difference of income.

Thus, our main conclusion asserts the importance of remittances for enhancing female financial inclusion especially in developing countries. It is imperative to make efforts to encourage banks and other financial institutions to increase financial services in order to bank the unbanked women. As remittances provide both push and pull factors to females and financial institutions respectively, the comparative analysis of these factors would be interesting for future research.

References

Abdih, Y., Chami, R., Dagher, J., & Montiel, P. (2012). Remittances and institutions: Are remittances a curse? *World Development*, *40*(4), 657–666. https://doi.org/10.1016/J.WORLDDEV.2011.09.014

Adekunle, I. A., Tella, S. A., Subair, K., & Adegboyega, S. B. (2020). Remittances and financial development in Africa. *Journal of Public Affairs*. https://doi.org/10.1002/pa.2545

Aggarwal, R., Demirgüç-Kunt, A., & Soledad Martínez Pería, M. (2011). Do remittances promote financial development. *Journal of Development Economics*. https://doi.org/https://doi.org/10.1016/j.jdeveco.2010.10.005

Ahmed, F. Z. (2014). The perils of unearned foreign income: Aid, remittances, and government survival. *American Political Science Review*, *108*(2), 478. https://doi.org/10.1017/S0003055414000197

Ajefu, J. B., & Ogebe, J. O. (2019). Migrant remittances and financial inclusion among households in Nigeria. *Oxford Development Studies*, *47*(3), 319–335. https://doi.org/10.1080/13600818.2019.1575349

Ambrosius, C. (2012). Are Remittances a Substitute for Credit? Carrying the Financial Burden of Health Shocks in National and Transnational Households. *Working Paper*.

Ambrosius, C., & Cuecuecha, A. (2016). Remittances and the Use of Formal and Informal Financial Services. *World Development*, *77*, 80–98. https://doi.org/10.1016/j.worlddev.2015.08.010

Amuedo-Dorantes, C., Pozo, S., Oettinger, G., Trejo, S., Lucas, B., & Blank, R. (2006). Migration, Remittances, and Male and Female Employment Patterns. *American Economic Review*, *96*(2), 222–226. https://doi.org/10.1257/000282806777211946

Anzoategui, D., Demirgüç-Kunt, A., & Martínez Pería, M. S. (2014). Remittances and Financial Inclusion: Evidence from El Salvador. *World Development*, *54*, 338–349. https://doi.org/10.1016/j.worlddev.2013.10.006

Ashraf, N., Aycinena, D., Martínez, C. A., & Yang, D. (2014). Savings in Transnational Households: A Field Experiment among Migrants from El Salvador. *NBER Wroking Paper*. http://www.nber.org/papers/w20024

Asuming, P. O., Osei-Agyei, L. G., & Mohammed, J. I. (2019). Financial Inclusion in Sub-Saharan Africa: Recent Trends and Determinants. *Journal of African Business*, *20*(1), 112–134. https://doi.org/10.1080/15228916.2018.1484209

Aterido, R., Beck, T., & Iacovone, L. (2011). Gender and Finance in Sub-Saharan Africa Are Women Disadvantaged? The World Bank Africa Region Private and Financial Sector Development. http://econ.worldbank.org.

Bashir, S., Nawaz, A., & Nigar, S. (2022). Financial Inclusion Profile: Determinants, Barriers, And the Reasons for Saving and Borrowing in Pakistan. *International Journal of Asian Social Science 12*(10), 449–462. https://doi.org/10.55493/5007.v12i10.4622

Brown, M., Guin, B., & Kirschenmann, K. (2016). Microfinance Banks and Financial Inclusion. *Review of Finance*, *20*(3), 907–946. https://doi.org/10.1093/rof/rfv026

Cabeza-García, L., Del Brio, E. B., & Oscanoa-Victorio, M. L. (2019). Female financial inclusion and its impacts on inclusive economic development. *Women's Studies International Forum*, *77*. https://doi.org/10.1016/j.wsif.2019.102300

Chami, R., & C.F. (2013). Workers'remittances And Economic Development: Realities And Possibilities. *UNCTAD report.*

Cooray, A. (2012). Migrant remittances, financial sector development and the government ownership of banks: evidence from a group of non-OECD economies. *Research Online*. https://ro.uow.edu.au/commpapers

Delis, M. D., Hasan, I., Iosifidi, M., & Ongena, S. (2022). Gender, Credit, and Firm Outcomes. *Journal of Financial and Quantitative Analysis*, *57*(1), 359–389. https://doi.org/10.1017/S0022109020000897

Dodson, B., & Simelane, H. S. (2008). Gender, migration, and remittances in Southern Africa. *Southern African Migration Project.* Migration Policy Series no 9. Idasa.

Donou-Adonsou, F., Gyan, P., & Basnet, H. C. (2020). Remittance inflows and financial development: Evidence from the top recipient countries in Sub-Saharan Africa. *Applied Economics, Taylor and Francis Journals, vol 52(53), pages 5807-5820.* https://www.sciencedirect.com/science/article/abs/pii/S1062940818304868

Evans, & Evans O. (2017). The Effects of Economic and Financial Development on Financial Inclusion in Africa. *Review of Economic and Development Studies* (Vol. 17, Issue 1), pages 17-25.

Ezeibekwe, O. F. (2020). Financial Development in Developing Countries. *Global Economy Journal*, *20*(3), World Scientific Publishing Co., vol. 20(03), 1-38 https://doi.org/10.1142/S2194565920500165

Fletschner, D., & Kenney, L. (2014). Rural women's access to financial services: Credit, savings, and insurance. In *Gender in Agriculture: Closing the Knowledge Gap* (pp. 187–208). Springer Netherlands. https://doi.org/10.1007/978-94-017-8616-4_8

Fromentin, V. (2017). The long-run and short-run impacts of remittances on financial development in developing countries. *Quarterly Review of Economics and Finance* Elsevier, vol. 66(c), pages 192-201. https://doi.org/10.1016/j.qref.2017.02.006

Fromentin, V. (2018). Remittances and financial development in Latin America and the Caribbean countries: A dynamic approach. *Review of Development Economics*, *22*(2), 808–826. https://doi.org/10.1111/rode.12368

Gemechu Ayana, A., Mrtinez Peria, & Maria Soledad. (2014). *International Remittances and Financial Inclusion in Sub-Saharan Africa*. http://econ.worldbank.org.

GFI. (2018). Global Financial Development Report 2017/2018. Global Financial Development Report 2017/2018: Bankers without Borders. Washington, DC. https://doi.org/10.1596/978-1-4648-1148-7

Ghosh, S., & Vinod, D. (2017). What Constrains Financial Inclusion for Women? Evidence from Indian Micro data. *World Development*, *92*, 60–81. https://doi.org/10.1016/j.worlddev.2016.11.011

Girón, A., Kazemikhasragh, A., Cicchiello, A. F., & Panetti, E. (2021). Financial Inclusion Measurement in the Least Developed Countries in Asia and Africa. *Journal of the*

Knowledge Economy, Springer, vol. 13(2), pages 1198-1211. https://doi.org/10.1007/S13132-021-00773-2/TABLES/3

Inoue, T. (2019). Financial inclusion and poverty reduction in India. *Journal of Financial Economic Policy*, *11*(1), 21–33. https://doi.org/10.1108/JFEP-01-2018-0012

Issabayev, M., Saydaliyev, H., Avsar, V., & Chin, L. E. E. (2020). Remittances, Institutions And Financial Inclusion: New Evidence Of Non-LinearitY. *Global Economy Journal*, *20*(1), pages 1-19. https://doi.org/10.1142/S2194565920500025

Klapper, L., El-Zoghbi, M., & Hess, J. (2016). *Achieving the Sustainable Development Goals The Role of Financial Inclusion*. CGAP, UNSGSA. www.cgap.org

Kokorović Jukan, M., Okičić, J., & Hopić, D. (2020). Remittances as an opportunity to increase savings and financial inclusion of youth in South East Europe. *Economic Research-Ekonomska Istrazivanja* , *33*(1), 2606–2619. https://doi.org/10.1080/1331677X.2020.1749104

Kristin, G. (2013). Remittances, expenditure patterns, and gender: parametric and semiparametric evidence from Ecuador. *IZA Journal of Migration*, *2*(1), pages 1-19.

Li, J. J., Juan, C.S., Salinas, C., Ramírez, T., Hoyo, C., & Serrano, C. (2014). Do remittances foster financial inclusion in Mexico? *Financial Inclusion Economic Watch*. *BBVA Research*. http://www.inegi.org.mx/est/contenidos/Proyectos/encuestas/hogares/especiales/enif/enif2012/default.aspx.

Morsy, H. (2020). Access to finance – Mind the gender gap. *Quarterly Review of Economics and Finance*, *78*, 12–21. https://doi.org/10.1016/j.qref.2020.02.005

Mukit, M. ., & Islam, N. (2016). Relationship between Remittance and Credit Disbursement of the Banking Sector: A Study from Bangladesh. *Journal of Business and Management Research*, *1*(1), 39–52.

Muravyev, A., Talavera, O., & Schäfer, D. (2009). Entrepreneurs' gender and financial constraints: Evidence from international data. *Journal of Comparative Economics*, *37*(2), 270–286. https://doi.org/10.1016/j.jce.2008.12.001

Orozco, M. (2006). The Gender Dimensions of International Migration. *UN,* Preliminary notes about senders and recipients in Latin America and the Caribbean.

Riley, E. (2018). Mobile money and risk sharing against village shocks. *Journal of Development Economics*, *135*, 43–58. https://doi.org/10.1016/J.JDEVECO.2018.06.015

Sha'ban, M., Girardone, C., & Sarkisyan, A. (2020). Cross-country variation in financial inclusion: a global perspective. *European Journal of Finance*, *26*(4–5), 319–340. https://doi.org/10.1080/1351847X.2019.1686709

Sofie, A., & Asa, D. (2010). Migration, remittances and the women left behind. L*innaeus University Institution of Social Sciences.*

Ullah, A. K. M. A. (2013). Exposure to Remittances: Theoretical and Empirical Implications for Gender. *Journal of International Migration and Integration*, *14*(3), 475–492. https://doi.org/10.1007/s12134-012-0250-8

UNCDF. (2020). Sustainable Development Goals. *UNCDF* . https://www.uncdf.org/financial-inclusion-and-the-sdgs?ref=hackernoon.com

Wellalage, N. H., & Locke, S. (2020). Remittance and financial inclusion in refugee migrants: inverse probability of treatment weighting using the propensity score. *Applied Economics*, *52*(9), 929–950. https://doi.org/10.1080/00036846.2019.1646876

World Bank. (2021). World Development Indicators. *World Bank.* https://databank.worldbank.org/home.aspx

Xu, X. (2020). Trust and financial inclusion: A cross-country study. *Finance Research Letters*, *Elsevier,* vol 35(c). https://doi.org/10.1016/j.frl.2019.101310

Yamada, E., Sioson, E. P., Murakami, E., & Murata, A. (2017). *No Woman Left Excluded from Financial Services*. Brookings Institution Press, Washington, D.C. https://www.jstor.org/stable/10.7864/j.ctvkjb38h

Zulfiqar, K., Aslam, M., & Aslam, A. (2016). Financial Inclusion And Its Implications For Inclusive Growth In Pakistan. *Pakistan Economic and Social Review*, *54*(2), 297–325.