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Does economic policy uncertainty influences personal remittances: Evidences from AARDL and NARDL

Md. Qamruzzaman *

School of Business and Economics, United International University, Dhaka-121, Bangladesh.

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Abstract

The purpose of this research is to investigate the impact of economic policy uncertainty (EPU) and financial inclusion (FI) on remittances in India and China over the 15-year period beginning in the first quarter of 2003 and ending in the fourth quarter of 2019 using augmented ARDL, non-augmented ARDL, and the fourier causality test. The results of stationary tests demonstrate that variables are integrated in a non-linear fashion, indicating that variables become stationary at a level or after the first difference. The long-run connection in the empirical equation was established by the use of combined cointegration and the AARDL test. When looking at the long-run coefficients of EPU and FI, it was shown that there is a positive and statistically significant correlation between remittances inflows and the economy. An asymmetry connection between EPU, FI, and remittances was shown to exist in both the long-run and the short-run when using nonlinear estimates. The causality test also demonstrates that there are directional effects accessible between FDI, GLO, and remittances; however, the direction of these impacts varies depending on the economy. A robustness test was conducted in the research using dynamic OLS, completely modified OLS, and CCR regression.

Keywords: Remittances; Economic Policy Uncertainty; Financial Inclusion; Augmented ARDL; Fourier Causality test

1. Introduction

Remittances are the funds that migrant workers send back to their home countries. Many families in low-income countries depend largely on them for assistance. With financial inclusion, remittance services and other benefits to migrants and their families may be enhanced. There is evidence to show that financial inclusion may increase remittances. This is due to the fact that ubiquitous access to financial services may promote quicker, less expensive, and more comfortable foreign monetary transactions. Moreover, financial inclusion may improve remittance management, making it easier for migrants to save for the future. Financial inclusion influences remittances in two ways: the amount sent and the economic development of the households who receive it. Financial inclusion may amplify the positive effects of remittances on poverty reduction and economic growth. Inclusive finance may also help to a more united community by promoting dialogue between immigrant communities and their home countries.

Remittances are a significant source of cash for many developing countries, but economic policy uncertainty may have a detrimental impact on them (EPU). If people are concerned about their home country's economy, they may be less eager to transfer money there. Here is one method EPU may potentially minimize remittances. This might have a negative impact on the economy of the destination country and the financial security of its citizens. There is evidence that EPU lowers the amount of money sent home to loved ones. Economists at the World Bank discovered that remittances decreased by 0.6% for every percentage point increase in EPU. Under periods of high uncertainty, EPU was associated with a 3.5% decline in remittances, according to another study. It is predicted that the impact of EPU on remittances would vary among countries and over time based on their specific economic conditions and the amount of

* Corresponding author: Qamruzzaman ORCID: 0000-0002-0854-2600

uncertainty. There is no question, however, that EPU may have a significant impact on this vital source of money for several impoverished countries.

Remittances are the funds sent home by migrant workers to their families. In recent decades, these transfers have been increasingly prevalent, and they are often utilized to enhance nutritional consumption, pay basic living expenditures, and support medical care and educational possibilities. In addition, it has been shown that remittances relieve poverty in low- and middle-income nations. Foreign direct investment, tourism, portfolio stocks, and commodity exports are examples of conventional external income sources, although inflows from migrants have increased and emerged as more reliable sources of foreign currency and money flows in the economy during the last several decades. In 2011, a projected \$351 billion was provided to impoverished nations, an 8% increase over the \$325 billion sent in 2010. It was anticipated that international remittances to all nations, even those with robust economies, would total \$483 billion in that year. The World Bank expects that India would receive a total of \$58 billion in remittances in 2011, second only to China (\$57 billion) and ahead of Mexico (\$24 billion) and the Philippines (\$23 billion). In 2011, India received 58 billion dollars in remittances, up to 13 billion dollars in 2000. In 2010, three percent of India's GDP came from inbound cash. Delpierre and Verheyden (1) familiarized an endogenous remittance model and revealed that the amount of uncertainty partially determines a migrant's proclivity to remit. The study postulated that Uncertainty in the home country might drive remittances in a variety of ways. Increased economic insecurity may indicate a high risk for migrants' investments, thus reducing remittances. On the other hand, uncertainty may create a perilous economic future for migrant families, increasing remittances consistent with altruistic conduct. Existing literature focused on remittances has produced two lines of research direction. First, a growing number of researchers have investigated the role of remittances in the economy by taking micro and macro aspects both see (2-10), while another line of findings has revealed the critical deterrents for increases and decrease of foreign remittances in the economy (11-14). Refers to macro determinants for remittances inflows in the economy, several factors have emerged, but with the change of the country's macrostructure, the role of macro deterrents differ accordingly (15). However, the new era regarding the nexus between uncertainty, especially economic policy uncertainty, and remittances have yet to investigate comprehensively. The motivation of this study is to explore fresh insight through assessing the migrant's remittances inflows in the Indian economy with the effects of economic policy uncertainty (EPU, hereafter).

The remaining structure of the paper is as follows: section II deals with theoretical development, literature survey, and hypothesis development. The description of research variables and econometrical tools exhibits in Section III: empirical model estimation and interpretation report in Section IV. Discussion of the study outcome available in Section V and summary findings and policy implications reports are in section VI.

2. Literature survey

The movement of people across national borders has been fundamental to understanding geographical and chronological divergences in national economic growth, technological development, and global integration. Migrants remittances transfer critically rely on the host and home economic macro-fundamental behavior; in particular, exchange rate limitations and black-market premiums in the home nation may discourage remittances and transfer remittances from the formal to informal sectors (16). Moreover, a high inflation rate or real exchange rate hyperinflation may similarly impact migrant's transfer behavior (17).

2.1. Uncertainties and remittances

Economic policy uncertainty (EPU) can have a significant impact on remittances, which are an important source of income for many developing countries. EPU can lead to lower levels of remittances, as people are less likely to send money home if they are uncertain about the economic conditions in their country of origin. This can have a negative impact on the economy of the receiving country, as well as on the welfare of individuals and families who rely on remittances for their livelihood. There is evidence that EPU has a negative effect on remittances. A study by World Bank economists found that a 1% increase in EPU was associated with a 0.6% decrease in remittances. Another study found that EPU was associated with a 3.5% decline in remittances during periods of high uncertainty. The impacts of EPU on remittances are likely to vary across countries and over time, depending on the specific economic conditions and the degree of uncertainty. However, it is clear that EPU can have a significant impact on this important source of income for many developing countries

Uncertainties in either form, including exchange rate volatility, hyperinflation, financial volatility, and political instability, among others, have an adverse effect on aggregated economic performance (18). The adverse linkage between macro-fundamental volatility and economic growth have been established in empirical literature such as investment (19), employment generation (20), industrial output (21), economic growth (22), financial market performance (23),

and so on. According to existing literature, the above-mentioned macro fundamentals have interlinkage with foreign remittances transfer behavior in the long and short run. The study of Elbadawi and Rocha (24) revealed that interest rate volatility provokes migrants in decreasing remittances transfer and thus creates consumption instability among remittances recipients and adversely impacting overall economic growth. Furthermore, Ozturk and Sheng (25) established that a higher degree of inflation creates discomfort in economic activities and exposes the negative impacts of migrants remittances transfer in the home economy. Mandelman (26) investigated the impact of monetary and exchange rate policy on remittances fluctuation in the Philippines from 1995 to 2009. Under the concept of the open economy. The study documented that a nominal fixed exchange rate system helps families who receive a rising trend of remittances avoid fast appreciation of their currency and work better.

Macroeconomic instability, i.e., high inflation, promotes migration, which boosts foreign remittances. At the same time, other research shows that price instability reduces foreign remittances (Macroeconomic instability, i.e., high inflation promotes migration, which boosts foreign remittances, while other research shows that price instability reduces foreign remittances (27). A change in the actual exchange rate also hurts remittances, whereas devaluation of the local currency increases remittances; it may also decrease immigrants' trust in their home country (28). Remittances may also be blocked by limitations on exchange rates and black market charges in the nation of origin. Foreign remittances are inversely related to political instability, nations with unclear economic policies (29). On the other hand, for democrats in the nation, democracy encourages remittances since migrants transfer more deposits to invest in the place of origin. Political risk refers to a country's internal disputes, which are a proxy for political violence and are negatively associated with internal conflict and remittances transfer and prevent capital accumulation for investment (30).

Policy uncertainty also impedes technical progress in energy-related sectors. For example, electricity generation is a method that utilizes industrial waste heat to generate power. While it is technically and economically viable, one of the barriers to widespread adoption is the uncertainty surrounding authorization from public service and regulatory commissions(31).

2.2. Financial inclusion and remittances

Remittances are transfers of money from migrant workers to their home countries. They are an important source of income for many households in developing countries. Financial inclusion can help to increase the reach and efficiency of remittance services, and also provide other benefits to migrants and their families. There is evidence that financial inclusion can increase the amount of money that is sent home as remittances. This is because inclusive financial services can help to reduce the costs of sending money, and also increase the speed and convenience of transfers. In addition, financial inclusion can help to improve the financial management of remittances, making it easier for migrants to save and invest their income. The impact of financial inclusion on remittances can be seen in terms of both the amount of money transferred and the economic development of recipient households. Remittances contribute to poverty reduction and economic growth, and financial inclusion can help to maximize these positive effects. Inclusive finance can also promote social cohesion by helping migrant communities to connect with each other and with their home countries.

The role of remittances on economic fundamentals such as poverty alleviation(32), reduction of inequality(33), financial development(34-37), capital formation (38), employment(39), financial openness (40) and economic growth, household consumption(41) among other. Another line of empirical studies focusing on financial inclusion impacts poverty and inequality(42). financial development(43), economic growth(44), capital accumulation(45), among others. According to existing literature, it is evident that financial inclusion and remittances are the critical factors of sustainable economic performance, and their interlinkage needs to be investigated.

It is widely acknowledged that financial inclusion has piqued the attention of policymakers, academics, and other stakeholders. The increased attention reflects a growing appreciation for the critical role of financial inclusion in economic and social development. It reflects a growing awareness that financial inclusion is essential for eliminating extreme poverty, increasing shared prosperity, and promoting inclusive and sustainable development. The nexus between remittances and financial inclusion, according to existing literature(46), very scanty evidence have available focusing on financial inclusion impact of remittances behavior. However, a growing number of researchers have investigated the hypothesis that remittances induce financial inclusion in the financial system by taking time-series data (4, 47, 48) and panel data set(49-54).

The remittance's impacts on financial inclusion have been established in the literature under two propositions. First, remittances encourage and enable households to get financial services and products benefits which financial institutions offer. Second, remittances increase savings propensity among households for future consumption, implying

the market demand for innovative financial products and services. Ambrosius and Cuecuecha (55) investigated the impact of remittances on formal and informal financial services in Mexico by utilizing household survey data. The study documented the positive and statistically significant effects of remittances on ownership of savings accounts, credit extension, and borrowing. With household-level survey data of El Salvador, Anzoategui, Demirgüç-Kunt (4) revealed positive and statistically linkage between remittances and financial inclusion through financial services and products innovation.

3. Variables and methodology of the study

3.1. Model specification

The empirical model for the study has developed by following empirical studies of Delpierre and Verheyden (1) and Mawusi (56), where remittances are treated as the function of economic policy uncertainty and financial inclusion.

$$Rem_i = \alpha_0 + \beta_1 \overline{EPU}_i + \beta_1 \overline{FI}_i + \beta_2 \overline{X}_i + \epsilon_{it} \dots \dots (1)$$

Where *Rem* denotes remittances, *EPU* specify the proxies of economic uncertainty, *FI* stands for financial inclusion, and *X* for a list of control variables which include trade openness and exchange rate, and the white noise can be detected with ϵ_{it} .

3.2. Variables and descriptive statistics

3.2.1. Economic policy uncertainty

EPU is a subject that continues to pique academics' attention due to its significant association with both micro and macro-economic aspects. Numerous studies have been conducted on the impact of policy uncertainty on economic growth, investment, employment, and productivity. Literature suggested that high uncertainty causes firms to postpone investment decisions because reversing investment projects is costly (57), households reduce saving in uncertain times (18), increasing financial constraints for firms as the cost of finance increases (58), investors always seek compensation for taking on high risk (59). Economic uncertainty encompasses policy changes such as fiscal, monetary, tax, and regulatory and pure economic shocks. Economic uncertainty associated with the policy, referring to ambiguity regarding economic policy, may usually result in the economy losing millions of jobs, delaying economic recovery, or collapsing stock markets. Policymakers are primarily responsible for high levels of economic uncertainty; governments are often unwilling or unable to alter economic policies.

As independent variable that is the economic policy uncertainty study considered three different uncertainty measures such as World uncertainty index, which is constructed by Ahir, Bloom (60), the economic policy uncertainty index for India, and the Global economic policy uncertainty developed by Baker, Bloom (18), (61-65).

3.2.2. Financial inclusion

According to existing literature, the measurement of financial inclusion in empirical assessment has revealed two lines of consideration is a group of researchers employed single proxies, and another group of researchers considers financial inclusion index with multiple proxies(66-69). By following Sarma (70), the study measured financial inclusion by constructing an index with the three aspects in financial inclusion such as accessibility, availability, and financial service usages (see table for details proxies).

The study implemented Principal Component Analysis (PCA) widely utilized, e.g., Qamruzzaman, Tayachi (71), Jia, Mehta (72). The application of PCA is an effective and simple tool in reducing dimensions but retaining the properties of the original data set. The following formula (2) has been implemented for index development:

$$FII = \sum W_i FI_{it} \dots \dots (2)$$

Where *FII* denotes the financial inclusion index, *W_i* for principal component weight, *FI_{it}* for financial inclusion value at *t* period. The results of PCA for variables selection with eigenvalue displays in Table 1 and factors for index construction reports in

Table 2 along with coefficient score matrix among them.

Table 1 Results of PCA for financial inclusion index

Principal Components	Eigenvalue	Cumulative (%)	Eigenvalue	Cumulative (%)
	India		China	
Components - 1	1.9452	0.5942	1.7812	0.7515
Components - 2	0.9845	0.7925	0.8641	0.8451
Components - 3	0.8452	0.8944	0.5125	0.9531
Components - 4	0.7954	1.000	0.4481	1.0000

Table 2 Results of Components score coefficient matrix

Financial inclusion index proxies	Factor score coefficient	
	India	China
Number of automated tell machines (ATMs) per 100,000 adults	0.6845	0.5548
Number of commercial bank branches per 100,000 adults	0.4533	0.4591
Number of depositors from commercial banks per 1000 adults	0.5214	0.4655
Number of borrowers from commercial banks per 1000 adults	0.4112	0.3512

Apart from the primary target variable, the study has considered two control variables: trade openness measured by the sum of total import and export as a % of GDP and exchange rate measured by the local currency in terms of USD, respectively. All the data were exported from the world development indicator (WDI) published by the World Bank (73) except the proxy measure of policy uncertainty. Variables are transformed into natural logarithms for mitigating seasonality issues. Table 3 display the variables definition and sources of data.

Table 3 Variables definition and data sources

Variables	Notation	Definition	Data sources
Remittances	<i>Rim</i>	Personal remittances received to GDP (%)	WDI
Economic policy uncertainty	EPU		Policy uncertainty index
Financial inclusion index (FII) Authors' construction with the following fours proxies			
<i>Number of automated tell machines (ATMs) per 100,000 adults</i>			WDI
<i>Number of commercial bank branches per 100,000 adults</i>			WDI
<i>Number of depositors from commercial banks per 1000 adults</i>			WDI
<i>Number of borrowers from commercial banks per 1000 adults</i>			WDI
Trade openness	TO		WDI
Exchange rate	EX		WDI

Note: WDI for World development Indicators

3.2.3. Estimation strategy

Unit root test

In empirical model estimation considering time series data, the variables properties assessments are critically essential for selecting the appropriate strategies of evaluating the nexus between dependent and explanatory variables (74). The study applied several unit root tests for evaluating the variables stationarity properties, such as the ADF test (75), P=P test (76), DF-GLS test (77), KPSS test (78) and Z-A test (79) for one structural break in the research unit.

Zivot and Andrew unit root test

The limitation with traditional unit root tests such as ADF, DF-GLS, and PP tests is that they do not account for the potential of a structural break. Phillips and Perron (76) demonstrated that when the stationary alternative is valid, and a structural break is disregarded, the ability to reject a unit root diminishes when the timing of the break is assumed to be an external event. Zivot and Andrews (79) offer a variant of Phillips and Perron (80) original test in which the precise timing of the break-point is uncertain. Zivot and Andrews (79) test for a unit root using three models: (1) model A, allowing a one-time change in the series level. Model B, which allows for a one-time change in the slope of the trend function. Furthermore, model C allows for a combination of one-time changes in the level and slope of the trend function of the series.

$$\Delta y_t = C + \alpha y_{t-1} \beta_t + \gamma DU_t + \sum_{j=1}^k d_j \Delta y_{t-j} + \varepsilon_t : A \dots \dots (8)$$

$$\Delta y_t = C + \alpha y_{t-1} \beta_t + \mu DT_t + \sum_{j=1}^k d_j \Delta y_{t-j} + \varepsilon_t : B \dots \dots (9)$$

$$\Delta y_t = C + \alpha y_{t-1} \beta_t + \gamma DU_t + \mu DT_t + \sum_{j=1}^k d_j \Delta y_{t-j} + \varepsilon_t : C \dots \dots (10)$$

3.2.4. Bayer-Combined cointegration test

The study implemented the cointegration test by following the framework proposed by Bayer and Hanck (81), commonly known as the combined cointegration test. The proposed cointegration test consists of four conventional tests of cointegration familiarized by Banerjee, Dolado (82), Peter Boswijk (83), Johansen (84), and Engle and Granger (85) with the null hypothesis of a no-cointegration test, the following Fishers' equation is considered in deriving the test statistics for detecting long-run association.

$$EG - JOH = -2[LN(PEG) + LN(PJOH)]$$

$$EG - JOH - BO - BD = -2[LN(PEG) - \ln(PJPH) + \ln(PBO) + \ln(PBDM)]$$

Where PBDM, PBO, PJOH, and PEG stands for the significance levels of Banerjee et al. (1998), Boswijk (1995), Johansen (1991), and Engle and Granger (1987), respectively.

3.2.5. Autoregressive disoriented Lagged (ARDL) and Augmented -ARDL

The long-run association in empirical literature has been implemented with several conventional cointegration tests such as Engle and Granger (86), Johansen (87), Johansen-Juselius (88); the proposed cointegration test demands research variables unique order of integration, suggesting that the mixed order of integration that is I(0) or I(1) is not applicable. The prevail limitation in conventional cointegration test, in the process of mitigating the problem Pesaran, Shin (89) has familiarized cointegration test with mixed order of variables integration which is commonly known as Autoregressive distributed lagged (ARDL). Since then, the ARDL approach has been extensively used in investigating long-run association in empirical studies (90-93). ARDL estimation possesses certain benefits over traditional cointegration tests, including (1) efficient estimation regardless of the study's sample size (94). (2) capable of handling mixed-order variable integration, and model stability and efficiency can obtain by selecting appropriate lagged specifications (89). (3) unbiased estimation for both long-run and short-run elasticity Banerjee, Dolado (95).

Following Pesaran, Shin (89), the generalized ADRL model for the study was considered for detecting both long-run and short-run coefficients by performing the following equation.

$$\Delta \ln Rem_t = \alpha_0 + \phi_1 DMU_t + \sum_{i=1}^n \mu_1 \Delta \ln Rem_{t-i} + \sum_{i=0}^n \mu_2 \Delta \ln EPU_{t-i} + \sum_{i=0}^n \mu_3 \Delta \ln FI_{t-i} + \sum_{i=0}^n \mu_4 \Delta \ln TO_t + \sum_{i=0}^n \mu_5 \Delta \ln EX_{t-i} + \gamma_1 \ln Rem_{t-1} + \gamma_2 \ln EPU_{t-1} + \gamma_3 \ln FI_{t-1} + \gamma_4 \ln TO_{t-1} + \gamma_5 \ln EX_{t-1} + \omega_{1t} \dots \dots (11)$$

Where Δ indicates differencing of variables, while ε_t is the error term (white noise), and $(t-1)$ is for the lagged period, γ_1 is the long-run coefficient. Based on linear ARDL 11, the long-run coefficient to be available from γ_1 to γ_4 and short-run coefficients to be obtained from μ_1 to μ_5 from each empirical model estimation. Long-run association between variables to be tested following the F-test (89) and the t-test on the lagged level of the dependent variable as suggested by and another additional F-test on the lagged levels of the independent variable(s) as suggested by McNown, Sam (96).

Table 4 The null hypotheses for all three tests are defined as follows

Cointegration test	Null hypothesis	Alternative hypothesis
F-bound test	$\gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0$	Any, $\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5, \neq 0$
a t-test on lagged dependent variable	$\gamma_1 = 0$	$\gamma_1 \neq 0$
F-test on the lagged independent variable	$\gamma_2 = \gamma_3 = \gamma_4 = \gamma_5 = 0$	Any, $\gamma_2, \gamma_3, \gamma_4, \gamma_5, \neq 0$

Pesaran, Shin (89) and Sam, McNown (97) presented two sets of asymptotic critical values, one for I(1) regressors and another for I(0) regressors. If the F-test statistic's value was less than the lower bound critical value or the t-test statistic's absolute value was less than the absolute lower bound critical value, the null hypothesis "no long-run connection" could not be rejected. This indicated that there was no long-run connection between the variables. By contrast, if the F-test statistic's value exceeded the upper limit critical value or the t-test statistic's absolute value exceeded the upper bound critical value, the null hypothesis may be rejected. This indicated the existence of long-run connections between the variables. Finally, if the test statistic's value was neither less than nor higher than the two critical values, indicating that the value lay between the two critical values, the conclusion about the long-run associations between the variables was ambiguous.

To capture the short-run dynamics, the study implemented the following equation with error correction terms.

$$\Delta \ln REM_t = \alpha_2 + \sum_{i=1}^n \beta_1 \Delta \ln REM_{t-i} + \sum_{i=0}^n \beta_2 \Delta \ln EPU_{t-i} + \sum_{i=0}^n \beta_3 \Delta \ln FI + \sum_{i=0}^n \beta_6 \Delta \ln TO_t + \sum_{i=0}^n \beta_7 \Delta \ln ER_{t-i} + \rho ECT_{t-1} + \omega_{1t} \dots (12)$$

We used a variety of diagnostic tests. First, we used the Harvey test to see whether the residuals of the enhanced ARDL model were heteroscedastic. Second, we used the Breusch-Godfrey Serial Correlation LM test to see whether the residuals were serially correlated. Third, as a model specification test, we utilized the Ramsey RESET test. Fourth, we used the Jarque-Bera normality test to determine the normality of the model residuals. Finally, we checked for model stability using the cumulative sum (CUSUM) and CUSUM of square tests.

3.2.6. Asymmetric ARDL estimation

The study considered a nonlinear framework following Shin, Yu (98) in empirical assessment for detecting the asymmetric impact of economic policy uncertainty and financial inclusion on remittances. For gauging the asymmetric effects for EPU and FI on Rem, the following generalized equation is to be implemented:

$$REM_t = (\beta^+ EPU_{1,t}^+ + \beta^- EPU_{1,t}^-) + (\gamma^+ FI_{1,t}^+ + \gamma^- FI_{1,t}^-) + \delta_i X_t + \varepsilon_t \dots \dots (13)$$

Where $\beta^+, \beta^-,$ and γ^+, γ^- stands for the long-run pavements. The coefficient of β^+ and β^- specifies the effect of positive and negative shocks in EPU and γ^+ and γ^- denotes the asymmetric effects of FI on RE. Furthermore, the coefficients of δ_i measures the effects of control variables in the equation.

The asymmetric shock of EPU, i.e., $EPU^+; EPU^-$ and financial inclusion, i.e., $FI^+; FI^-$ can be derived in the following manner.

$$\begin{cases} POS(EPU)_{1,t} = \sum_{k=1}^t \ln EPU_k^+ = \sum_{K=1}^T MAX(\Delta \ln EPU_k, 0) & POS(FI)_{1,t} = \sum_{k=1}^t \ln FI_k^+ = \sum_{K=1}^T MAX(\Delta \ln FI_k, 0) \\ : & : \\ NEG(EPU)_t = \sum_{k=1}^t \ln EPU_k^- = \sum_{K=1}^T MIN(\Delta \ln EPU_k, 0) & NEG(FI)_t = \sum_{k=1}^t \ln FI_k^- = \sum_{K=1}^T MIN(\Delta \ln FI_k, 0) \end{cases}$$

Now, the equation (), transformed into asymmetric long-run and short-run coefficient assessment as follows:

$$\begin{aligned} \Delta REM_t = & \partial U_{t-1} + (\beta^+ EPU_{1,t-1}^+ + \beta^- EPU_{1,t-1}^-) + (\gamma^+ FI_{1,t-1}^+ + \gamma^- FI_{1,t-1}^-) + \delta X_{1,t-1}^* + \sum_{j=1}^{m-1} \lambda_j \Delta REM_{t-j} \\ & + \sum_{j=1}^{n-1} (\pi^+ \Delta EPU_{1,t-1}^+ + \pi^- \Delta EPU_{1,t-1}^-) + \sum_{j=0}^{m-1} (\beta^+ \Delta FI_{1,t-1}^+ + \beta^- \Delta FI_{1,t-1}^-) + \sum_{j=0}^{m-1} \mu \Delta X_{1,t-1}^* \\ & + \varepsilon_t \dots \dots \dots (14) \end{aligned}$$

For detecting long-run and short-run asymmetry, a standard Wald test is to be implemented with a null symmetry hypothesis. Only the insignificant test statistics will confirm the asymmetric association both in the long-run and short-run. Furthermore, the asymmetric long-run cointegration to be assessed by following F-bound testing, Joint Primality test and tBDM test, the higher the test statistics relative to critical value will confirm asymmetric cointegration in the empirical model.

The error correction term of the above equation is as follows

$$\Delta REM_t = \partial e_{t-1} + \sum_{j=1}^{m-1} \lambda_j \Delta REM_{t-j_0} + \sum_{j=1}^{n-1} (\pi^+ \Delta EPU_{1,t-1}^+ + \pi^- \Delta EPU_{1,t-1}^-) + \sum_{j=0}^{m-1} (\beta^+ \Delta FI_{1,t-1}^+ + \beta^- \Delta FI_{1,t-1}^-) + \sum_{j=0}^{m-1} \mu \Delta X_{1,t-1}^* + \varepsilon_t \dots \dots \dots (15)$$

4. Results

Prior target model implementation, i.e., variables properties detection, is critical because appropriate econometrical tools selection immensely relies on the research unit's integration order. Therefore, the test of stationary has been extensively utilized and reveals variables' order of integration. In this study, both conventional and advanced unit root tests were applied with structural break such as ADF test (75), P-P test (76), GF-DLS test (77), KPSS test (78), Ng-Perrot unit root test (99) and for unknown structural break unit root test, study considered Zivot and Andrews (79) unit root test, see Table 5 for test statistics. Refers to the test statistics of conventional unit root tests, study established all the variables are exposed to stationary after first difference, however, in some instance variables are exposed order of integration at a level. This suggesting variables are in mixed order integration but neither variables reveals integration after 2nd difference which is desirable for empirical assessment with time series data.

The unit root test results (see Panel -B) following Ng and Perron (99) revealed that all the test statistics, i.e., MZa, MZt, MSB, and MPT, are statistically significant at a 1% level of significance after the first difference. The verdict of stationary properties is valid for all sample countries' estimations. Furthermore, the next study performed a unit root test with unknown structural break by following Zivot and Andrews (79), and the unit root test results reported in Table 5 (Panel-C). According to test statistics, all the variables are established stationary after the first difference with one structural break. The study reveals the variables of Rem exposed structural break (lag) in 2009Q2 (2), the variables of EPU exposed structural break (lag) in 2013Q1 (1), the variables of FD exposed structural break (lag) in 2007Q4 (1), the variables of TO exposed structural break (lag) in 2016Q2 (2), and ER exposed structural break (lag) in 2015Q2 (3), respectively.

Next, the study evaluated the long-run association between economic policy uncertainty and remittances inflows in India by utilizing the novel combined cointegration test offered by Bayer and Hanck (81). The test statistics of cointegration test displays in Table 6, including two sets of output representing test statistics for EG-JOH and EG-JOH-BO-BDM following Engle and Granger (85), Johansen (84), Peter Boswijk (83) and Banerjee, Dolado (82), respectively. All the test statistics are detected statistically significant at a 5% level; the test statistics are higher than the critical value proposed for the null hypothesis. So, a long-run association between economic policy uncertainty and migrants remittances inflows, financial inclusion, exchange rate, and trade openness is established. It is valid for both economies, i.e., India and China. Now we proceed to investigate symmetric and asymmetric magnitudes in long-run and short-run horizon

Table 5 Results of Unit root test

Panel A: conventional Unit root test								
	At level				First difference			
	ADF	GF-GLS	PP	KPSS	ADF	GF-DLS	PP	KPSS
For India								
Rem	-2.005	-2.639	-0.311	0.9750	-6.002	-3.578	-5.515	0.0760
EPU	-1.974	-0.601	-0.102	0.6950	-7.695	-2.435	-3.439	0.0830
F1	-2.051	-1.645	-1.009	0.9160	-6.763	-2.31	-4.115	0.0750
TO	-1.371	-2.373	-0.761	0.6950	-7.945	-3.696	-4.347	0.1250
ER								
For China								
Rem	-1.3427	-0.4898	-2.2416	0.6368***	-7.4908***	-7.8788***	-8.9647***	0.019
EPU	-1.1351	-2.0874	-0.321	0.5977***	-5.5405***	-6.4126***	-7.0789***	0.0215
F1	-1.742	-2.1832	-1.1924	0.7767***	-8.3104***	-8.0458***	-6.2046***	0.0206
TO	-0.3129	-0.9547	-1.85	0.7137***	-9.5462***	-6.4729***	-7.2046***	0.0195
ER	-1.085	-1.6632	-2.3592	0.9194***	-9.1149***	-9.4915***	-5.8366***	0.0192
Panel -B: Ng-Perron Unit root test								
	MZa	MZt	MSB	MPT	MZa	MZt	MSB	MPT
For India								
Rem	-1.892	-1.1296	0.2555	8.0606		-23.128	-5.324	0.1319
EPU	-1.9558	-1.2968	0.2368	7.4544		-24.323	-5.5196	0.1369
F1	-2.2564	-1.6646	0.3009	7.8265		-19.954	-3.8015	0.1556
TO	-2.2581	-1.7094	0.3181	7.1307		-18.165	-4.9512	0.1285
ER	-2.2055	-1.6858	0.3133	7.8595		-17.718	-5.4007	0.1537
For china								
Rem	-1.1859	-0.3407	-2.4914	0.749***		-7.4908***	-7.8788***	-8.9647***
EPU	-2.3601	-1.0012	-1.7388	0.9035***		-5.5405***	-6.4126***	-7.0789***
F1	-1.477	-0.363	-1.2298	0.6481***		-8.3104***	-8.0458***	-6.2046***
TO	-2.2293	-2.4447	-2.2187	0.7071***		-9.5462***	-6.4729***	-7.2046***
ER	-1.6373	-0.6654	-2.2577	0.5893***		-9.1149***	-9.4915***	-5.8366***
Panel -C: Unit root with structural Break								
	t-statistic	Year	lag	t-statistic	Year	lag		
For India								
Rem	-1.908	2011Q1	(2)	-5.138***	2009Q2	(2)		
EPU	-2.309	2009Q4	(1)	-7.811***	2013Q1	(1)		
F1	-3.109	2014Q2	(0)	-7.21***	2007Q4	(1)		
TO	-1.952	2005Q1	(1)	-7.165***	2016Q2	(2)		

ER	-2.068	2017Q2	(3)	-6.145	2015Q2	(3)
For china						
Rem	-2.223	2011	(1)	-6.576***	2004	(2)
EPU	-3.008	2010	(1)	-8.671***	2015	(3)
F1	-2.122	2002	(2)	-8.595***	2011	(2)
TO	-2.568	2010	(3)	-8.066***	2014	(1)
ER	-3.046	2005	(3)	-5.293***	1998	(2)

Note: the superscripts *** denotes statistically significant at 1% level.

Table 6 Results Bayer and Hanck cointegration test

Model	EG-JOH	Critical value at 5%	EG-JOH-BO-BDM	Critical value at 5%	Comments
For India					
Rem EUU	14.558	11.229	27.562	21.913	√
Rem EUU, FII	11.134	10.895	25.824	21.106	√
Rem EUU, FII, TO	10.914	10.637	22.196	20.486	√
Rem EUU, FII, TO, EX	10.942	10.576	21.596	20.143	√
For china					
Rem EUU	13.369	11.229	32.432	21.913	√
Rem EUU, FII	10.996	10.895	27.729	21.106	√
Rem EUU, FII, TO	11.232	10.637	22.97	20.486	√
Rem EUU, FII, TO, EX	10.975	10.576	21.721	20.143	√

The long-run association between Remittances, Economic Policy Uncertainty, Financial inclusion and Exchange rate and trade openness, was evaluated under the framework of Augmented ARDL proposed by. The results of long-run cointegration for India (China) with the three Wald statistics F_{pss} , $t-DV$ and $F-IDV$ are displayed in Table 7. It is apparent that all the test statistics that are F_{bound} is 7.211 (12.365), $t-DV$ is -5.646 (-8.912) F_{IDV} is 4.988(6.551) are statistically significant at a 1% level of significance, suggesting that the long-run interlinkage among the variables. Once the long-run association is detected, the study further investigates long-run and short-run magnitudes on remittances from independent variables.

Table 7 Results of long-run cointegration - AARDL

		F-bound		t-DV	F-IDV	Remark
$F(Rem) = (Ren/EPU, FD, TO, ER)$						
For India		7.211		-5.646	4.988	Presence
For China		12.361		-8.912	6.551	Presence
Critical value : K=4	1%	5%		10%		
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Pesaran, Shin (89)	4.59	6.368	3.276	4.63	2.696	3.898
Narayan (100)	-3.43	-4.6	-2.86	-3.99	-2.57	-3.66
Sam, McNown (97)	3.58	5.91	2.46	4.18	2.00	3.47

For the effects of economic policy uncertainty on migrants' remittances, for India, the study documented a positive statistically significant linkage in the long-run (a coefficient of -0.1464; $p < 0.00$) and short-run (a coefficient of 0.0177). More specifically, a 10% increase in economic instability can increase migrants' remittance inflows between 1.464% and 0.177%. Furthermore, empirical estimation for China establishes positive and statistically significant effects from economic policy uncertainty to remittances in the long-run (short-run) with a coefficient of 0.1147 (0.0171). In particular, a 10% economic instability can increase the migrants transfer from host economy to home country by Chinese remittances provider by 1.147% in the long-run and 0.171% in the short-run. Our Study findings suggest that macro volatility creates tension in remittances senders' minds regarding the recipient's economic and financial state in the home economy. Thus, a growing trend has been observed in remittances transfer.

The study established a positive and statistically significant association between financial inclusion and remittances in the long run with a coefficient of 0.0752(0.0954) and short-run with a coefficient of 0.0358(0.0448) in India (China). Our study findings advocated that financial sector development is a motivating factor for remittance development; in particular, a 10% progress in the financial sector can augment the present trend of remittances receipts in India (China) between 0.752% 0.358% (0.954% and 0.448%). It suggests the financial efficiency and efficient financial institutions encourages migrants; for sent money to the home economy and contribute to sustainable development.

For exchange rate and remittances inflows behavior, in the long run, the positive statistically significant linkage documented in India (China) a coefficient of 0.0726 (0.2248). Study findings suggest that home currency appreciation encourages migrants to transfer more money to capitalized exchange rate appreciation benefits the home economy. Thus, ensuring sustainability in remittances inflows, the stability in the exchange rate is imperative; otherwise, due to exchange rate volatility, the adverse shocks might experience in the case of remittances trend. Moreover, in the short run, a positive and statistically significant connection was established in India (China) with a coefficient of 0.0274 (0.0214). It is apparent that the exchange rate has a prominent effect on remittances in the long run than the short run in both economies; specifically, a 10% home currency appreciation can boost the present state of remittances inflows from migrants by 0.726% in India and 2.218% in China, respectively. Our findings align with existing literature, e.g., Kuncoro (101),(51, 102-107) Olubiyi (108), Sultonov (109). Non-classical theory advocated that the migrant's remittances transfer guided by transaction cost, current consumption pattern, the price of goods and services in the home economy relative to the host economy. Moreover, the exchange rate ratio between hosts and home currency has revealed the most critical quantitative factors because currency appreciation in the home economy encourages migrants to send money. During currency depreciation, migrants have shown reluctance to send money to the home economy, especially with the formal channel (28).

The effects of trade openness on remittances revealed a positive statistically significant linkage in the Indian economy both in the long-run (a coefficient of 0.1216) and short-run (a coefficient of 0.0295), which is supported by Md (110), Miao and Qamruzzaman (40). Whereas a mixed relationship is detected in China, that is, negative and statistically significant effects in the long-run (a coefficient of -0.1867) and short-run (a coefficient of 0.0819). Study findings suggest domestic trade augmentation with international integration boosts migrant's remittances inflows both in the long-run and short-run for India and only in the short-run for China. Additionally, domestic trade expansion in the Chinese economy ceases adverse effects on remittances transfer behavior in the long run. The economic expansion allows higher-earning possibilities for the people and acts as a confident enhancing factor regarding income stability for migrants in the home economy. In particular, a 10% development in domestic trade liberalization can improve the preset status of remittances in the Indian economy by 1.216% to 0.0295%, but in the case of the Chinese economy, will be experienced by a 1.867% negative trend in the long run but growth in the short-run by 0.819%.

The speed of disequilibrium correction explained by the coefficient of error correction terms shows that the coefficient of error correction terms is negative and statistically significant at a 1% level in India (China) with a coefficient of -0.3586(-0.885). Study findings suggest that disequilibrium towards long-run convergence be corrected by 35.86% (88.5%) quarterly. The empirical model assessment passes several residual diagnostic tests to confirm estimation efficiency, internal consistency, and robustness in model construction. According to residual test statistics, it is established that the empirical model for India and China is free from serial correlation issues, residuals are normally distributed, no issue with heteroskedasticity. Furthermore, CUSUM and CUSUM of square revealed stability in coefficient estimation.

Table 8 Results of long-run and short-run coefficient: nexus between EPU and Remittances

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Coefficient	Std. Error	t-Statistic	Prob.
Panel –A: long-run coefficients								
EPU	0.1464	0.0331	4.4101	0.0001	0.1147	0.0120	9.502	0.0000
FI	0.0750	0.0140	5.3247	0.0000	0.0954	0.0707	1.3493	0.014
ER	0.0726	0.028	2.5928	0.0056	0.2248	0.0384	5.854	0.0005
TO	0.1216	0.0296	4.1057	0.0001	-0.1867	0.0125	-14.94	0.0004
DMU(y)	-0.0344	0.0184	-1.872	0.0021	-0.0344	0.0184	-1.872	0.0087
Panel-B: short-run coefficients								
C	-1.0025	0.0695	-14.41	0.0000	-4.4333	0.1981	-22.375	0.000
@TREND	0.0011	0.0001	8.1279	0.0000	-0.0038	0.000212	-18.1084	0.000
D(EPU)	0.0177	0.0167	1.0571	0.0953	0.0171	0.0017	10.0085	0.000
D(FI)	0.0358	0.0037	9.6160	0.0000	0.0448	0.0162	2.7631	0.000
D(ER)	0.0273	0.0054	5.0533	0.0000	0.0214	0.0078	2.7168	0.0101
D(TO)	0.0295	0.0126	2.3377	0.0232	0.0819	0.0385	2.1292	0.0000
D(DMU(y))	-0.0881	0.0398	-2.2113	0.0313	-0.1393	0.3537	-0.3939	0.696
CointEq(-1)*	-0.3586	0.0255	-14.0219	0.000	-0.885	0.039	-22.1654	0.000
<i>Residual Diagnostic test</i>								
χ^2_{Auto}	0.2541				0.4812			
χ^2_{Het}	05574				0.3822			
χ^2_{Nor}	0.6112				0.7512			
χ^2_{RESET}	0.2511				0.3411			

The asymmetric effects of economic policy uncertainties and financial development on remittances inflows in the Indian economy display in Table 9, including panel – A for asymmetric cointegration, Panel-B contains asymmetric coefficients in the long-run, and the coefficients of short-run report in Panel –C, and finally, symmetry test along with residual diagnostic test available in Panel –D.

The asymmetric long-run association between EPU, FI, TO, EX and REM in India (China) has been investigated by following the bound testing approach (89), i.e., $F_{pass} = 17.8451(12.845)$, the joint probability test for $W_{pass} = 11.5112(8.9551)$, and tBDM test, i.e., $t_{BDM} = 9.7512(-9.862)$, respectively. All the test statistics are higher than the critical value at a 1% significance level, suggesting rejecting the null hypothesis of "no-cointegration," alternatively establishing the long-run association under asymmetry. Once cointegration is confirmed, the study proceeds to assess asymmetric effects of EPU (EPU+ & EPU-) and financial development (FT+, FT-) on remittances inflows in India and china

The asymmetric effects of economic policy uncertainty in the long-run (short-run) on remittances espoused to the positive and statistically significant linkage, suggesting the instability)in macro fundamentals play a motivating role in the mind of migrants and encourage them to transfer money in the home economy. More precisely, a 10% positive (negative) shock in economic instability can result in increasing (decreasing) effects on remittances inflows in the economy by 0.983% (0.389%), indicating the positive shocks, in the long run, has profound effects than negative innovation in EPU. Therefore, in the long run, sustainability in remittances is imperative to bring stability in macroeconomic behavior. Moreover, a 10% positive (negative) shock in EUP encourages migrants to transfer remittances in the economy by 0.123% (0.006%). Asymmetric effects of EPU on remittances in China, the study documented positive and statistically significant linkage both in the long-run short-run. In the long run, a 10% positive (negative) shock in EPU can results in acceleration (declining) the present state of remittance transfers from migrants remittances from host to home economy by 1.249%(1.016%). While short-run asymmetric shocks revealed remittances

inflows augmented by 0.209%(0.827%) with 10% positive(negative) variations in EPU. According to asymmetric effects of EPU on remittances, migrant's attitudes towards remittances transfer to the home economy during economic shocks behave differently in the long-run relative to in the short-run, indicating that remittances inflows increased with the perception of remittances recipients' economic and financial stability.

Remittances and financial inclusion in India: an unbalanced relationship (China). The research uncovered both long- and short-term favorable and statistically significant links between them. Remittance inflows to the Indian (Chinese) economy increased by 2.234 percent (0.521 percent) for every 10 percent increase in financial inclusion, but the opposite was true for every 1.492 percent decrease in financial inclusion due to discouragement and a negative view of the system's efficacy (1.126 percent). Negative shocks are crucial for the Chinese economy if remittance inflows matter, whereas positive shocks cause more intense remittances behavior in India over the long term. A 10-percentage-point asymmetric shock in financial inclusion speeds up remittances by 0.006% and dampens negative shocks by 0.867% in India over the near term. In addition, both positive and negative shocks of 10% revealed statistically significant increases (decreases) of 0.1986 percent in the inflows of migrant workers' remittances to China (0.9846 percent). Findings suggest that ease of access to financial services and products in the financial system is a driving factor in the minds of migrants who send remittances; conversely, financial inefficiency, restriction in availing financial services discourages and negatively affects remittances inflows to the economy. (61, 111-114).

For further information on how the currency rate and trade openness affect remittances in a nonlinear context, see the aforementioned control variables. Based on the results of the model estimate, it seems that there is a positive and statistically significant link between the exchange rate (trade openness) and remittances over the long term. In particular, in India and China, an increase of 0.572 percent (1.067 percent) and 1.091 percent (1.452 percent) in remittances inflows, respectively, is the outcome of a ten percent shift in the exchange rate (trade openness). In India, a positive (negative) statistically significant correlation was found between the exchange rate and remittances, whereas a negative association was found between the two in China. Panel –C in Table 9 reports symmetry and residual diagnostics tests. A standard Wald test has been performed with the null hypothesis of "symmetry in the long-run and short-run," and test statistics from Wald tests (W_{LR} , W_{SR}) revealed statistically significant at a 1%, i.e., the rejection of the null hypothesis. Alternatively, accept the hypothesis that is an asymmetric association between exchange rate, trade openness and remittances. Furthermore, asymmetric model estimation passes several residual diagnostic tests to confirm estimation efficiency, internal consistency, and robustness in model construction. According to residual test statistics, it is established that the empirical model for India and China is free from serial correlation issues, residuals are normally distributed, no issue with heteroskadacity. Furthermore, CUSUM and CUSUM of square reviled stability in coefficient estimation.

Table 9 Result of asymmetric nexus between EPU, FD and remittances

	India				China			
Panel A: long-run asymmetric cointegration test								
Fpass	17.8451					12.845		
Wpass	11.5112					8.9551		
tBDM	-9.7512					-9.862		
Panel –B: long-run asymmetric coefficient								
	Coeff.	St.Error	t-stat	p-value	Coeff.	St.Error	t-stat	p-value
EPU+	0.0983	0.0485	2.0227	0.0485	0.1249	0.01322	9.4478	0.0647
EPU-	0.0389	0.0159	2.4463	0.0173	0.1016	0.01594	6.3739	0.0645
FI+	0.2238	0.0499	4.4820	0.0009	0.0521	0.0355	1.4692	0.0913
FI-	0.1492	0.0420	3.5498	0.0009	0.1126	0.0535	2.1036	0.0003
ER	0.0572	0.0175	3.2636	0.0022	0.1091	0.0437	2.4945	0.0001
TO	0.1067	0.0241	4.4265	0.0005	0.1452	0.0195	7.4398	0.0000
DMU09					-0.6719	0.3940	-1.7053	0.0014

Panel –C: short-run asymmetric coefficients								
C	0.6231	0.0689	9.0352	0.000	3.5776	0.3730	9.5892	0
@TREND	0.0468	0.0049	9.3941	0.000	0.0097	0.00099	9.7941	0
ΔEPU^+	0.1825	0.0742	2.4568	0.0175	0.0209	0.0024	8.3016	0
ΔEPU^-	0.0123	0.0023	5.3090	0.000	0.0827	0.0354	2.3366	0.0007
ΔFI^+	0.0006	0.0002	2.4286	0.0188	0.01986	0.01172	1.693	0
ΔFI^-	0.0867	0.0357	2.4235	0.0608	0.09846	0.0499	1.9708	0
ΔER	0.0424	0.0043	9.7065	0.000	-0.0355	0.1149	-0.3091	0.7584
ΔTO	-0.048	0.0249	-1.9282	0.0595	-0.0756	0.0620	-1.2186	0.2281
$\Delta DMU09$	-0.0165	0.0038	-4.1368	0.0001	-0.7935	0.2077	-3.8190	0.0003
CointEq(-1)*	-0.2619	0.0278	-9.3891	0.000	-0.1698	0.0175	-9.6565	0
Panel –D: symmetry test and Residual diagnostic test								
W_{LR}^{EPU}	12.5412			10.611				
W_{LR}^{FD}	15.2514			12.394				
W_{SR}^{EPU}	9.8451			9.5123				
W_{SR}^{FD}	12.5541			7.632				
χ_{Auto}^2	0.9451			0.58841				
χ_{Het}^2	0.5112			0.6117				
χ_{Nor}^2	0.6917			0.9152				
χ_{RESET}^2	0.6134			0.3381				

5. Discussion

Remittances' importance is in terms of their progressive presence in every aspect of the economy has been extensively investigated in the literature. Furthermore, the critical determinants of remittances inflow behavior have been investigated. The prime focus of this study is to gauge the remittances inflows behavior with economic policy uncertainty in Indian and Chinese economy for the period 2000Q1-2019Q4.

The nexus between remittances transfer and economic policy uncertainty revealed a positive statistically significant linkage in symmetry assessment; moreover, the standard Wald test documented the asymmetric association between EPU and remittances in the long-run and short-run. Furthermore, the coefficient magnitudes of EPU+ and EPU- disclosed positive ties with remittances inflows in India. Study findings suggest that policy uncertainties boost remittances growth, implying that economic instability generates tension in the minds of migrants regarding their families' economic and financial discomfort, which eventually encourages them to transfer more remittances in the home economy. Study findings are supported by existing literature, for instance, Akçay and Karasoy (115), Mawusi (56), De, Islamaj (116)

According to Lucas and Stark, there are three basic microeconomic incentives for remittance: pure altruism, pure self-interest, and tempered altruism (1985). The primary driving force for migration is the selfless desire of migrants to improve the lives of their loved ones back home. Those who send money back home to their relatives do so for solely selfish reasons, and this is reflected in their remittance behavior. Those who leave their families in search of work sometimes send money back to establish new communities, start businesses, and collect material riches. In essence, migrants and their families back home come to an understanding based on a kind of altruism that is regulated by cultural norms. In a study, Akçay and Karasoy (115) postulated that increased macroeconomic volatility and rising oil prices encourage remittances, as do host country GDP growth and currency depreciation. Furthermore, host and home economic activities such as domestic trade expansion, financial efficiency and industrial output play a positive role in accelerating remittance transfer from host to home economy. Qamruzzaman, Karim (117) discussed that the degree of

economic activity in host nations (push factor) is expected to have a two-fold effect on remittances, such as increased economic activity in the host nation may boost migrants' incomes by boosting job possibilities and salaries, allowing them to send more money home. On the downside, an economic downturn in the host nation may reduce migrants' wages, causing them to send less money home.

The assessment of remittances-led financial inclusion revealed positive statistically significant interlinkage between them, suggesting remittances inflows allow unbanked population inclusion into the formal financial system through financial expansion and efficient financial intermediation. Our findings are in line with existing literature, for instance, Eggo and Bangak (69).

Refers to nexus between exchange rate led remittance, findings documented positive and statistically significant linkage both in the long-run and short-run, our findings align with existing literature, e.g., Kuncoro (101); Olubiyi (108), Sulonov (109). Non-classical theory advocated that the migrant's remittances transfer guided by transaction cost, current consumption pattern, the price of goods and services in the home economy relative to the host economy. Moreover, the exchange rate ratio between hosts and home currency has revealed the most critical quantitative factors because currency appreciation in the home economy encourages migrants to send money. During currency depreciation, migrants have shown reluctance to send money to the home economy, especially with the formal channel (28).

6. Conclusion

The motivation of the study is to gauge the effects of economic policy uncertainty and financial inclusion on remittances in India and China for the period 2003Q1 to 2019Q4 by implementing Augmented ARLD (97), nonlinear ADRL (98) and directional causality through Fourier TY causality test. The key findings of the study are as follows:

First, the properties of the research variables have been explored by implementing both conventional unit root tests following Dickey and Fuller (75), Elliott, Rothenberg (77), Phillips and Perron (76), Ng and Perron (99) and unit root test with a known structural break (79). The results of the stationarity test revealed mixed order of integration; that is, variables are either stationary at a level $I(0)$ or after the first difference $I(1)$. Neither variable was exposed to stationary after second differences. Next, the study implemented the novel combined non-cointegration test familiarized by Bayer and Hanck (81). The fishers' test statistics appeared statistically significant, higher than the critical value at a 5% level. It suggests that long-run cointegration prevails between REM, EPU, FI, EX and TO.

Third, a traditional Wald test was used to assess long-run cointegration between EPU, FI, and REM in India and China, with divergent findings. Furthermore, both the long-run and short-run symmetry tests demonstrated that EPU and FI had distinct impacts on remittances. Financial inclusion (FI+, FI-) and economic policy uncertainty (EPU+, EPU-) were shown to have a positive and statistically significant relationship with remittances. It seems from the statistics that during times of economic turbulence, migrants' primary motivation is to provide a comfortable level of life for their families back home. However, a positive impression is left on the remittances provider when the receiver has access to formal financial systems, which gives the provider faith in the sender's financial stability and the recipient's capacity to make wise investments. Third, long-run cointegration between EPU, FI, and REM in India and China was determined using a conventional Wald test, although the results were not the same for both countries. In addition, both the long-run and short-run symmetry tests showed that remittances were affected differently by EPU and FI. There was shown to be a positive and statistically significant correlation between remittances and the asymmetric shocks of EPU (EPU+, EPU-) and financial inclusion (FI+, FI-). The data suggests that during times of economic instability, migrants are motivated only by a desire to protect their loved ones' standard of living by sending more money back to their home countries. Access to formal financial systems, on the other hand, leaves a favorable impression on the remittances provider and instills confidence in the viability of the sender's finances and the recipient's ability to make sound investments.

Compliance with ethical standards

Disclosure of conflict of interest

There is no conflict of interest

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