



The remittance inflows - private investment nexus in Asian developing countries: does institutional quality matter?

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Abstract

The literature illustrates that remittance inflows boost private investment in developing countries. Does it hold for the case of Asian developing countries? Does institutional quality significantly contribute to the remittance inflows - private investment nexus in these countries? We look for answers by studying the influences of institutional quality, remittance inflows, and interaction on the investment of the private sector for a dataset of 25 developing economies in Asia between 2002 and 2020. It employs the twostep difference GMM estimator and the defactored instrumental variables estimator to estimate and test the robustness. The results seem counter-intuitive that remittance inflows crowd in private investment, while institutional quality crowds out it, but their interaction boosts it. Besides, trade openness and economic growth increase, but inflation decreases private investment. The paper provides some policy lessons for developing countries in Asia in improving institutional structure to get more remittances and stimulate private investment.

Keywords: Institutional Quality, Remittance Inflows, Private Investment, Developing Countries in Asia

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1. Introduction

The significant contribution of remittance inflows has been recorded throughout the economic development process in many Asian developing countries because of their positive impacts on the economy. They decrease poverty and increase the living standards of households in developing countries by spending on healthcare and education and covering living expenses (Adams Jr & Page, 2005). Ratha (2003) notes that households use remittances for consumption, which raises the need for services and goods, thereby stimulating economic growth. Notably, Jawaid and Raza (2016) report the positive role of remittances in economic development in four Asian developing countries (Sri Lanka, Bangladesh, India, and Nepal). In reality, most developing countries in Asia have underdeveloped financial markets, scared foreign currency reserves, and limited access to credit. As an exogenous factor, remittance inflows do not depend on economic situations in host countries. Recipient countries needn't pay interest, hence these inflows are a stable source of investment capital to improve the BOP in countries having high current account deficits (Buch & Kuckulenz, 2010). Because of their benefits, developing countries in Asia always try to adjust and implement policies and regulations (institutional environment) to receive more remittance inflows. More importantly, proper institutional reforms and improvements can help these countries both

receive more remittance flows and channelize these inflows appropriately into investment and production.

Although remittance inflows have shown their positive role during economic development, they still have adverse influences on the economy. Polat & Rodríguez Andrés (2019) note that they reduce commercial competition by increasing the value of the domestic currency – a typical form of “the Dutch disease”. Luca & Petrova (2008) emphasize that in some countries, the over-absorption of remittance flows is one of the causes of the dollarization of the economy. A possible reason is that remittance recipients could receive and use remittances under foreign currency. In addition, they don’t need to pay taxes and sell remittances to the banking system after receiving them. Notably, they can live dependent on the remittances of immigrants. Chami et al. (2005) argue that if remittance recipients improperly use remittances, remittance inflows can not be an investment capital source to promote economic growth in host countries. Meanwhile, the investment of the private sector is an endogenous input in the theoretical models of economic growth to develop the economy and create employment (Khan and Reinhart, 1990). In particular, Greene and Villanueva (1991) show that the private sector’s investment can enhance income and reduce interest rates, debt, and inflation in developing countries. Therefore, we raise two research questions: (1) Do remittances crowd in private investment in developing countries in Asia? (2) Does institutional quality matter for the remittance inflows – private investment nexus in these economies? We will look for answers as a new contribution to the literature.

In short, remittance inflows and private investment both have a crucial position throughout economic development in Asian developing countries. Meanwhile, a good institutional environment can help receive more remittance inflows, eliminate their negative impacts, and improve the remittance inflows – private investment nexus in these economies. Given these facts, we apply the twostep difference GMM and defactored instrumental variables estimator estimators to study the influences of institutional quality, remittance inflows, their interaction term on the investment of the private sector in 25 developing countries in Asia over the period of 2002-2020. The findings will provide some policy lessons.

The paper has been presented by the following structure. Section 1 will be the introduction that describes the research motivation. Section 2 highlights an overview of remittance inflows into Asian developing countries, while Section 3 describes theoretical backgrounds. Meanwhile, Section 4 notes the empirical equation and dataset. Section 5 shows the results, while Section 6 concludes and suggests some lessons.

2. Overview of remittance inflows into Asian developing economies

An official report by World Bank (2018) notes that in 2013, about 80 million Asian people in developing countries lived and worked outside their original countries. Remittance inflows in these countries rose steadily because of the increasing number of working immigrants. These inflows are exposure to negative conditions in host countries because of the financial crisis of 1997 in Asia and the low level of oil prices of 2015-2016. However, in 2017, these inflows into this region still grew substantially and obtained \$252 billion.

Another report by World Bank (2022) shows that low- and middle-income countries can obtain \$589 billion of remittance inflows in 2021, a rise of 7.3 percent, compared to a decrease of 1.7 percent in 2020 because of the coronavirus outbreak. It can be the second year that remittance inflows into these economies (not China) are projected to surpass the total FDI and ODA. These

figures indicate the crucial role of these inflows in helping families with food, education, and healthcare in host countries.

In 2021, it could be that remittance inflows into the Pacific and East Asian subregion can reduce by 4 percent to \$131 billion. However, excluding China, these inflows into this subregion increased by 1.4 percent and can rise by 3.3 percent in 2022. The top host countries are Toga (approximately 44 percent GDP), Samoa (21.2 percent GDP), Marshall Islands (12.9 percent GDP). Meanwhile, in 2021, remittance inflows into the South Asian subregion reached \$159 billion, a rise of 8 percent. Fiscal stimulus, high oil prices, and economic recovery in United States are the main causes of the growth rate in remittance inflows. For instance, remittance inflows into India rose by 4.6 percent to \$87 billion, and into Pakistan increased by 26 percent to \$33 billion.

In 2021, remittance inflows into Central Asia could increase by 5.3 percent to \$67 billion because of high oil prices and economic recovery in the EU after a decline of 8.6 percent in 2020. Remittance inflows into this subregion are expected to increase by 4.8 percent in 2022. The top host countries are Tajikistan and Kyrgyz (approximately 25 percent GDP).

3. Theoretical backgrounds

3.1. Theoretical framework

Relevance of the topic, the portfolio and family approaches are two theoretical ones to explain the influence of remittance inflows on the investment of the private sector (Dash, 2020). The former illustrates that remittance inflows are sent by immigrants as an investment capital source in host economies (Rao and Hassan, 2012). Meanwhile, the latter shows that altruism can be the main reason that immigrants use remittances to help their households in host economies (Fullenkamp et al., 2008). As a result, remittances can boost economic growth via sumption, investment, and production, which promotes domestic private investment. Furthermore, these inflows can enhance capital expenditure on physical and human capital. Notably, remittance inflows can crowd in domestic private investment via the following mechanisms: (i) They could increase domestic private investment via the multiplier impact by stimulating household spending (Ratha, 2013); (ii) They could enhance human capital by promoting family expenditure on healthcare and education in host countries (McKenzie & Rapport, 2011); (iii) They are foreign currency to import equipment, raw material, and machine for production in host economies (Fullenkamp et al., 2008); (iv) They are investment capital for domestic companies by promoting the development of the financial industry in host economies (Aggarwal et al., 2011); (v) They can become savings for the private sector's investment in host economies (Gani, 2016).

Apart from FDI and ODA, at the macroeconomic level, remittance inflows become one crucial capital to promote economic growth in developing countries. Governments will try to design, issue, and enforce policies and regulations (institutional improvement) to receive more remittance inflows. Therefore, institutional improvement can increase remittance inflows, which can promote private investment.

3.2. Literature review

Remittance inflows are a capital source sent by immigrants to help their relatives in improving living standards through enhancing human and physical capital in host countries. Some studies note the crowding-in influence of remittance inflows on private/domestic investment, while others report the crowding-out impact.

Regarding the crowding-in influence, most researchers suggest that governments could remove barriers to receiving more remittances to promote investment in host countries. Bjuggren & Dzansi (2008) employ the onestep difference GMM estimation, random effects model, fixed effects model, and the pooled OLS estimation for 79 developing countries throughout 1995-2005. Meanwhile, Adams Jr & Cuccuecha (2010) employ the twostage selection estimation for a dataset of 2000 ENCOVI in Guatemala from 07/2000 to 12/2000, whereas Adams Jr & Cuccuecha (2013) apply the twostage multinomial selection estimation for a dataset of 2005-2006 Ghana Living Standards between 09/2005 and 09/2006. Similarly, Nurul Hossain & Hasanuzzaman (2013) use an ARDL estimation for a dataset in Bangladesh during the period of 1976-2010, while Okodua (2013) applies the onestep system GMM estimation for a group of 31 economies in Sub-Saharan Africa during the time of 2000-2011. In the same vein, Gyimah-Brempong & Asiedu (2015) employ onestep difference GMM estimations and fixed effects model for a dataset of Living Standards in Ghana. In the conclusion, they emphasize that remittances provide prospects for economic development and reduce poverty by improving human capital. Meanwhile, Manic (2017) applies the twostage process estimator for a dataset in Moldova. He notes that remittances boost the investment of the private sector in the urban areas at the price of the rural areas. Notably, Abbas (2019) uses an ARDL estimation in four economies in South Asia (Sri Lanka, India, Pakistan, Bangladesh) between 1980 and 2017. He shows that remittances increase the private sector's investment in Bangladesh, India, and Sri Lanka and decrease it in Pakistan. Meanwhile, Khan et al. (2019) use the PMG estimation, fixed effects model, pooled OLS regression, and random effects model for 5 countries in South Asia (Nepal, Pakistan, Sri Lanka, India, and Bangladesh) from 1990 to 2016. They suggest that governments need to barriers and channelize remittance inflows to establish a proper environment for the private sector's investment. Lately, Dash (2020) employs the onestep system GMM estimation for six countries in South Asia (Nepal, Pakistan, Sri Lanka, Maldives, India, and Bangladesh) during the period 1991-2017. He emphasizes that remittances enhance consumption and investment in human and physical capital.

Concerning the crowding-out influence, some researchers recommend that governments should channelize remittances into investment and production by reforming the institutional environment in host economies. Mallick (2012) applies the ECM model and dynamic OLS estimation for a dataset of India from 1966 to 2005. He recommends governments can apply proper policies to channelize remittances from unproductive sectors to productive ones, which promotes economic growth. Similarly, Yiheyis & Woldemariam (2016) employ an ARDL estimation in four economies in Africa (Nigeria, Burkina Faso, Kenya, and Senegal) between 1981 and 2013. In the same vein, Su et al. (2021) use an augmented ARDL estimation for seven emerging economies (Mexico, China, Turkey, Indonesia, Russia, Brazil, and India,) from 1990 through 2019.

From the literature perspective, the review shows that (i) no papers study the contribution of governance/institutional quality to the remittance inflows – private investment nexus, (ii) no papers apply the twostep difference GMM estimator and the defactored instrumental variables estimator to estimate and test the robustness. Therefore, this paper will handle these issues as a novel contribution.

4. Empirical equation and dataset

4.1. Empirical equation

From Nurul Hossain & Hasanuzzaman (2013), we modify the empirical equation as follows:

$$PIN_{mn} = \alpha_0 + \alpha_1 PIN_{mn-1} + \alpha_2 REM_{mn} + \alpha_3 INS_{mn} + \alpha_4 (REM \times INS)_{mn} + X_{mn} \alpha' + \mu_m + \psi_{mn} \quad (1)$$

where n and m denote respectively the time index and the country index. PIN_{mn} is the private sector's investment (% GDP), REM_{mn} is remittance inflows (% GDP), INS_{mn} is the governance indicator including regulatory quality (INS1), rule of law (INS2), voice and accountability (INS3), control of corruption (INS4), government effectiveness (INS5), political stability (INS6) (institutional quality), and $(REM \times INS)_{mn}$ is the interaction term. X_{mn} contains inflation, trade openness, and economic growth (control variables); ψ_{mn} is the error term, μ_m is the fixed effects; α_0 , α_1 , α_2 , α_3 , α_4 , and α' are estimated parameters. Economic growth could increase capital accumulation for the private sector's investment. Meanwhile, the openness policy can help the private sector mobilize investment capital from foreign financial markets. However, inflation could boost transaction costs and reduce business profit, decreasing the private sector's investment. Following Bjuggren & Dzansi (2008), Nurul Hossain & Hasanuzzaman (2013), Dash (2020), Abbas (2019), Khan et al. (2019), Su et al. (2021), Okodua (2013), and Yiheyis & Woldemariam (2016), we use economic growth, trade openness, and inflation as control variables.

Some severe issues in econometrics stem from regressing Equ. (1). First, the dataset has a short observation length ($N = 19$) and a relatively large unit of countries ($M = 25$). Second, a high serial correlation arises from the presence of $PIN_{i,t-1}$. Third, some fixed effects existing in μ_m like culture and anthropology could correlate with regressors. Finally, inflation and economic growth can be endogenous. They could correlate with μ_m to lead to endogenous phenomena. These issues could make the OLS estimation biased. Traditional panel regressions (random effects, fixed effects) could not tackle endogenous phenomena and serial correlation. Meanwhile, IV-2SLS estimation needs some instruments out of models. From the suggestion by Judson & Owen (1999), we apply the twostep difference GMM estimation and the defactored instrumental variables estimator to estimate and check the robustness.

The paper uses the difference GMM Arellano and Bond (1991) estimation (DGMM) that can tackle simultaneity biases in estimation. This approach is first suggested by Holtz-Eakin et al. (1988). Accordingly, it gets first differences in Equ (1) to rule out fixed effects μ_m , then it uses all regressors in first differences as different instrumented variables by lags under conditions that serial correlations do not exist in original equations (Judson & Owen 1999). The twostep DGMM (2DGMM) is more efficient than the onestep DGMM (1DGMM). Unfortunately, employing 2DGMM in a small research sample has one problem (Roodman, 2009). This is the instrument proliferation that increases quadratically once the time dimension rises, which leads to the number of instrumental variables being larger than the number of countries. The paper should apply the rule of thumb to make the number of instrumental variables lower than or equal to the number of countries (Roodman, 2009). The paper uses Sargan/Hansen and Arellano-Bond tests in 2DGMM to examine the validity of instrumental variables in estimation. Sargan/Hansen tests check endogenous phenomena, whereas Arellano-Bond tests AR(2) detect the serial correlation of errors in first differences.

Furthermore, the paper applies the defactored instrumental variables estimator (DIVE) proposed by Kripfganz & Sarafidis (2021) and developed by Norkutė et al. (2021) to test the robustness. This approach's key idea is to guess general factors via exogenous covariates by analysing principal

components, then carry out iv estimation in the two-stage procedure by applying defactored covariates as instruments. Sargan tests are employed to detect endogenous phenomena.

4.2. Dataset

The dataset includes governance indicators, private investment (% GDP), GDP per capita, personal remittances (% GDP), inflation, and trade openness. We exact it from the WB and IMF databases. The sample contains 25 developing economies in Asia from 2002 to 2020 (Azerbaijan, Vietnam, Bangladesh, Turkey, Bhutan, Thailand, Cambodia, Tajikistan, China, Sri Lanka, Egypt, Saudi Arabia, India, Philippines, Iran, Pakistan, Jordan, Oman, Kuwait, Nepal, Kazakhstan, Myanmar, Kyrgyz, Mongolia, and Malaysia).

The definition of the dataset is presented in Table A, while the descriptive statistics of the dataset are reported in Table B and Table C. Meanwhile, Table D indicates that inflation and remittance inflows are negatively linked with private investment. Furthermore, correlation coefficients among independent variables are not high as 0.8, ruling out collinearity. Table E notes that correlation coefficients among the six governance dimensions are very high, so, we employ them separately in empirical equations.

5. Results

5.1. DGMM estimates

Table 1 and Table 2 illustrate the results without and with the interaction term, respectively. Columns in two tables are results corresponding with six governance indicators. In each estimation, the paper detects the endogeneity of economic growth, so we employ it as an instrumented regressor in the gmm style and private investment, remittance inflows, trade openness, institutional quality, and inflation as instrumental regressors in the iv style.

Without the interaction, the results across empirical models present that remittance inflows promote private investment, and institutional quality reduces it. For the full model, the results are still consistent that remittance inflows increase and institutional quality decreases private investment, but their interaction enhances it. These findings imply that remittance inflows crowd in the private sector's investment, and this positive impact is amplified by institutional quality.

Most developing economies are poor ones with low-income levels. The living standard of the people is not high. Migration is mainly caused by war or political instability in these countries (countries of origin) or looking for jobs in countries of destination with higher income and living standards. Access to many resources such as knowledge, improved infrastructure, money, economic opportunities, and lifestyles elsewhere provide incentives for people in countries of origin to migrate to their destination countries (De Haas et al., 2019). Workforce demand in countries of destination can be the most crucial motivation for international immigration, and family immigration may be an indirect consequence of labor immigration. Immigrants are ready to accept manual low-level service, agricultural, and industrial jobs (low-quality working environments and low incomes) when original communities remain their key social reference counterpart (De Haas et al., 2019). Having a stable life with enough income, immigrants will use remittances to help relatives in their original countries. Remittances will be used for consumption, developing human capital via healthcare and education, and improving income by the establishment of small businesses that creates jobs for immigrants' relatives. Family ties in Asian countries will drive

immigrants to use remittances to support relatives in their original countries. Immigrants hope their relatives in original countries enjoy a good life. It seems similar to Latin American and African countries. Orozco (2002) indicates that one consequence of immigration in Latin American countries is the ties or linkages between immigrants and their countries of origin. Meanwhile, Azam & Gubert (2006) note that individuals in African countries do not decide personally on immigration, instead, it stems from the extended family. In addition to human capital (healthcare and education), creating employment is the target on which immigrants focus. Remittances will be used to develop small businesses. Therefore, remittances promote private investment in developing economies in Asia, supporting the family hypothesis. We can find this result in previous papers like Abbas (2019), Adams Jr & Cuecuecha (2010), Bjuggren & Dzansi (2008), Dash (2020), Adams Jr & Cuecuecha (2013), Gyimah-Brempong & Asiedu (2015), Manic (2017), Khan et al. (2019), and Okodua (2013). In particular, Bjuggren & Dzansi (2008) discover it in 79 developing countries, whereas Okodua (2013) shows it in 31 Sub-Saharan African countries.

The results report that institutional quality/governance hinders the private sector's investment in developing countries in Asia. The statistical data show that the governance indicators of most developing countries in Asia have negative scores, meaning that these countries have bad institutional quality. In these countries, start-up or production expansion faces several difficulties because of public officials' obstacles. Public officials often seek rent by harassing businesses. Institutional reform/improvement in these countries is slow, with no breakthrough, and offers some opportunities for public officials to seek rent. As a result, institutional quality/governance hinders the private sector's investment in Asian developing countries.

Like most developing countries, at a macroeconomic level, Asian developing countries have not enough capital to develop the economy. Apart from FDI and ODA, these countries often issue and enforce regulations and policies (institutional improvement) to facilitate remittance flows and channelize them into consumption and investment. In particular, they can enter the economy in the form of physical capital to stimulate economic growth and enhance people's living standards. Ajide & Raheem (2016) find that institutional improvement attracts more remittance inflows to 14 developing countries in the ECOWAS sub-region, while Lartey & Mengova (2016) note that governance structure enhances remittance inflows in 90 developing countries. Therefore, institutional improvement attracts more remittance inflows, which increases private investment. Because of this, the interaction between institutional quality and remittance inflows boosts private investment. From these findings, governments in Asian developing economies should establish appropriate policies and regulations (institutional improvement) to receive more remittances from immigrants and eliminate the opportunities for rent-seeking by public officials to promote private investment.

Economic growth promotes capital accumulation for the economy under saving – investment. Private enterprises will mobilize this capital source of accumulation to expand investment and production. As a result, economic growth fosters the private sector's investment. This finding can be looked at Su et al. (2021), Bjuggren & Dzansi (2008), Dash (2020), Abbas (2019), Yiheyis & Woldemariam (2016), Khan et al. (2019). Meanwhile, the deep openness policy sets up some different channels to help the private sector mobilize investment capital: (i) the private sector can access foreign inflows into host countries to expand investment; (ii) private enterprises can access easily foreign capital in international capital markets; (iii) private enterprises can increase exports of goods and services, which leads to expanding production and investment. Therefore, trade openness fosters private investment. Yiheyis & Woldemariam (2016), Dash (2020), Bjuggren & Dzansi (2008), and Nurul Hossain and Hasanuzzaman (2013) provide empirical evidence for this finding. By contrast, on the one hand, inflation increases transaction costs, which reduces profits.

For this reason, it decreases private investment. On the other hand, inflation also raises interest rates, which reduces private investment. This finding can be found in Yiheyis & Woldemariam (2016).

Table 1 - Institutional quality, remittance inflow and private investment: 2DGMM estimates, 2002 – 2020 (without the interaction)

| Dependent variable: Private investment (% GDP) | | | | | | |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Variables | INS1 | INS2 | INS3 | INS4 | INS5 | INS6 |
| Private investment (-1) | 0.304*** (0.003) | 0.323*** (0.009) | 0.308*** (0.008) | 0.311*** (0.006) | 0.309*** (0.010) | 0.305*** (0.005) |
| Remittance inflow | 0.102*** (0.027) | 0.099*** (0.024) | 0.137*** (0.030) | 0.089*** (0.157) | 0.099*** (0.028) | 0.097*** (0.030) |
| Institutional quality | -1.235*** (0.503) | -2.792*** (0.802) | -1.482** (0.565) | -1.658*** (0.599) | -1.167*** (0.447) | -0.650 (0.471) |
| Economic growth | 0.025** (0.012) | 0.029** (0.014) | 0.023* (0.012) | 0.009 (0.014) | 0.032** (0.013) | 0.029** (0.013) |
| Trade openness | 0.048*** (0.007) | 0.040*** (0.007) | 0.047*** (0.008) | 0.042*** (0.008) | 0.045*** (0.006) | 0.046*** (0.009) |
| Inflation | -0.096*** (0.019) | -0.072*** (0.013) | -0.090*** (0.022) | -0.125*** (0.018) | -0.112*** (0.042) | -0.085*** (0.022) |
| Instrument | 24 | 23 | 23 | 24 | 23 | 23 |
| Country/Observation | 25/425 | 25/400 | 25/400 | 25/425 | 25/425 | 25/425 |
| AR(2) test | 0.267 | 0.279 | 0.199 | 0.287 | 0.247 | 0.312 |
| Sargan test | 0.299 | 0.321 | 0.202 | 0.233 | 0.317 | 0.235 |
| Hansen test | 0.426 | 0.330 | 0.492 | 0.472 | 0.415 | 0.472 |

Note: *, **, and *** reports level of significance at 10%, 5%, and 1% corresponding. Standard deviation errors are in parentheses.

Table 2 - Institutional quality, remittance inflow and private investment: 2DGMM estimates, 2002 – 2020 (with the interaction)

| Dependent variable: Private investment (% GDP) | | | | | | |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Variables | INS1 | INS2 | INS3 | INS4 | INS5 | INS6 |
| Private investment (-1) | 0.312*** (0.003) | 0.324*** (0.011) | 0.302*** (0.013) | 0.290*** (0.011) | 0.349*** (0.020) | 0.318*** (0.009) |
| Remittance inflow | 0.252*** (0.066) | 0.672*** (0.163) | 0.324*** (0.052) | 0.786*** (0.157) | 0.321*** (0.115) | 1.327*** (0.227) |
| Institutional quality | -1.239*** (0.385) | -5.077*** (1.522) | -5.296*** (0.387) | -1.658*** (0.599) | -7.786** (3.569) | -2.974** (1.268) |
| Remittance*Inst. quality | 0.171*** (0.042) | 0.728*** (0.233) | 0.312*** (0.024) | 0.437*** (0.159) | 0.229** (0.108) | 1.339*** (0.214) |
| Economic growth | 0.022* (0.013) | 0.021* (0.010) | 0.012 (0.016) | 0.009 (0.014) | 0.043** (0.021) | -0.024 (0.019) |
| Trade openness | 0.053*** (0.006) | 0.010 (0.009) | 0.055*** (0.006) | 0.042*** (0.008) | -0.014 (0.008) | 0.053*** (0.010) |
| Inflation | -0.099*** (0.021) | -0.072*** (0.020) | -0.085*** (0.015) | -0.125*** (0.018) | -0.063*** (0.021) | -0.083*** (0.014) |
| Instrument | 24 | 24 | 24 | 24 | 22 | 25 |
| Country/Observation | 25/425 | 25/425 | 25/425 | 25/425 | 25/425 | 25/425 |
| AR(2) test | 0.264 | 0.264 | 0.147 | 0.150 | 0.195 | 0.583 |
| Sargan test | 0.332 | 0.385 | 0.729 | 0.419 | 0.205 | 0.472 |
| Hansen test | 0.354 | 0.439 | 0.263 | 0.618 | 0.490 | 0.328 |

Note: *, **, and *** reports level of significance at 10%, 5%, and 1% corresponding. Standard deviation errors are in parentheses.

5.2. Robustness

We employ DIVE to test the robustness. Similar to 2DGMM estimates, DIVE estimates in Table 3 note that remittance inflows crowd in private investment. Furthermore, trade openness and economic growth foster private investment, but inflation impedes it. Therefore, these results express the robustness and reliability of 2DGMM estimates.

Table 3 - Institutional quality, remittance inflow and private investment: DIVE estimates, 2002 – 2020

| Dependent variable: Private investment (% GDP) | | | | | | |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Variables | INS1 | INS2 | INS3 | INS4 | INS5 | INS6 |
| Private investment (-1) | 0.652*** (0.017) | 0.653*** (0.021) | 0.616*** (0.016) | 0.629*** (0.016) | 0.633*** (0.015) | 0.613*** (0.017) |
| Remittance inflow | 0.783*** (0.097) | 0.257*** (0.106) | 0.205*** (0.060) | 0.412*** (0.073) | 0.483*** (0.081) | 0.310*** (0.117) |
| Institutional quality | -3.584*** (1.094) | -7.391*** (2.962) | -1.591** (0.708) | -1.481*** (0.617) | -7.734*** (0.526) | -3.256*** (1.067) |
| Remittance*Inst. quality | 0.741*** (0.062) | 0.347*** (0.118) | 0.271*** (0.076) | 0.582*** (0.100) | 0.571*** (0.054) | 0.402*** (0.088) |
| Economic growth | -0.010 (0.021) | 0.046*** (0.016) | 0.013 (0.015) | 0.0001 (0.022) | 0.074*** (0.008) | 0.072*** (0.009) |
| Trade openness | 0.091*** (0.020) | 0.126*** (0.014) | 0.125*** (0.016) | 0.107*** (0.024) | 0.106*** (0.017) | 0.097*** (0.021) |
| Inflation | -0.099 (0.061) | -0.064*** (0.022) | -0.136*** (0.051) | -0.112 (0.069) | -0.111*** (0.031) | -0.100* (0.061) |
| Instrument | 24 | 24 | 24 | 24 | 22 | 25 |
| Country/Observation | 25/425 | 25/425 | 25/425 | 25/350 | 25/350 | 25/425 |
| Sargan test | 0.332 | 0.385 | 0.729 | 0.419 | 0.205 | 0.472 |

Note: *, **, and *** reports level of significance at 10%, 5%, and 1% corresponding. Standard deviation errors are in parentheses.

6. Conclusion

Remittances have importance throughout economic development in developing countries in Asia because of their contribution to the economy. However, they can increase or decrease the private sector's investment in host countries. Besides, Asian developing countries try to adjust and improve governance/institutional quality to receive more remittance inflows. Does governance/institutional quality significantly contribute to the remittance inflows – private investment nexus in these countries? For the answer, the paper tests the effects of institutional quality, remittance inflows, their interaction on private investment in 25 developing countries in Asia during the period time of 2002-2020. It uses DIVE and 2DGMM to estimate and check the robustness. The findings seem counter-intuitive that remittance inflows increase and institutional quality reduces private investment, but their interaction boosts it. It means that remittance inflows crowd in private investment, and this positive impact is amplified by governance/institutional quality. Moreover, trade openness and economic growth promote private investment, but inflation impedes it.

The findings in this paper advocate the crucial role of institutional quality/governance in the remittance inflows – private investment nexus in developing countries in Asia. The paper suggests some lessons for developing countries in Asia as follows:

- (1) Formulate suitable policies and regulations (institutional improvement) to attract more remittance inflows to the country, for instance, no fees and taxes (if any) for remittance recipients.
- (2) Set up appropriate conditions (institutional improvement) to channelize remittance inflows into investment and human capital development.
- (3) Open convenient money transfer channels with low cost to encourage migrants to send more remittances home.
- (4) Encourage remittance recipients to spend remittances rationally on education, healthcare, and business purposes.
- (5) Create communication channels with migrants living and working overseas to help them when they are in trouble and express gratitude for their contributions to economic development.

Future research should compare the different roles of institutional quality in the remittance inflows – private investment relationship among developing economies in Asia, Latin America, and Africa. The difference in culture, level of economic development, and political mechanism can lead to the difference in this relationship.

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Appendix

Table A - Data description

| Variable | Definition | Type | Source |
|---------------------------------|---|-------|------------|
| Private investment (PIN) | “Gross fixed capital formation (% GDP)” | % | IMF |
| Remittance inflows (REM) | “Personal remittances consist of compensation of employees and personal transfers (% GDP)” | % | World Bank |
| Economic growth (GDP) | “GDP per capita (constant 2010 US\$)” | log | World Bank |
| Trade openness (OPE) | “Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.” | % | World Bank |
| Inflation (INF) | “Inflation, consumer prices (annual %)” | % | World Bank |
| Regulatory Quality (INS1) | “Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.” | value | World Bank |
| Rule of Law (INS2) | “Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.” | value | World Bank |
| Voice and Accountability (INS3) | “Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.” | value | World Bank |
| Control of Corruption (INS4) | “Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.” | value | World Bank |
| Government Effectiveness (INS5) | “Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.” | value | World Bank |
| Political Stability (INS6) | “Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.” | value | World Bank |

Table B - Descriptive statistics

| Variable's name | Obs. | Mean | Std. Dev. | Min | Max |
|---------------------------|------|----------|-----------|--------|----------|
| Private investment (PIN) | 475 | 25.447 | 9.171 | 8.797 | 69.635 |
| Remittance (REM) | 475 | 6.111 | 8.526 | 0 | 44.126 |
| Real GDP per capita (GDP) | 475 | 6200.976 | 8661.786 | 434.66 | 49578.36 |
| Trade openness (OPE) | 475 | 81.416 | 41.129 | 0.167 | 210.4002 |
| Inflation (INF) | 475 | 6.605 | 6.266 | -2.091 | 46.289 |

Table C - Descriptive statistics

| Variable's name | Obs. | Mean | Std. Dev. | Min | Max |
|---------------------------------|------|--------|-----------|--------|-------|
| Regulatory quality (INS1) | 475 | -0.471 | 0.6007688 | -1.672 | 1.646 |
| Rule of law (INS2) | 475 | -0.248 | 0.5511736 | -1.617 | 1.267 |
| Voice and accountability (INS3) | 475 | -0.564 | 0.8240234 | -2.810 | 1.283 |
| Control of corruption (INS4) | 475 | -0.353 | 0.5706684 | -2.344 | 0.837 |
| Government effectiveness (IN) | 475 | -0.361 | 0.5671834 | -1.739 | 0.627 |
| Political stability (INS6) | 475 | -0.803 | 0.6229809 | -2.233 | 0.462 |

Table D - Matrix of correlation coefficients

| | PIN | REM | GDP | OPE | INF |
|-----|-----------|-----------|-----------|-----------|-----|
| PIN | 1 | | | | |
| REM | -0.166*** | 1 | | | |
| GDP | 0.048 | -0.533*** | 1 | | |
| OPE | 0.052 | 0.040 | 0.135*** | 1 | |
| INF | -0.091** | 0.036 | -0.165*** | -0.228*** | 1 |

Note: *, **, and *** reports level of significance at 10%, 5%, and 1% corresponding

Table E - Matrix of correlation coefficients among six governance indicators

| | INS1 | INS2 | INS3 | INS4 | INS5 | INS6 |
|------|----------|----------|----------|----------|----------|------|
| INS1 | 1 | | | | | |
| INS2 | 0.789*** | 1 | | | | |
| INS3 | 0.533*** | 0.440*** | 1 | | | |
| INS4 | 0.580*** | 0.758*** | 0.372*** | 1 | | |
| INS5 | 0.888*** | 0.855*** | 0.499*** | 0.749*** | 1 | |
| INS6 | 0.304*** | 0.305*** | 0.056*** | 0.374*** | 0.403*** | 1 |

Note: *, **, and *** reports level of significance at 10%, 5%, and 1% corresponding