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THE IMPACT OF REMITTANCES ON DOMESTIC INVESTMENT IN DEVELOPING COUNTRIES: FRESH EVIDENCE FROM THE ASIA-PACIFIC REGION

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Abstract: *Despite the sharply increasing remittances in developing countries (especially in the Asia-Pacific region), the relationship between remittances and domestic investment in recipient countries has not been fluently evidenced. This paper aims to fill the empirical gap in the Asia-Pacific region by investigating the impact of remittances on domestic investment with a sample including nineteen developing countries based on time series data from 1980 to2015. However, our findings contradict some evidence from other regions. The results robustly confirm that remittances have a negative impact on domestic investment in these countries. Our results also indicate that the annual GDP per capita growth, official development assistance, domestic credit, gross saving, and inflation have a positive impact on domestic investment, however, we conclude that the impact of trade openness on domestic investment has a negative sign in the study period. The paper also provides some policy suggestions with regard to remittance flows in this region.*

Key words: *remittances, domestic investment, GDP per capita growth, official development assistance, domestic credit, gross saving, inflation, Asia-Pacific region, developing countries*

Introduction

Nowadays, there are more than 251 million people, or 3.4% of the world population, who live abroad but send money to their countries of birth. In recent decades, remittances have been one of the most important sources of foreign capital for the economy of many countries in the world. Remittances can be defined as current transfers sent by non-resident workers from the overseas to recipient countries (Chowdhury, 2011); or remittances refer to the money and goods that are transmitted to the households by the

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migrant workers working outside of their origin country (Adams & Cuecuecha, 2013). Remittances play a significant role in the developing countries worldwide. In addition, remittances create a financial connection more and more closely among countries, regions, and continents over the world. In most developing countries, remittances are the second-largest financial inflows after foreign direct investment. According to the new edition of the Migration and Development Brief (World Bank, 2017a), global remittances were reported to be approximately $582 billion in 2015, and the developing countries received over $440 billion, accounting for 75.6%, or nearly three times the amount of official development assistance in the same period. However, the true size of remittances (including unrecorded money through formal and informal channels) is believed to be significantly larger. In 2016, some economists forecasted that the remittances to the developing world may be decreased because of the low oil prices and weak economic growth over the world.

Following the reports of the World Bank, it is clear that Asia-Pacific has been the region with the world's largest remittances within the recent 10 years. There are also more than 95 million migrants from the Asia-Pacific region, approximately 37.8% of the migrants in the world. In the Asia-Pacific region, the total inward remittances accounted for more than $244 billion in 2014 (or 56% of the total developing world), a 6% increase from 2013 (see Figure 1). We see that the remittances in the Asia-Pacific region had increased 17 times, from $14.2 billion in 1990 up to $244 billion in 2014. This showed a compound annual growth rate of 5% in 2012–2014, lower than 9% of the remittance received in 2010–2012. The slowdown in 2014 was mainly because of the exchange rate volatility phenomenon, as remittance flows are reported in US dollars. In 2015, remittances via official channels were around $254 billion in the Asia-Pacific region, accounting for 43.6% of the total amount of remittances in the world. Especially, there are

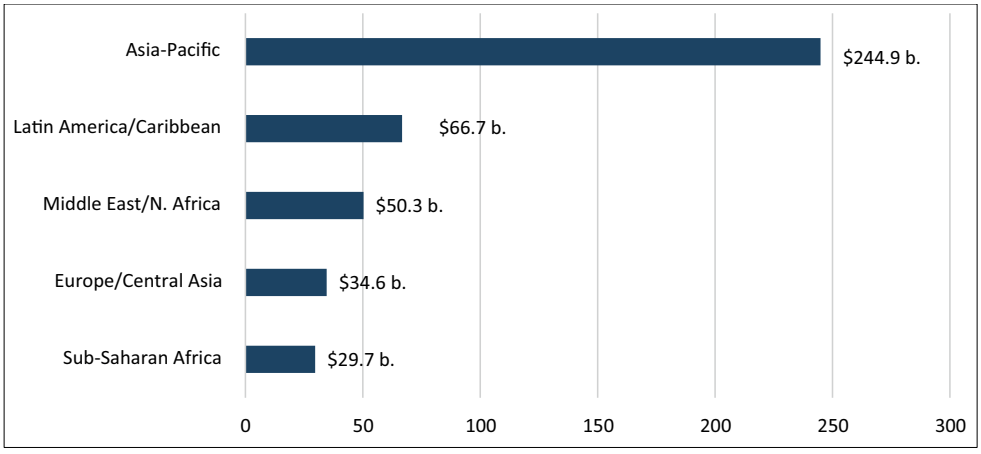

FIGURE 1. **Remittances into the developing countries, 2014 (Unit - $ billions)**

Source: World Development Indicators (World Bank, 2017b)

5 countries from Asia Pacific region ranking in the top-ten remittance-receiving countries in the world, including India, China, Philippines, Pakistan, and Bangladesh. In this region, there were 20 countries with the ratio of remittances over GDP greater than 1% in 2015, and 9 countries with the ratio of remittances to GDP more than 10%, such as Tonga 27.02%, Kyrgyz Republic 25.6% or Jordan 14.2%. Since 1995, remittances have become the second largest foreign capital source (after foreign direct investment) for the Asia-Pacific region. In 2012, the remittance inflows in this region increased up to $236.6 billion in comparison with the foreign direct investment ($557.1 billion) and official development assistance ($33.9 billion).

Despite the significant increase in remittances in the Asia-Pacific region, the main role of remittances has not been empirically investigated more profoundly in this region, including the question how remittances impact domestic investment in recipient countries. There is some previous evidence from the Asia-Pacific region focusing on the impact of remittances on poverty (Hatemi-J & Uddin, 2013), their role in promoting access to finance (Inoue & Hamori, 2016), business cycle (Jha et al., 2010; Mughal & Ahmed, 2014), households consumption (Petrou & Connell, 2016), inflation rate (Tung et al., 2015) or exchange rate (Prakash & Mala, 2015), however, there still exists an empirical gap for the impact of remittances on domestic investment in remittance-receiving countries in this region. Following the literature, there have been some experimental results focusing on the relationship between remittances and domestic investment at the micro-level in other regions; for example, Massey and Parrado (1998) conducted a study in Mexico, Adams and Cuecuecha (2010, 2013) experimented in Guatemala and Ghana, Salas (2014) implemented research in Peru, however, there are few studies on how remittances affect domestic investment at the macro-level, and there is no evidence at this level in the Asia-Pacific region. The expected findings of our paper will contribute to the theoretical literature on remittances in three ways. First, our study is the first evidence focusing on the impact of remittances on domestic investment in the Asia-Pacific region. Second, the results of our study are likely to add to the body of knowledge about the role of remittance by using a sample of nineteen developing countries in the Asia Pacific region. Third, in this paper, we re-examine the effects of some key macro variables on domestic investment in the case of the Asia-Pacific region, including the annual GDP per capita growth, official development assistance received, domestic credit, gross saving, the expense of government, inflation and the trade openness.

The structure of our paper is as follows: it starts with the introduction part, an overview of the literature and some empirical investigations. The econometric equation, methodology, and data description are introduced in the next part. Then the paper shows the estimation results and discussion. Finally, we present conclusions as well as some suggestions for the policy-makers.

1. Literature review

Remittances are the large capital inflows from foreign countries into the recipient countries, in which most of the remittances are transferred to the household sector. Recently, many studies have shown that remittances promote economic growth in the long run (Giuliano & Ruiz-Arranz, 2009; Kratou & Gazdar, 2016) and help to reduce poverty (Acosta et al., 2008; Gupta et al., 2009; Imai et al., 2014). Besides, remittances were found to contribute to the expansion of the financial sector in many countries, which may help promote the domestic investment (Chowdhury, 2011; Aggarwal et al., 2011), increase the efficiency of the banking system, which leads to a better credit environment for domestic firms (Cooray, 2012), increase the competitiveness of an economy (Bayangos & Jansen, 2011; Inoue & Hamori, 2016) or improve financial connection between the host countries and the recipient countries because almost all remittances go through the official banking systems of the countries (Beine et al., 2012). However, remittances were also found to have some negative effects on the economy of the recipient countries, such as social inequality (Acosta et al., 2008), increase of the corruption level (Berdiev et al., 2013), rise of the inflation rate (Narayan et al., 2011; Tung et al., 2015), or the negative impact of remittances on public spending on education and health, namely a "public moral hazard problem" (Ebeke, 2012). On the other hand, the relationship between remittances and domestic investment is still an infrequent topic in the literature review, and the studies are mostly based on micro-level data in some Latin American or Africa countries. Moreover, these studies showed inconsistent or even contradictory results.

According to Massey and Parrado (1998), remittances from the U.S accounted for 21% of start-up capital of the new business formation in Mexico. They concluded that the receipt of U.S. earning by the households and communities significantly increased the odds of business formation and supported productive investment. The results indicated that U.S. migration was an important factor promoting business formation by migrants and nonmigrants alike in Mexico. Conway and Cohen (1998) found that remittances promoted and supported manufacturing companies in the Santa Anan community in Mexico. Both of the above-mentioned studies proved the impact of remittance on promoting private investment in the recipient countries but they are only based on micro-level data in small communities in Latin American.

Adams and Cuecuecha (2010) used a nationally-representative household data in the period from July to December 2000 to investigate how the receipt of internal remittances and international remittances affects the marginal spending behavior of households in Guatemala. Their empirical research led to two findings: first, the households receiving remittances spend less at the margin on one of the major consumption items - food, than they would have done without remittances. Second, the households receiving remittances spend more at the margin on education and housing than they would have spent without remittances. These findings evidenced that remittances increased the level of investment in human and physical capital in recipient countries.

Maphosa (2007) focused on the case of remittances in Zimbabwe (Africa). The study suggested that governments must have the strategies to encourage the flow and investment of remittances, which can significantly contribute to poverty reduction and development in the recipient economies. However, the results concluded that remittances were continuously used mainly for household consumption, with a very small proportion being invested in sustainable investment in this country. With the macro-level sample in Africa, Baldé (2011) investigated the impact of remittances on savings and investment using 37 and 34 Sub-Saharan Africa (SSA) countries over the period 1980–2004. The empirical results found that both remittance inflows and foreign aid had a positive and significant impact on investment in the SSA region. The study also indicated that although the volume and share of remittances were lower than foreign aid, remittances had a more positive impact on investment in these countries. The paper also concluded the remittances that were directly received by people in need and not by governments as intermediaries, would serve more household interests and be more effective in favoring economic development than foreign aid. The results suggested that remittances may have indirect positive effects on economic growth in SSA through savings and investment.

Continuously focusing on the countries in the SSA region, Lartey (2011) found that there was not only a positive impact of remittances on economic growth in this region but also a positive interaction effect between remittances and financial depth of growth. The results also provided evidence for the existence of an investment channel through which remittances contributed to supporting a stable macroeconomic environment and growth, through a consumption smoothing effect. In a highlighted research, Ahamada and Coulibaly (2013) applied the panel Granger causality testing approach to investigate the causal relationship between remittance inflows and economic growth over the period 1980–2007 in the case of 20 countries in the Sub-Saharan African (SSA) region. Unlike other empirical results in the literature, they found that there is no causality between remittances and growth in any SSA country. Their causality tests explained that remittances did not increase growth in SSA countries because they did not increase physical capital investment in these countries.

Adams and Cuecuecha (2013) studied the impact of remittances on investment and poverty in Ghana. Using the dataset of Ghana's household survey from September 2005 to September 2006, they came up with three main conclusions: (i) households receiving remittances spent less at the margin on one key consumption item – food, (ii) remittances increased households investment not only in housing and education but also health care, and (iii) the receipt of remittances greatly reduced the likelihood of household poverty. Their empirical results supported the theoretical framework of the impact of remittances on investment: it not only increased human and physical capital but also reduced poverty in the recipient countries. Gyimah-Brempong and Asiedu (2015) continuously investigated the effects of remittances on investment in education in Ghana. Their results show that remittances significantly increased education human

capital formation in households (the probability of primary and secondary school enrollment was particularly strong for international remittance). They concluded that international remittances supported economic growth and decreased poverty in the long run through the human capital channel in the case of Ghana.

Mallick (2012) focused on the relationship between remittance inflows and private investment in India from 1966 to 2005. The study argued that remittances may result in a moral hazard or dependency syndrome situation, which can prompt the recipients to reduce their participation in productive activities. Thus, the empirical results proved that remittances had a negative impact (or detrimental effect) on private investment in India in the study period. He assumed that a significant proportion of remittances would result in an increase in private consumption without production impact. The results also showed the crowding-out impact of public sector investment, while openness measure raised private investment sector. On the basis of the research findings, he suggested that the Indian government should have appropriate policies regarding more remittance inflows to the private sector for promoting the economic growth. Buckley and Hofmann (2012) compared remittance-receiving and non-remittance households in Tajikistan (a country highly dependent on remittances in Asia) in the period 1999–2007. The empirical findings suggested that households receiving remittances were not more economically stable, wealthier, or entrepreneurial than non-remittances households during the research period; remittances did not support domestic investment in the case of Tajikistan. Investigating the household data of the Vietnamese economy, Tran et al. (2012) focused on the impact of international migration on job creation in the informal sector in Vietnam. Their results indicated that there was no self-employment difference between migrant and non-migrant households. The findings showed the effectiveness of government labor export programs designed to reduce poverty and the tendency of rich families to send children to study abroad. The empirical results also remarkably presented that international migration had no impact on entrepreneurship in the study period in Vietnam.

More recently, Salas (2014) investigated the effect of international remittances on children left behind in Peru using data for the period 2007–2010. The theoretical model was based on the theory of human capital and educational investment decisions linked to remittances. This model tried to analyze the impact of remittances toward households decision to invest in children's education. The results proved that remittances had a positive effect on human capital investment in the case of Peru in the research period. In another study in the Latin American region, Calero et al. (2009) examined the influence of remittance on human capital investments in Ecuador from 2005 to 2006. They concluded that remittances played a role as an investment resource for human capital. Furthermore, the results also found that aggregate shocks were associated with increased work activities, while remittances were spent on education when Ecuador's households were faced with these shocks in the study period.

Davis and Lopez-Carr (2014) applied the new economics of labor migration framework (NELM) to examine the relationship between migration, remittances and household decision-making in land use and livelihood change for the case of four countries in Central America, including Costa Rica (2002), El Salvador (2007), Guatemala (2004) and Nicaragua (2002). The study showed that remittances led to a growth in private investment in agriculture in these countries.

In Asia region, Dahal (2014) analyzed the impact of remittances on economic growth in Nepal through the effects of remittances on financial development, productivity, international trade, and human capital accumulation. The results found that increasing inflows of remittances in this country had a positive association with the financial development and human capital accumulation, but a negative impact on international trade. Remarkably, the empirical results also found a negative association of remittances with manufacturing in Nepal during the study period. This evidence in the case of Nepal had been supported by the results of Adams's study (Adams, 2011), which covered 50 recent empirical studies of the economic impact of remittances on the developing world that were based on household survey data. Adams showed that while international remittances generally had a positive impact on poverty and health in the developing world, remittances could also have negative effects on labor supply, education, and economic growth.

2. Methodology and data description

Based on the previous studies which focused on the determinant variables in investment function, we included the following determinants of domestic investment: output growth (Jongwanich & Kohpaiboon, 2008; Adams, 2009; Mallick, 2012), official development assistance (Baldé, 2011; Röttgers & Grote, 2014; Tigabu et al., 2017), domestic credit (Servén & Solimano, 1992; Jongwanich & Kohpaiboon, 2008; Barbosa et al., 2016), savings of the economy (Feldstein & Horioka, 1980), expense of government (Barbosa et al., 2016), inflation (Jongwanich & Kohpaiboon, 2008; Baldé, 2011) and the openness of trade (Kim et al., 2013). The remittances variable is added to investment function to test the topic hypothesis in this paper. So our econometric model analyzing the impact of remittances on domestic investment in the Asia-Pacific developing countries is presented as follows:

$$\begin{aligned} INV_{i,t} = \beta_0 + \beta_1 GGDPPER_{i,t} + \beta_2 REM_{i,t} + \beta_3 ODA_{i,t} + \beta_4 CREDIT_{i,t} + \beta_5 SAVING_{i,t} + \\ + \beta_6 GE_{i,t} + \beta_7 INF_{i,t} + \beta_8 OPENNESS_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

Where $INV_{i,t}$ is domestic investment, $GGDPPER_{i,t}$ represents the annual GDP per capita growth, $REM_{i,t}$ denotes remittances, $ODA_{i,t}$ is official development assistance received, $CREDIT_{i,t}$ is domestic credit to private sector, $SAVING_{i,t}$ is gross savings of the economy, $GE_{i,t}$ is the expense of the government; $INF_{i,t}$ is inflation, $OPENNESS_{i,t}$

measures the trade openness of the economy and $\varepsilon_{i,t}$ is the error term. Continuously, t denotes time periods, and i is cross-sectional units with $i \in [1, N]$.

TABLE 1. **List, definition and source of variables**

Variable symbol	Definition	Unit	Source of data
INV	Gross fixed capital formation (% of GDP)	%	World Development Indicators of the World Bank, 2017
GGDPPER	Annual GDP per capita growth	%	
REM	Personal remittances, received (% of GDP)	%	
ODA	Net Official development assistance received (% of GNI)	%	
CREDIT	Domestic credit to private sector (% of GDP)	%	
SAVING	Gross savings (% of GDP)	%	
GE	Expense of government (% of GDP)	%	
INF	Inflation, consumer prices (annual %)	%	
OPENNESS	Calculated by the sum of exports and imports over GDP	%	

Source: Calculated by the author from the World Bank (2017b)

This study employs two estimation methods including Ordinary least squares (OLS) and Two-stage least squares (2-SLS) to regress econometric Equation 1. First, we use OLS with both fixed effect model (FEM) and random effect model (REM). In order to choose which yields a better result between fixed effect and random effect regressions, this study applies the Hausman test (Hausman, 1978) to examine the null hypothesis, which states that the unobservable individual specific random errors are uncorrelated. If the null hypothesis is rejected (the p-value is <0.05), we can conclude that the random effect estimations are biased and the fixed effect is better than the random effect regression. Otherwise, if the estimated random effects are not significantly different from the fixed effects estimator, then we choose the random effects estimator.

According to many suggestions about the endogenous phenomenon, we continuously use the 2-SLS regression method, which aims to control the endogeneity in the econometric model, and the results of OLS method are used for comparison. The 2-SLS regression method is applied when the dependent variable's error terms are correlated with the independent variables in the econometric equation, this situation leads to violating the assumption of a linear regression model. To solve this problem, we use some instrumental variables which correlate with the right-hand-side endogenous variables, but they are independent of the error term. The most difficult in 2-SLS technique is finding some good instrumental variables which control the endogeneity in the econometric regression. Following econometric literature, we will replace the endogenous variables in the econometric Equation 1 by their one-period lag values (Vella & Verbeek, 1999), as this method was successfully applied to solve the endogenous phenomenon in some previous studies (e.g., Salas, 2014). Finally, the 2-SLS regression corrects for the possible endogeneity problems in our econometric model.

In this paper, we employ annual panel data from 1980 to 2015 to empirically examine the impact of remittances on domestic investment using the sample that includes 19 developing countries in the Asia-Pacific region. The detailed information of this sample is presented in Table 2, including the name of the country, region and volume of remittances over GDP in the recent time (2015). The countries in the sample were in the Top 10 recipients in the world in 2015, including India ($72.2bn, No1), China ($63.9bn, No2), Philippines ($28.9bn, No3), Pakistan ($20.1bn, No7) and Bangladesh ($15.7bn, No10). There are only 13 countries in Asia and 6 countries in the Pacific in the sample because of the missing data in some countries in this region. However, to our knowledge, this may be the first time that any research has covered so many

TABLE 2. **List of countries and remittances in percent of GDP (2015)**

Country list	Region	Remittances (% GDP)	Country list	Region	Remittances (% GDP)
Bangladesh	Asia	7.88	Pakistan	Asia	7.12
Cambodia	Asia	2.20	Philippines	Asia	10.18
China	Asia	0.40	Papua New Guinea	Pacific	0.06
Fiji	Pacific	5.67	Solomon Islands	Pacific	1.64
Indonesia	Asia	1.12	Thailand	Asia	1.49
India	Asia	3.29	Sri Lanka	Asia	8.50
Lao	Asia	0.75	Tonga	Pacific	27.02
Malaysia	Asia	0.55	Vietnam	Asia	6.81
Maldives	Pacific	0.10	Vanuatu	Pacific	3.24
Mongolia	Asia	2.22			

Source: Calculated by the author from the World Bank (2017b)

TABLE 3. **Descriptive statistics of the variables**

Statistics	Mean	Maximum	Minimum	STD	Observations
INV	25.87	70.22	5.182	9.160	587
GGDPPER	3.197	15.56	-16.55	4.117	622
REM	3.876	36.41	0.012	5.572	585
ODA	6.530	68.57	-0.644	8.900	647
CREDIT	41.95	166.5	0.962	33.77	632
SAVING	23.55	60.78	-48.71	13.29	562
GE	18.43	59.32	7.590	5.959	324
INF	8.203	268.1	-23.82	14.19	610
OPENNESS	84.85	375.3	9.105	48.14	647

Notes: INV is domestic investment, GGDPPER represents the annual GDP per capita growth, REM denotes remittances, ODA is official development assistance received, CREDIT is domestic credit to private sector, SAVING is gross savings of the economy, GE is expense of government; INF is inflation, OPENNESS measures the trade openness.

Source: Calculated by the author from the World Bank (2017b)

observations from the Asia-Pacific region in a cross-countries analysis of the impact of remittances on domestic investment. The data was obtained and analyzed from the World Development Indicators online database (World Bank, 2017b). Table 3 shows the descriptive statistics of the variables in this study.

The correlations between the variables in econometric Equation 1 are shown in Table 4. There are a number of issues discovered through this correlation analysis. Firstly, the relationship between remittances and domestic investment has a negative sign (-0.1112) in the correlation matrix results. However, some macro variables, including domestic credit, gross saving, inflation, have a positive relationship with domestic investment, which reflects that these variables play a role in supporting domestic investment in the Asia-Pacific developing countries.

TABLE 4. **Correlation coefficients between variables**

Variable	INV	GGDP-PER	REM	ODA	CRED-IT	SAV-ING	GE	INF	OPEN-NESS
INV	1.0000								
GGDP-PER	0.3743	1.0000							
REM	-0.1112	0.0465	1.0000						
ODA	-0.0319	-0.0845	0.0124	1.0000					
CREDIT	0.2865	-0.0146	-0.2323	-0.3239	1.0000				
SAVING	0.3441	0.1491	0.2914	-0.3845	0.3085	1.0000			
GE	-0.0354	-0.2614	-0.0667	0.3130	0.0092	-0.2639	1.0000		
INF	0.0190	-0.2143	0.0188	0.0218	-0.2790	-0.1026	0.0779	1.0000	
OPEN-NESS	0.0601	-0.0044	-0.1359	0.2004	0.6056	0.0695	0.2925	-0.2140	1.0000

Notes: INV is domestic investment, GGDPPER represents the annual GDP per capita growth, REM denotes remittances, ODA is official development assistance received, CREDIT is domestic credit to private sector, SAVING is gross savings of the economy, GE is expense of government; INF is inflation, OPENNESS measures the trade openness.

Source: Calculated by the author from the World Bank (2017b)

3. Empirical results and discussion

According to our econometric strategies presented in Section 3, the panel data are estimated using two estimation methods, OLS and 2-SLS. The value of F-test suggests that the null hypothesis of individual homogeneity be rejected at statistically significant1% level and also confirms the existence of individual specificity in our study sample. Continuously, to check which is better between fixed effect and random effect result, we apply the Hausman test, and the testing result leads us to choosing fixed effects because the null hypothesis that the unobservable individual specific random errors are uncorrelated is rejected at the significance of 1%. Therefore, the testing results indicate that

we need to choose the fixed effects to describe both the OLS and 2-SLS regressions. The Durbin-Watson (DW) statistics also confirmed that the estimated results might pass the series correlation phenomenon (1.96 in the OLS and 1.88 in the 2-SLS). Besides, the Wu-Hausman test is a commonly used test for endogeneity in instrumental variables regression. The value of the test confirms that the result of 2-SLS regression is free with the endogenous phenomenon at the significance of 5% level. All regression coefficients presenting the relationship between the variables in econometric Equation 1 as well as the testing values are shown in Table 5 below.

TABLE 5. **The estimation results**

Dependent variable: Domestic Investment	**Ordinary Least Squares (OLS) Fixed-effects**	**Two-Stage Least Squares (2-SLS) Fixed-effects**
GGDPPER	0.4726***	0.9862***
	(5.33)	(7.78)
REM	-0.5120***	-0.3893***
	(-2.68)	(-2.88)
ODA	-0.0840	0.7756***
	(-0.60)	(5.54)
CREDIT	0.1278***	0.1263***
	(6.49)	(6.49)
SAVING	0.3409***	0.3051***
	(6.43)	(5.23)
GE	0.0095	0.1204
	(0.07)	(1.19)
INF	0.1264**	0.5097**
	(2.18)	(2.30)
OPENNESS	-0.0895***	-0.0647***
	(-4.8)	(-5.25)
Constant	17.473***	7.0296**
	(5.93)	(2.43)
Observations	280	258
R-squared	0.4026	0.4073
DW	1.96	1.88
F-test	13.50 (0.0000)	
Hausman test	26.46 (0.0009)	
Wu-Hausman test		2.56389 (0.0390)

*Notes: INV is domestic investment, GGDPPER represents the annual GDP per capita growth, REM denotes remittances, ODA is official development assistance received, CREDIT is domestic credit to private sector, SAVING is gross savings of the economy, GE is expense of government; INF is inflation, OPENNESS measures the trade openness. t-statistics are in parentheses below the coefficients; * significant at 10%; ** significant at 5%; *** significant at 1%.*

Source: Calculated by the author from the World Bank (2017b)

Firstly, we focus on the most important coefficients in these regressions. Contrary to some studies we have reviewed in the literature, our quantitative results show a negative impact of remittances on domestic investment using both OLS (at the 1% significance level) and 2-SLS regression (at the 1% significance level). This evidence affirms that remittances have a significant adverse impact on domestic investment in the Asia-Pacific developing countries over the study period. This result is not consistent with the previous findings in the case of SSA countries reported by Baldé (2011) and some empirical studies in recipient countries in Latin American (Massey & Parrado, 1998; Conway & Cohen, 1998; Davis & Lopez-Carr, 2014). However, our findings are supported by some empirical evidence in previous studies in the Asia-Pacific developing countries, e.g., Mallick's empirical study showed a negative impact of remittances on private investment in India (Mallick, 2012), Tran et al. (2012) concluded that international migration has no impact on entrepreneurship in the case of Vietnam, Buckley and Hofmann (2012) found that households receiving remittances were not more economically stable, wealthier, or entrepreneurial than non-remittance households in Tajikistan, and Dahal' results indicated that remittances had a negative association of remittances with manufacturing in Nepal (Dahal, 2014). Thus, we assumed that remittances have been used extensively for household consumption purposes instead of funding investment in the case of the Asia-Pacific developing countries; this evidence is supported by some previous empirical studies in the Asia-Pacific region (Maphosa, 2007; Sing et al., 2012; Petrou & Connell, 2014). Our empirical results can be explained by the fact that this negative impact of remittances is due to the withdrawal of resources from the investment toward private consumption in the economy. We also think that the negative impact of remittances on domestic investment is created because remittances do not

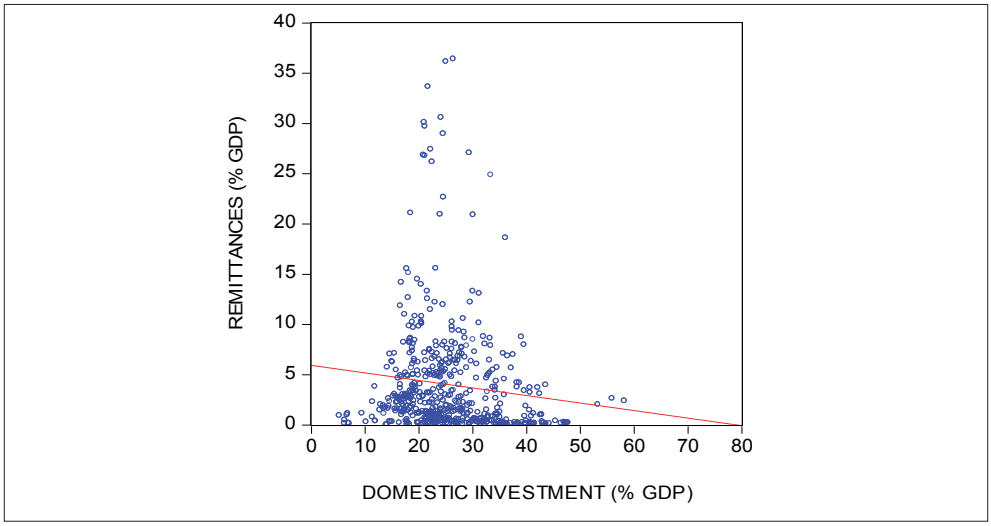

FIGURE 2. **Remittances and domestic investment in the Asia-Pacific region**

Source: World Development Indicators (World Bank, 2017b)

increase physical capital investment in the Asia-Pacific developing countries; this situation had been evidenced in the case of the Sub-Saharan African (SSA) region (Ahamada & Coulibaly, 2013). In particular, the quantitative results show that higher in values remittances may lead to lower domestic investment of the recipient countries (This can be seen quite clearly in the relationship between the two variables in Figure 2).

The negative impact of remittances on domestic investment in the Asia-Pacific region can also be explained by the fact that remittances may lead to a compensatory phenomenon. According to Mallick (2012), the compensatory nature of remittances shows a moral hazard or dependency syndrome that can harmfully affect economic growth as that gets the recipients to slow down their involvement in productive investment activities. Kireyev (2006) studied the impact of remittances on macroeconomics in Tajikistan (an Asian developing country), and he concluded that remittances could contribute to the expansion of the trade deficit. Kireyev (2006) argued that a large amount of remittances was used to finance imports, as most consumer products other than traditional food and virtually all investment products are imported. When people buy more and more foreign products, it can lead to a reduction in demand for domestic products, so the quantity of domestic companies and investment will be decreased in the next period. This implies that remittances do not have a role as a financial source for economic development, and the link between remittances and domestic investment in the Asia-Pacific developing countries assumes a negative sign. Our empirical results imply that the policy-makers not only in the Asia -Pacific region but also in the developing world should take into account the impact of remittances on domestic investment in their economies.

The study results indicate that the growth of GDP per capita has a positive impact on domestic investment using both OLS (significant at the 1% level) and 2-SLS (significant at the 1%). This impact is really robust because the regression values of the GGDPPER variable are the biggest in the coefficient estimation results in the regressions. Our empirical results are in agreement with the theoretical literature and some previous evidence in Asia, for example, Jongwanich and Kohpaiboon (2008) found that private investment tends to positively affect economic growth in both the short run and the long run in Thailand in the period 1960-2005; Mallick (2012) concluded that an increase in output growth (or income level) had a positive impact on private investment in the case of India in the period of 1966-2005. Our evidence is also supported by some empirical results in the case of developing countries in Africa, which found that GDP per capita or real GDP per capita growth rate had a positive effect on investment in this region (Adams, 2009; Baldé, 2011).

Our empirical study also provided evidence of the role of official development assistance (ODA) on domestic investment in the Asia-Pacific region in the study period with 2-SLS regression (at the significance of 1% level). This finding is consistent with the previous empirical result which showed the positive impact of ODA on investment in SSA region in Africa (Baldé, 2011). Our results are also in line with a number of

previous studies which indicate the positive impact of official aid not only on economic growth and reduction of poverty (Kherallah et al., 1994; Tigabu et al., 2017), but also on expanding the investment in the developing world (Röttgers & Grote, 2014). This evidence proves that official development assistance will continuously play an important role in supporting the development in the developing world in the future.

The results indicated that domestic credit had a positive impact and significantly correlated with domestic investment in all regression methodologies. Both OLS and 2-SLS estimations are similar values and have a statistical significance at the 1% level. Our results fit with some empirical studies in Asia, e.g., Jongwanich and Kohpaiboon (2008) concluded that real domestic credit was one of the positive key determinants of private investment in Thailand; Dressler and Li (2009) found that households investment had a positive correlation with credit and money supply; Acosta and Loza (2005) investigated that private investment was positively cointegrated with both short term and long term domestic credit in Argentina in the period 1956-1996; Barbosa et al. (2016) concluded that domestic credit, which was supported by lower funding costs and a higher efficiency of investment, had a positive impact on investment in the developing world. We also found that gross saving has a positive impact on domestic investment at the significance level of 1% in the case of the Asia-Pacific developing countries. The results imply that more savings in an economy lead to higher domestic investment acquired in the long run. The positive impact of savings on domestic investment in the developing countries is also described in some previous studies in Asia or Africa regions (Kim et al., 2007; Eslamloueyan & Jafari, 2010; Baldé, 2011).

Our results showed that there is a positive sign in the relationship between the expense of government (GE) and domestic investment, but we have not found the significant statistic in this relationship in the case of the Asia-Pacific developing countries in the study period. This evidence indicates that higher government expenditure does not tend to increase domestic investment in these economies. The expense of government is cash payments for operating activities of the government in providing products and services, including compensation of employees (such as wages and salaries), interest and subsidies, grants, social benefits, and other expenses such as rent and dividends. According to the literature, when the governments increase their expenditure, this tends to increase in aggregate demand and support the growth, however, if the governments decide to raise taxes to finance their expenses, those additional taxes will further discourage investment. So, the role of the expense of the government (or public investment) is really difficult to determine because it causes a "crowding-in effect" or "crowding-out effect", which depends on the structure of the economy or institutions, or access to the international financial flows and markets. Some evidence has shown this relationship has a positive sign (Narayan, 2004; Jongwanich & Kohpaiboon. 2008), but other studies point to a negative impact (Cavallo & Daude, 2011).

The study shows that the impact of inflation on domestic investment has a positive sign in the Asia-Pacific region. This impact is statistically significant at the 5% level both

in OLS and 2-SLS estimation results. However, the sign of the estimated coefficient of trade openness (OPENNESS) is negative and statistically significant at the 1% level in both OLS and 2-SLS estimations. The literature has a number of empirical data which conclude that the degree of trade openness can support or discourage domestic investment in a developing country. The link between trade openness and domestic investment is still an open question in the literature. To our knowledge, the openness can expand the contracting opportunities for businesses to come to the foreign markets and improve the efficiency of investment worldwide. However, the trade openness may also adversely affect domestic investment in an economy because the firms in developing countries would not have enough competitive resources (e.g., finances or technologies) to be faced with many multinational companies from the developed countries. Moreover, trade openness will increase the imported products, which can lead to narrowing of not only the market of domestic firms but also the domestic investment. Our results are supported by a number of empirical studies which found the negative impact of trade openness or trade liberalization on domestic investment in developing countries (Bleaney & Fielding, 1995; Kim et al., 2013; Dahal, 2014; Musila & Yiheyis, 2015).

4. Concluding remark and Implication

Although remittances have increased rapidly in the developing world in recent decades, most previous studies have been conducted using micro-level data, only a few employ empirical data at the macro-level, in addition, there is no evidence for the Asia-Pacific region. The central target of our paper was to investigate the impact of remittances on domestic investment with a sample of nineteen developing countries in the Asia-Pacific region in the period from 1980 to 2015. Two regression methods, including OLS and 2-SLS, were applied to deeply examine this impact. Our research results contradict most of the empirical studies in other regions. Thus, we conclude that remittances have a negative and statistically significant impact on domestic investment. Our findings also imply that an increase in the volume of remittances may reduce domestic investment in these countries. The increase of remittances may cause a phenomenon of moral hazard or dependency syndrome, which can prompt the receivers to decrease not only domestic investment but also their participation in productive activities. Although the result is contrary to a number of previous studies in Africa and Latin America, our finding is strongly supported by some previous studies in the Asia region. We also conclude that the negative impact of remittances on domestic investment in the Asia-Pacific region is robust because of the high regression values in econometric estimations.

In order to re-examine the effects of some key macro variables on domestic investment in the case of the Asia-Pacific region, we also show that some macro variables have positive and significantly statistic impact on domestic investment, including the annual GDP per capita growth, official development assistance, domestic credit, gross saving, and inflation. However, we find that the impact of trade openness on domestic investment

is negative and significant. Finally, the empirical results present a positive impact of the government expense on domestic investment, but this impact is not statistically significant. The above findings are supported by a number of previous studies in the literature.

The results suggest that remittances may be used to increase the household consumption in the Asia-Pacific region. Consumption impacts on the gross domestic product and supports economic growth with a multiplier effect on aggregate demand. The results also contribute to the literature on the role of remittances in the economy. Besides, remittances are the foreign currency inflows to the Asia-Pacific developing countries, which will increase the total of the medium of exchange in these countries. Therefore, the remittance will lead to an increase in the inflation rate in the economy because some developing countries in the Asia–Pacific region allow people to settle payment by foreign currency. The research findings also provide valuable information about the influence of remittances on domestic investment, hence, the policy-makers in these countries should design some form of friendly policies to attract more remittances, which promote domestic investment due to the upward trend in remittances in the Asia-Pacific region. On the basis of the study findings, we also suggest that the governments should have some appropriate policies regarding remittance inflows to the private sector for promoting the economic growth.

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