Evidence on the Linkages between Remittances and the Macroeconomy

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ABSTRACT. This paper analyzes the linkages between remittances, consumption, investment, and GDP for the small open economy of the Philippines. Taking advantage of the superior remittance reporting of this archipelago nation, we document that remittances share a long-run relationship with consumption, investment, and GDP. Our results show that remittances are useful for forecasting investment, consumption, and GDP. While an innovation to remittances do not contribute to the variance of aggregate investment, over 13% of the variance of consumption is explained by an innovation to remittances. Furthermore, an innovation to remittances impacts consumption and GDP positively. Overall our findings suggest that remittances impact the variability of GDP via the consumption channel. (E20, F24)

I. Introduction

The purpose of this paper is to garner an understanding of the intertemporal linkages between remittances, aggregate consumption, aggregate investment, and GDP in the Philippines. International remittances refer to money and goods that are transmitted to the home country from workers employed abroad. Remittances to developing countries are estimated to have reached $372 billion in 2011, an increase of 12.1% over 2010 (World Bank, 2011). While the volume of remittances has increased, the relationships between consumption, investment, GDP, and remittances have not been adequately studied (Giuliano and Ruiz-Arranz, 2009).

Remittances represent discretionary income and can be used for investment and/or consumption. Early Keynesian theory of consumption suggests that the most important determinant of short-run consumption is current disposable income. An implication of this theory is that increases in remittances should stimulate consumption and thereby

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increase GDP growth. Early empirical evidence supports this view. For example, Stahl and Habib (1989) and Nishat and Bilgrami (1991) estimate a remittance/consumption multiplier of about 1.24 and 2.43 for Bangladesh and Pakistan respectively.

Friedman's Permanent Income Hypothesis (PIH) provides additional insights on the impact of remittances on the macroeconomy. According to the PIH, consumption decisions are largely driven by changes in consumers' permanent incomes. Therefore, if remittances are expected to be permanent, they should be primarily used for consumption. However, if remittances are expected to be transitory, then a larger portion should be invested or saved. Amuedo-Dorantes and Pozo (2010) find empirical support for this notion. They show that when the uncertainty of remittances increases households increase their asset accumulation.

Consumption and investment are intermediate steps through which remittances may encourage economic growth. Durand et al. (1996) argue that remittance may impact economic activity directly through investment and indirectly through consumption. They assert that when remittances are primarily used for consumption, they increase demand for goods and services in the recipient country and in time increase production and income. The above two lines of theory argue for a potential relationship among remittances, consumption, investment, and GDP.

The literature on worker remittances has generally followed two broad approaches. The first approach addresses the determinants of international remittances; these studies typically look at household and economic data in the context of large cross-sectional regressions. The second approach looks at the impact of remittances on the economies of the receiving nations. These studies are interested in understanding the impact of remittances on economic variables such as GDP growth, inflation, and exchange rates. The current research is most related to the second line of literature, as we specifically focus on the impact of remittances on consumption, investment, and GDP.

Existing research documents both positive and negative effects of remittances on economic growth. A few studies present evidence of a positive relationship between remittances and growth (e.g., Giuliano and Ruiz-Arranz, 2009, and Pradhan et al., 2008). Giuliano and Ruiz-Arranz (2009) argue that remittances promote growth in less financially developed countries by providing an alternative way to finance investments and helping to overcome liquidity constraints. Using a

sample of 39 developing countries, Pradhan et al. (2008) document a positive relationship between remittances and growth.

On the other hand, several studies have shown that remittances are negatively correlated with GDP growth (e.g., Chami et al., 2005 and Rao and Hassan, 2011). These studies argue that remittances are not intended to be a source for capital development. Using data from 113 countries over the period of 1970-1998, Chami et al. (2005) argue that remittances provide an incentive to reduce effort, thereby making weak economic performance more likely. Their research argues that recipient households substitute remittances for labor income, which keeps recipient households from working and producing. A recent study by Rao and Hassan (2011), using panel data estimation methods, verifies that remittances do not have any significant direct impact on growth.

Mixed results are also presented in literature on the impact of remittances on consumption. The majority of existing empirical evidence supports the notion that remittances are primarily spent for consumption purposes and have a minimal impact on long-term growth or investment. For example, work by Gilani (1981) finds that most of the remittances sent to a sample of households in Pakistan are spent on consumption. According to Nsiah and Fayissa (2011) remittances are often viewed as compensatory transfers between family members who lost skilled workers due to migration. Given their compensatory nature, remittances are often not directed towards investment. Adams (2011) further supports this proposition in a review which finds that while international remittances can have positive effects on poverty, remittances can also have negative effects on labor supply, education, and economic growth.

Some researchers present evidence that remittances are not necessarily entirely spent on consumption. Baldé (2011) points out that remittances in sub-Saharan Africa (SSA) can have positive influences on savings and investment, as not all migrant remittances in SSA are used for consumption needs. Similarly, using survey data for Western Samoa and Tonga, Brown (1997) shows that housing expenditures are the single largest expenditure out of remittance income. In addition, Airola (2007) documents that remittance receiving households spend relatively more on durable goods, healthcare, and housing compared to households that do not receive remittances. The active debate over the type of consumption remittances stimulates is beyond the scope of the current research, but we hope to add clarity on the dynamic interaction between remittances and consumption.

Similarly, the impact of remittances on aggregate investment spending is a topic of active research. An early paper using a sample of Mexican households by Massey and Parrado (1998) finds that 21% of businesses in their sample are financed with international remittances. In a more recent but related paper, Woodruff and Zenteno (2007) find that international remittances help supply migrant households in Mexico with the capital needed to expand their small enterprises. Similarly, Adams and Cuecuecha (2010) show that for Guatemalan households international remittances are spent less at the margin on food and more on education and housing, supporting the view that remittances may foster certain types of investments. In a paper on the Philippines, Quisumbing and McNiven (2010) use longitudinal data from Bukidnon to show that remittances have a positive impact on housing, consumer durables, non-land assets, total expenditures, and educational expenditure.[1] The above discussion clearly shows that more work is needed to understand the linkage between remittances and macroeconomic variables. The scant and conflicting empirical findings regarding the impact of remittances on consumption and investment motivate this research.

The Philippines is selected for two reasons: 1) data availability and 2) the importance of remittances for the nation. Most studies using aggregate data to analyze the macroeconomic impact of remittances rely on annual data, which can obscure the dynamics. This research explores the relationships between remittances and macroeconomic variables using quarterly data, which is rare in existing literature. Figure 1 illustrates the steady increase in remittances to the Philippines.

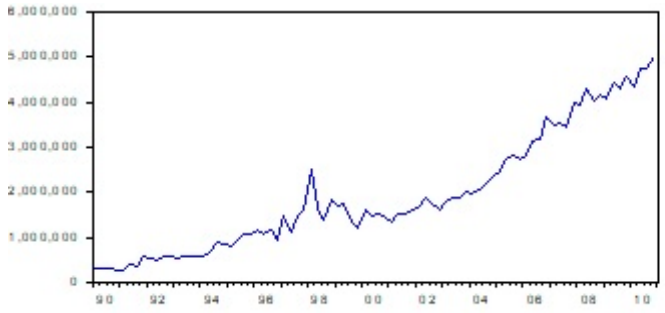

Figure 1: Quarterly Worker Remittances to the Philippines in thousands of USD
1990q01-2010q4

According to a World Bank report (2011), the Philippines was the world's fourth largest recipient of remittances in 2010. World Bank data show that in the Philippines, remittances as a percent of GDP increased from 1.92% in 1980 to 10.73% in 2011. In 2012 total remittances to the Philippines was over 21 billion US dollars. Filipino workers are found throughout the world performing a variety of tasks as illustrated by the composition of official remittances. Remittances from the United States accounted for about 9 billion of the Philippines remittances in 2012. The next five largest sources of remittances in 2012 were Canada (2 billion), Saudi Arabia (1.8 billion), United Kingdom (1.7 billion), Japan (1.1 billion), and the United Arab Emirates (1 billion).[2] As figure 1 illustrates, remittance flows to the Philippines have remained resilient during economic downturns. During the Asian financial crisis of 1997, remittances to the Philippines increased and during the 2008 global financial crisis remittances to the Philippines were not significantly impacted. Figure 1 illustrates the potential for remittances to act as a shock absorber in times of economic uncertainty.

This study represents one of the first to explicitly model the simultaneous linkages between remittances, aggregate consumption, aggregate investment, and GDP. Many studies have recognized the potential endogeneity problem in studying international remittances (Lucas, 2005). For example, do remittances generate GDP growth? Or does growth lead to increases in remittances? The primary manner for dealing with this endogeneity problem is to use instrumental variables within a panel data framework focusing on a large sample of countries. In this research, we implement an econometric framework which allows for feedback between remittances and economic variables. Specifically, we apply a vector error correction model (VECM). This method addresses the endogeneity problem associated with remittances and is appropriate to tackle our main research questions (Zuniga, 2011).

We find that remittances, consumption, investment, and GDP are cointegrated and share at least one long-run relationship. When we consider the importance of remittances in forecasting our selected macroeconomic variables, we find that the time path of consumption, investment, and GDP are better predicted by including lagged values of remittances. In addition, we document that lags of consumption, investment, and GDP are not statistically significant in forecasting remittances.

To understand how remittances impact the variability of the macroeconomy, we decompose the variance of our endogenous variables. Our decompositions show that an innovation to remittances explains about 13% of the variance in consumption and 12% of the variance of GDP growth. Furthermore, impulse response function analysis demonstrates that an innovation to remittances leads to an increase in consumption and GDP. In contrast, an innovation to remittances does not impact the variability of investment. Overall, our findings argue that remittances impact the variability of GDP via the consumption channel rather than the investment channel.

The remainder of the paper proceeds as follows: section 2 describes our methodology and data, section 3 presents our empirical results, and section 4 concludes the paper.

II. Methodology and Data

We apply the VECM method developed by Johansen (1991) to understand the dynamic impacts of remittances on the level and variability of aggregate consumption, aggregate investment, and GDP. There are advantages to using a VECM. One of the attractive features of a VECM is that all variables are jointly endogenous and there is no need to assume an a priori theory of causality. In particular, a VECM allows us to explore the causal relationships between the variables of interest, with causality running in either direction (i.e. from consumption to remittances or remittances to consumption). Our VECM is defined as:

$$\Delta Y_t = \mu + \sum_{j=1}^{k-1} \gamma_j \Delta Y_{t-j} + \varphi y_{t-1} + \varepsilon_t \qquad (1)$$

Where Δ is a first difference notation, μ include deterministic components, Y_t is a $p \times 1$ vector (p = 4 for this study), γ_j and φ are $p \times p$ coefficient matrices representing short-term and long-term impacts, respectively. The matrix φ is decomposed into two matrices, $\varphi = a\beta'$. Here, a and β are $p \times r$ matrices (r <p) and denote respectively the loading (or weight) and the cointegrating space (or vectors) with order r.

The VECM procedure involves the following steps.[3] First, one must decide on the appropriate number of lags to include such that the residuals from each equation are not autocorrelated. Second, the

eigenvectors are estimated based on the full information maximum likelihood method of Johansen (1991). Third, the order of cointergration (r) is determined using the following test statistic:

$$\lambda_{max} = -T\ln(1-\hat{\lambda}_{r+1}) \tag{2}$$

The test statistic is called the maximum eigenvalue test, where $\hat{\lambda}$'s are the estimated eigenvalues. The critical values are obtained from MacKinnon-Haug-Michelis (1999). The fourth step tests if meaningful restrictions can be placed on the r unrestricted cointegration vectors, similar to Johansen and Juselius (1990). Finally, results can be summarized using Granger causality types of tests, variance decompositions, and impulse response functions.[4]

Our data are obtained from two sources. Quarterly consumption, investment, and GDP data in current U.S. dollars are extracted from the National Statistical Coordination Board of the Philippines. We pair these data with monthly remittance data in current U.S. dollars obtained from the Bangko Sentral NG Philippines.[5] To match the frequency of our consumption, investment, and GDP data, remittances are converted into quarterly frequency.[6] The sample period for this study is from the first quarter of 1990 through the fourth quarter of 2010. Following existing literature all variables are transformed using natural logs. Logged values of remittances, consumption, investment, and GDP are denoted throughout the paper as LREM, LC, LINV, and LGDP respectively. Upon inspection of these series, we anticipate that there will be one or more long-run cointergrating relationships between the levels of the variables. Furthermore, we expect based on macroeconomic theory that substantial short-run relationships will exist between the logged differences of these variables. In addition, we examine our variables for the existence of potential structural breaks, but none appear to be evident during our sample period.

III. Empirical Results

Table 1 presents the summary statistics for the variables used in our empirical model as well as the growth rates of each, denoted as GGDP, GC, GINV, GREM. The average quarterly growth rate of worker remittances to the Philippines is 3%. These flows are volatile with a

standard deviation of 15% and extreme values of -41% and 47%. When we look at the growth rates of consumption and investment, we note both have experienced average quarterly growth rates of approximately 1%. As consumption smoothing would suggest, the growth rate in investment fluctuates twice as much as consumption. We report standard deviations of 24% for investment and 11% for consumption.

TABLE 1–Summary Statistics

	REM	GREM	C	GC	INV	GINV	GDP	GGDP
Mean	1.94	0.03	29.77	0.01	8.80	0.01	49.77	0.01
Median	1.60	0.03	28.43	0.06	8.39	-0.02	39.32	0.01
Max.	4.98	0.47	49.35	0.20	17.87	0.59	67.47	0.18
Min.	0.26	-0.41	17.77	-0.20	5.29	-0.59	27.97	-0.16
Std. Dev.	1.32	0.15	8.01	0.11	2.23	0.24	10.65	0.09
Obs.	83	83	83	83	83	83	83	83

Notes: The table above presents the mean, median, extreme values, and standard deviation for selected variables. Where REM, C, INV, and GDP represent remittances, consumption, investment, and GDP in billions of USD respectively and GREM, GC, GINV, and GGDP represent the continuous growth rates of remittances, consumption, investment, and GDP.

Table 2 presents the contemporaneous correlations between the natural logs of remittances, consumption, investment, and GDP. All variables are strongly positively correlated.

TABLE 2–Correlations

	LREM	LC	LINV	LGDP
LREM	1			
LC	0.93*	1		
LINV	0.62*	0.66*	1	
LGDP	0.93*	0.99*	0.67*	1

Notes: The table above presents the correlations of variables used in our empirical model. Where LREM, LC, LINV, and LGDP represent the natural log of remittances, consumptions, investment, and GDP respectively. Significance levels are reported with asterisks, *, **, and ***, which indicate significance at 1, 5, and 10 percent levels, respectively.

The strong positive correlations between the variables and the difficultly in determining causality priori argues for our selected econometric model. A strong positive contemporaneous correlation between worker remittances and consumption is consistent with the Keynesian prediction that consumption spending and current income move in lockstep. The positive correlation between consumption and remittance income can also be explained in light of permanent income hypothesis. Since remittance flows to the Philippines are resilient, these income flows are likely perceived as a part of permanent income, and therefore spent on consumption.

In order to appropriately estimate equation 1, variables in the system must be both nonstationary and cointegrated. Augmented Dickey-Fuller unit root tests confirm that all variables are nonstationary in the levels, but stationary in the first differences.[7] The λ_{max} test presented in equation 2 suggests at least one cointegrating relationship.[8] The number of lags included is selected using SBIC and AIC. We test models up to eight lags and both SBIC and AIC suggest two lags as optimal.

Granger causality results are presented in table 3, under the null hypothesis that Granger causation does not exist. These results show that the lags of consumption, investment, and GDP are not significant factors in the forecasting of remittances. Our results are in contrast to Gupta (2005) who finds that remittances tend to be high in India when growth slows. Our findings using quarterly data indicate that in the Philippines remittances are not directly determined by aggregate macroeconomic factors. We conjecture that household factors are likely more important determinants of remittances as reported by Quisumbing and McNiven (2010).

TABLE 3–Summary of Granger Causality Test

	D(LREM)	D(LC)	D(LINV)	D(LGDP)
D(LREM) causing	n/a	10.78***	9.30**	9.20**
D(LC) causing	0.78	n/a	27.42***	177.58***
D(LINV) causing	0.22	0.45	n/a	1.94
D(LGDP) causing	1.22	52.40***	4.02	n/a

Notes: The table above presents a summary of Granger causality tests originating from the VECM of LREM, LC, LINV, and LGDP for the period of 1990Q1-2010Q4. Where LREM, LC, LINV, and LGDP represent the natural log of remittances, consumptions, investment, and GDP respectively. Reported in the table are Chi-squared statistics. The null hypothesis is that Granger causation does not exist. Significance levels are reported with asterisks, *, **, and ***, which indicate significance at 1, 5, and 10 percent levels, respectively.

We do, however, note that the lags of remittances have a strong and statistically significant impact on the forecastablity of the other macroeconomic variables. The finding of 'one way' causality between remittances and macroeconomic variables is consistent with existing literature that reports that remittance flows are more stable than other financial flows.[9] Our results demonstrate that in the medium term, while remittances impact the macroeconomy they flow into, their time paths appear to evolve independent of the performance of their home country.

Although remittances appear to have an economic impact, it does not necessarily imply that they are the main factor behind variability of consumption, investment, and GDP growth. Variance decompositions are estimated to determine the ability of an innovation to endogenous variables in the system to explain variation in other endogenous variables. Table 4 reports the results of this exercise for forecasting horizons of three, six, and ten quarters.

Consistent with the Granger causality results, we document that the variance of remittances are not significantly impacted by an innovation to aggregate consumption, investment, and GDP. When we decompose the variance of consumption, however, we document that as the forecasting period increases, a greater percentage of the variance of consumption is explained by an innovation to remittances. At the ten quarter time horizon, we find that 13.13% of the variance of consumption is explained by an innovation to remittances, which is greater than the variance of consumption explained by an innovation to GDP (9.94%).

Turning now to the decomposition of aggregate investment, in contrast to our decomposition of consumption, we report that while the lags of remittances are useful in forecasting investment, an innovation to remittances does not significantly impact the future variance of investment. This result must be considered carefully. The data used in this study are aggregate investment as the purpose of our research is to explore the dynamic relationship between remittance flows and investment on the aggregate level. At the household level remittances might be spent on housing or to purchase land, both of which may be considered as an investment. However, transactions in land or housing among households do not represent a change in aggregate investment. In addition, remittance income may be spent on education and healthcare, which contribute to increased productivity and growth. The impact of increased spending on human capital potentially funded by remittances

may not be realized over the period captured in this study. Overall, while our research does not offer a test of permanent income hypothesis, it uncovers that aggregate investment in the Philippines is independent of remittance flows.

TABLE 4–Variance Decomposition

Forecasting Horizon	LREM	LC	LINV	LGDP
Variance Decomposition of LREM:				
3	98.70	0.15	0.45	0.70
6	98.66	0.33	0.37	0.64
10	98.60	0.38	0.34	0.68
Variance Decomposition of LC:				
3	4.90	72.68	17.53	4.88
6	10.21	66.81	15.05	7.93
10	13.13	62.45	14.48	9.94
Variance Decomposition of LINV:				
3	0.85	6.70	90.23	2.22
6	1.71	24.56	69.73	4.00
10	1.40	28.29	65.84	4.47
Variance Decomposition of LGDP:				
3	5.83	47.36	12.82	33.98
6	9.94	38.19	7.71	44.16
10	11.99	33.79	6.67	47.55

Notes: The table above presents a summary of the variance decompositions originating from the VECM of LREM, LC, LINV, and LGDP for the period of 1990Q1-2010Q4. Where LREM, LC, LINV, and LGDP represent the natural log of remittances, consumptions, investment, and GDP respectively.

We continue our empirical investigation with the analysis of the impulse response functions (IRF). IRF gives the estimated response of each variable in a VECM to a pure innovation to one of the variables in the system. A pure innovation is defined as an innovation to one of the variables that is uncorrelated with any of the innovations to other variables in the system. The IRF captures the dynamics of the system.

Figure 2 presents the IRFs from the VECM presented in equation 1. Row 1 shows the response of remittances to an innovation to other variables in the system. Row 1 shows that an innovation to remittances tends to predict higher remittances in the immediate future. In addition,

an innovation to consumption or GDP also tends to lead to higher levels of remittances. Row 2 reports the response of consumption to an innovation to other variables in the system. There is a clear significantly positive impact of an innovation to remittances on consumption. An innovation to remittances, significantly positively impacts the future time path of consumption, this results is consistent with the Granger causality and variance decomposition results reported earlier. It is also noted that an innovation to consumption and GDP elicit higher levels of consumption over a ten quarter time horizon. Additionally, an innovation to investment tends to lead to a temporary increase in consumption. Row 3 presents the responses of aggregate investment. We note that an innovation to remittances slightly increases investment. An innovation to consumption and GDP tends to increase investment sharply in the short-run, but the impact quickly dissipates and becomes minimal after one or two quarters.

Row 4 reports the responses of GDP to a pure innovation from other variables included in the VECM. The responses of GDP are very similar to those of consumption; this is due to the fact that the majority of GDP in the Philippines is comprised of consumption spending. An innovation to remittances leads to a persistent increase in GDP. Overall our empirical results demonstrate that remittances positively impact growth in the Philippines through the consumption channel rather than the investment channel.

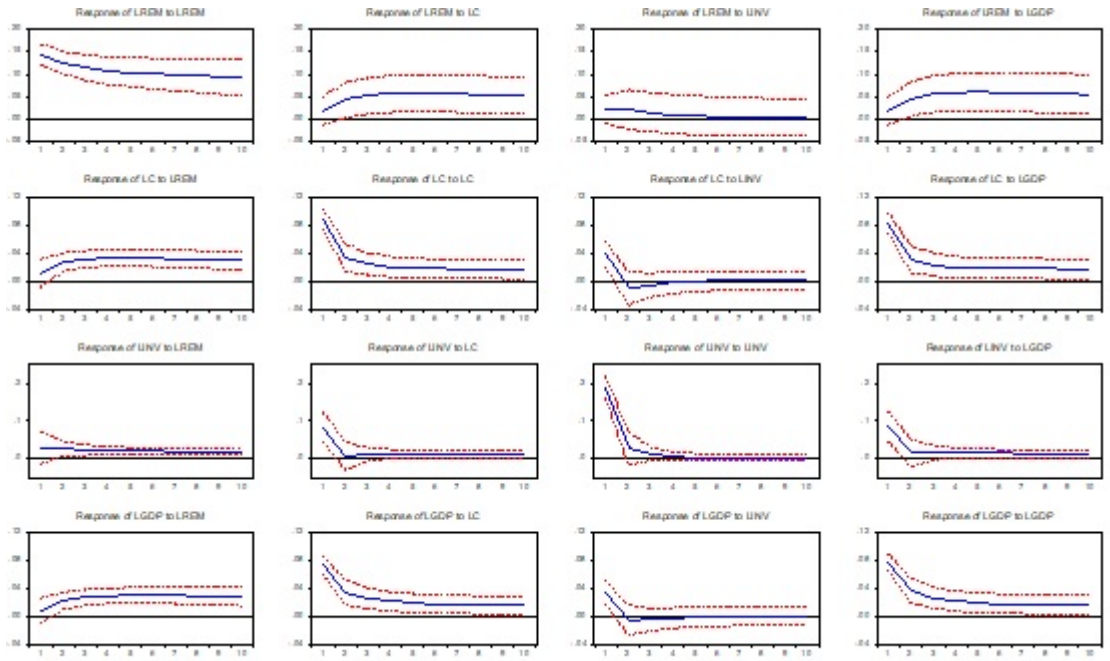

FIGURE 2: IMPULSE RESPONSE FUNCTIONS (IRF)

Notes: The figure above presents a summary of the impulse response functions originating from the VECM of LREM, LC, LINF, and LGDP for the period of 1990Q1-2010Q4. Where LREM, LC, LINV, and LGDP represent the natural log of remittances, consumptions, investment, and GDP respectively. Dotted lines are 90%-confidence bounds, which were generated by a Monte-Carlo simulation with 1000 draws from the posterior distribution. The horizontal axis represents periods elapsed following an innovation and the vertical axis represent percentage deviation in a variable from its long run value caused by an innovation to variables in the model.

IV. Conclusions

The Philippines relies heavily on remittances with over 10% of this archipelago nation's GDP comprised of official remittances in 2010. In this research, we focus on the dynamic linkages between remittances, aggregate consumption, aggregate investment, and GDP in the Philippines. We document that GDP, consumption, investment, and remittances share one long-term relationship. In addition, we report that the lags of remittances are important in forecasting future realizations of consumption, investment, and GDP. On the other hand, we report that the variance of the remittance sequence is primarily driven by innovations to remittances rather than innovations to other variables included in our empirical model. This finding supports existing literature that remittances are more stable than other notoriously volatile cross border financial flows such as foreign equity flows. This result argues that household level factors are likely the most critical in understanding what determinants remittances to small open economies.

To understand the impact of remittances on the variability of consumption, investment and GDP, we decompose the variance of these sequences. We find that an innovation to remittances explains a significant portion of the variance of consumption. In contrast, we document that the variance of the investment is exogenous to innovations to other variables in our system. Our IRF analysis confirms these findings and illustrates that innovations to remittances have a significantly positive impact on aggregate consumption and GDP.

Overall, our results indicate that remittances have a much greater impact on GDP via the consumption channel than the investment channel. As consumption is the largest component of many small open economies' GDP, our results argue for continual monitoring of these important financial flows.

References

Adams, Jr. Richard H. 2011. "Evaluating the Economic Impact of International Remittances on Developing Countries Using Household Surveys: A literature Review." *Journal of Development Studies,* 47(6): 809-828.

Adams, Jr. Richard H., and Alfredo Cuecuecha. 2010. "Remittances, Household Expenditure and Investment in Guatemala." *World Development,* 38(11): 1626-1641.

Airola, Jim. 2007. "The Use of Remittance Income in Mexico." *International Migration Review*, 41(4): 850-859.

Amuedo-Dorantes, Catalina, and Susan Pozo. 2010. "When do Remittances Facilitate Asset Accumulation? The Importance of Remittance Income Uncertainty." Working Paper

Baldé, Yéro. 2011. "The Impact of Remittances and Foreign Aid on Savings/Investment in Sub-Saharan Africa." *African Development Review*, 23(2): 247-262.

Brown, P. C. Richard. 1997. "Estimating Remittance Functions for Pacific Island Migrants." *World Development,* 25(4): 613-626.

Chami, Ralph, Connel Fullenkamp, and Samir Jahjaj. 2005. "Are Immigrant Remittance Flows a Source of Capital for Development?" IMF staff papers, 52 (1): 55-81.

Durand, Jorge, William Kandel, Emilio A. Parrado, and Douglas S. Massey.1996. "International Migration and Development in Mexican Communities." *Demography,* 33(2): 249-264.

French, J. Joseph, and Vijay Vishwakarma. 2013. "Volatility and Foreign Equity Flows: Evidence from the Philippines." *Studies in Economics and Finance,* 30 (1): 4-21.

Gupta, Poonam. 2005. "Macroeconomic Determinants of Remittances: Evidence from India," *International Monetary Fund Working Paper,* WP/05/224.

Johansen, Soren.1991. "Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models." *Econometrica*, 59 (6): 1551–1580.

Johansen, Soren. 1995. "Likelihood-Based Inference in Cointegrated Vector Autoregressive Models." Oxford University Press, USA.

Johansen, Soren, and Katarina Juselius. 1990. "Maximum Likelihood Estimation and Inference on Cointegration–with Applications to the Demand for Money." *Oxford Bulletin of Economics and Statistics*, 52(2):169–210.

Lucas, E.B. Robert. 2005. "International Migration and Economic Development. Stockholm: Expert group on development issues." *Swedish Ministry of Foreign Affairs*.

MacKinnon, G. James, Alfred A. Haug, and Leo Michelis. 1995. "Numerical Distribution Functions of Likelihood Ratio Tests for Cointegration." *Journal of Applied Econometrics*, 14 (5): 563-577.

Massey, Douglas, and Emilio Parrado. 1998. "International Migration and Business Formation in Mexico." *Social Science Quarterly,* 79(1): 1-20.

Nishat, Mohammed, and Nighat Bilgrami. 1991. "The Impact of Migrant Worker's Remittances on Pakistan Economy," *Pakistan Economic and Social Review,* 29(1): 21-41.

Nsiah, Christian, and Bichaka Fayissa. 2011. "Remittances and Economic Growth in Africa, Asia, and Latin American-Caribean Countries: A Panel Unit Root and Panel Cointegration Analysis." *Journal of Economics and Finance*, 32 (1): 424-441.

Paola, Giuliano, and Martha Ruiz–Arranz. 2009. "Remittances, Financial Development, and Growth." *Journal of Development Economics,* 90 (1): 144–152.

Pradhan, Gyan, Mukti Upadhay, and Kamal Upadhay. 2008. "Remittances and Economic Growth in Developing Countries." *The European Journal of Development Research,* 20(3): 497-506.

Quisumbing, Agnes, and Scott McNiven. 2010. "Moving forward, Looking Back: the Impact of Migration and Remittances on Assets, Consumption, and Credit Constraints in the Rural Philippines." *Journal of Development Studies*, 46: 91-113.

Rao, B. Bhaskara, and Gazi Hassan. 2011. "A Panel Data Analysis of the Growth Effects of Remittances." *Economic Modelling*, 28(1-2): 701-709.

Stahl, W. Charles W, and Ahsanul Habib. 1989. "The Impact of Overseas Workers' Remittances on Indigenous Industries: Evidence from Bangladesh." *The Developing Economies,* 27: 269-285.

Toda, Y. Hiro, and Taku Yamamoto. 1995. "Statistical Inferences in Vector Autoregressions with Possibly Integrated Processes." *Journal of Econometrics*, 66 (1-2): 225-250.

Woodruff, Christopher, and Rene Zenteno. 2007. "Migration Networks and Microenterprises in Mexico." *Journal of Development Economics* 82: 509-528.

World Bank. 2011. "Migration and Remittances Fact Book." *World Bank*, Washington, DC.

Zuniga, C. Martha. 2011. "On the Path to Economic Growth, Do Remittances Help? Evidence from Panel VARs." *The Developing Economies*, 49 (2): 171-202.

Endnotes

1. Bukidnon is a province in Northern Mindanao, an island in the southern Philippines.
2. Due to the tremendous importance of remittances to the economy of the Philippines and due to the vast number of its citizens living abroad, wire transfer companies, such as Western Union, are ubiquitous in the Philippines and is the preferred way to transfer money to or within the Philippines.
3. See Toda and Yamamato (1995) for an alternative estimation procedure under the null hypothesis that causation exists.
4. For exact details refer to Johansen (1995).
5. Remittances are only available in current USD. We also note that remittances received by Filipinos are not taxed in the Philippines.
6. Seasonality was detected in consumption, investment, GDP and these variables were seasonality adjusted prior to estimating our empirical model.
7. Unit root tests are not reported, but available upon request.
8. Cointegration tests are not reported, but available upon request.
9. See French and Vishwakarma (2013) for a detailed analysis of foreign equity flows to the Philippines.