Remittances, Banking Sector Development and Economic Growth in Fiji

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ABSTRACT: This study examines the role of remittances and economic growth in banking sector development in Fiji using annual data from 1980-2010. This study finds evidence of long run relationship between banking sector development, remittances and economic growth using bounds testing procedure developed by Pesaran et al. (2001). In addition, our causality analysis based on vector error correction model (VECM) and Toda Yamamoto Granger Non Causality test (1995) suggest that there is causality from economic growth and remittances to banking sector development. The study indicates that remittances inflows may not be only important for economic growth but also for development of banking sector. It is thus, important for policymakers to ensure that remittances flow through formal channels.

Keywords: Remittances; Economic growth; Banking sector development; Bounds testing procedure
JEL Classifications: C32; F24; O16

1. Introduction

International flow of remittances to developing economies is now increasingly part of discussions in academic and public forums. In 2011, remittances flow to developing countries exceeded $350 billion, Mohapatra et al. (2011). In recent years, remittances have increasingly become important for the Fijian economy. In 2011, Fiji received about $290.4 million of remittances, a marginal fall of 1.7% from $295.40 million received in 2010, Reserve Bank of Fiji(2011).A recent study by Jayaraman et al. (2011a) notes that during the period 1984-2002,inflow of remittances in absolute terms capped to about $40 million. According to World Bank (2011), in 2010, remittances accounted for about 6% of GDP.Given the narrow export base, remittances play a very important role not only in Fiji but other small a Pacific Island Countries. A number of papers in recent years have been advanced to explore the impact of remittances on economic growth in Pacific Islands countries, see for example Jayaraman et al. (2011a); Jayaraman et al. (2011b); Jayaraman et al. (2010); Jayaraman et al. (2009).Apart from studying the growth effects of remittances flows, researchers are often interested in investigating whether increased remittance contributes to financial development? Recently, a number of studies have attempted to examine the relationship between remittances and financial development, see inter alia, Oke et al. (2011); Motelle(2011); Shahbaz et al. (2007); Gupta et al. (2007); Aggarwal et al. (2006).

Furthermore, studies by Giuliano and Ruiz-Arranz (2005); Mundaca (2005) reveals the role of financial development in remittances-growth nexus.In another recent study , Ahamada and Coulibaly (2011) investigated how financial development influence the impact of remittances on growth volatility using data from 87 emerging and developing economies and finds that higher level of financial development helps remittances to have a high stabilizing impact on growth volatility. Increase in remittances flow can increase demand for financial services either during transfer of remittances or when they are channeled into savings by recipients. Moreover , increased in remittances flow to recipients account may make them eligible for bank loan and thus expand the size of their credit market, Motelle (2011). It is also possible that due to rising remittances, bank may become more interested in capturing this segment of the market and as a result reduce transfers costs. A recent study by Jayaraman et al. (2010), notes with large proportion of remittances likely to kept in interest earning

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deposits than before and entering of remittances receipts through banking channels promote financial intermediation. On the other hand, a well developed financial sector may facilitate increased inflow of remittances, possibly through reduced transfer costs and attractive saving plans. In a recent study, Motelle (2011) finds causality from financial sector to remittances. Noman and Uddin (2011) also show that financial development contributes to remittances flow[1]. Bettin et al. (2012) studied how level of financial development in home country affects decisions on whether and how much to remit. The authors noted that financial development in the home country does not affect propensity to remit but the amount of money remitted increases with financial development. Thus, whether financial development causes remittances or remittances causes financial development remains to be debated and fully understood.

Policymakers need to know the long run and causal relationship between remittance, economic growth and financial development in order to understand the role of economic growth and remittance in financial sector development. If remittance contributes to financial development, then this may imply that policies that increase flow of remittance may not only contribute to economic growth but also contribute to financial development. If however, increased financial developed facilitates remittances flows and then policies must focus on developing the financial sector to attract more remittances in the country. Nyamongo et al., (2012) investigated the role of financial development and remittances on economic growth in a panel of 36 countries in Africa over the period 1980-2009 and find that remittances appear as a complement to financial development.

Beine et al. (2012) examined the relationship between remittances and financial openness using data from 1980-2005 for 66 mostly developing countries. The author finds strong positive and significant impact of remittances on financial openness.Oke et al. (2011) examined the nexus between financial development in Nigeria for the period 1977 to 2009.The results generally indicated that remittances have positive influence on financial development.Motelle(2011) examined the role of remittances in financial development in Lesotho using alternative measures of financial development. The author did not find evidence that remittances cause financial development. Instead, the author finds evidence that financial development causes remittances, suggesting that development of financial sector can increase remittances flow of remittances. Noman and Uddin(2011) examined the relationship between remittances, banking sector development and GDP in four South Asian of countries (Bangladesh, India, Pakistan and Sri Lanka).Based on individual country time series analysis, the authors note that remittances flow Granger cause banking sector development in Pakistan and Sri Lanka and development of banking sector Granger cause remittances inflow in India and Pakistan. Billmeier and Massa(2009) investigated macroeconomic determinants of stock market capitalization in panel of 17 emerging markets in the Middle East and Central Asia and found that institutions and remittances have positive and significant impact on market capitalization. Male (2009) investigated the impact of remittances on financial development in South-Eastern and Eastern-European countries and found that remittances have positive impact on financial development. Demirgüç-Kunt (2009) examined the impact of remittances on banking breadth and depth for Mexico and finds the remittances are strongly associated with greater banking breadth and depth, increasing number of branches and accounts per capita and the ratio of deposits to gross domestic product. Shahbaz et al. (2007) examined whether remittances promote financial sector performance in Pakistan and finds that remittances promote financial sector in the long run. Gupta et al. (2007) examined the impact of remittances on financial development in 44 Sub Saharan African (SSA) countries. The authors found that remittances promote financial development. Aggarwal et al. (2006) examined the relationship between remittances and financial development in 99 developing countries and finds that remittances have positive impact on financial development. While, there some notable studies that have examine role of remittance in economic growth in Fiji and other Pacific Island countries such as Tonga and Samoa, see, Jayaraman et al. (2011a), Jayaraman et al. (2011b), Jayaraman et al. (2010), Jayaraman et al. (2009) , there is very little or no study done to examine causal relationship between remittances and banking sector development.

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[1] Specifically, the authors found that development of banking sector Granger cause remittances inflow in India and Pakistan based on individual country time series analysis.

Consequently, very little is known about pattern of causality between remittances and banking sector development in Fiji. Fiji become a ideal country in the Pacific Island region, as it is considered to relatively well developed financial sector compared to Tonga and Samoa. Furthermore, given the dominant role of banking sector compared to non banking sector in the Fiji's financial system, it of interest to see if increased remittances inflows bears any relationship with level of banking sector development. Secondly, the literature on causal relationship between banking sector development and remittances for Fiji is almost nonexistent. This study attempts to fill the gap by examining the link between remittances and banking sector development in case of Fiji. Thus, given the increasing role of remittance in Fiji and relative importance of banking sector in the financial system, this article has two major objectives. Firstly, the article aims to investigate if there is long run relationship between banking sector development, remittances and economic growth in Fiji. Secondly, it also aims to investigate the causal relationship between banking sector development and remittance inflow in Fiji.

This study thus, has two major innovations. It studies the relationship between specifically between banking sector development and remittances for Fiji, rather than focusing of financial sector development and remittances. Another major innovation of this study is that, it examines the causal relationship between remittances and banking sector development within trivariate framework by resorting vector error correction model (VECM) and Toda-Yamamoto Granger Non Causality test (1995).The use of two causality techniques will help assess the robustness of the results.The Toda-Yamamoto Granger Non Causality test (1995) has been attractive to researchers due to number of reasons. Firstly, this procedure can be used even if the series are $I(0)$, $I(1)$ or $I(1)$.Testing for unit roots is quite problematic in small sample studies as power of traditional unit roots tests are low, see for example, Schwert (1987), Lo and MacKinlay (1989), Blough (1988).Secondly, the procedure does not require the variables in system to be cointegrated thus, the use of this technique is not conditioned upon existence of cointegration between variables. On the same note, it useful for one to note that traditional Johansen maximum likelihood method (1988, 1990) for testing cointegration is biased in finding cointegration in finite samples, Konya (2004).

The rest of paper is organized as follows. Section 2 explains the data sources and econometric methodology. Section 3 provides the results and discussions while Section 4 provides the concluding remarks.

2. Data Sources and Econometric Methodology
2.1 Data and Unit Root tests

The data for the study are annual figures covering period of 1979-2010 was obtained from World Development Indicators (2011).Banking Sector Development is measured as ratio of domestic credit to private sector as percent of GDP. This measure indicates the quantity and quality of investment financed by the banking sector and has been widely used in empirical studies as noted in Anwar et al. (2011). Jayaraman et al. (2010) also notes that credit to private sector is a more appropriate measure of financial development. Remittance (R) is measured as Workers' remittances and compensation of employees and economic growth(Y) is measured by real GDP per capita. Prior to conducting any empirical analysis, all variables were converted into natural logarithms. Next, the stationary properties of three series(R, F, and Y) are examined using Augmented Dickey –Fuller (ADF),(1979,1981) and Phillips-Perron Unit root(PP),(1988) tests. To conserve space, details of these unit roots are not provided and interested readers are referred to original papers by the authors. The unit root tests are conducted to ensure that none of variables are $I(2)$,as this would invalidate the use of bounds testing procedure.

2.2 Bound testing procedure

This study examines the existence of cointegrating relationship between remittance and banking sector development in Fiji using economic growth as control variable. There are number of advantages of using this procedure to examine long run relationship between banking sector development, remittance and economic growth. Firstly, this procedure to some extent avoids pre-testing for unit roots to verify that all variables are integrated of the same order. In contrast, the Johansen and Juselius (1988, 1990) test and Engle-Granger test (1987) requires variables to be integrated of the same order. The bound test for cointegration can be applied regardless of whether the independent variables are $I(0)$ or $I(1)$.Secondly, this procedure has shown to have superior

performance when compared to the other technique of cointegration such Johansen and Juselius (1988, 1990) test and Engle-Granger test (1987),see Narayan and Smyth(2006), Pesaran and Shin(1999),Haug(2002).For this possible reason, the bound testing procedure has been widely used in small sample studies; see for example, Tang (2001), Pattichis (1999).Thirdly, this procedure allows address the possible endogeneity problem that exist in empiricial studies, Narayan and Smyth (2006).Furthermore, Pesaran and Shin (1999) argue that appropriate modification of orders of the ARDL is sufficient to simultaneously correct the problem of serial correlation and endogeneity. Thus, cointegration between the variables is examined by estimating the equation (1)-(3) using least squares estimators. In equation (1)-(3), the variables are defined as before. The Δ term represents the first difference operator. In conducting the bound test approach for cointegration, the lag length of 2 was adopted based on SBC.

$$\Delta InF_t = \alpha_0 + \beta_1 InF_{t-1} + \beta_2 InY_{t-1} + \beta_3 InR_{t-1} + \sum_{k=1}^{n} \varpi_k \Delta InF_{t-k} +$$

$$\sum_{k=1}^{n} \theta_k \Delta InY_{t-k} + \sum_{k=1}^{n} \rho_k \Delta InR_{t-k} + \varepsilon_t \qquad (1)$$

$$\Delta InY_t = \alpha_1 + \alpha_2 InF_{t-1} + \alpha_3 InY_{t-1} + \alpha_4 InR_{t-1} + \sum_{k=1}^{n} \psi_k \Delta InF_{t-k} +$$

$$\sum_{k=1}^{n} \theta_k \Delta InY_{t-k} + \sum_{k=1}^{n} \rho_k \Delta InR_{-k} + \varepsilon_t \qquad (2)$$

$$\Delta InR_t = \alpha_1 + \sigma_1 InF_{t-1} + \sigma_2 InY_{t-1} + \sigma_3 InR_{t-1} + \sum_{k=1}^{n} \psi_k \Delta InF_{t-k} +$$

$$\sum_{k=1}^{n} \theta_k \Delta InY_{t-k} + \sum_{k=1}^{n} \rho_k \Delta InR_{t-k} + \varepsilon_t \qquad (3)$$

Thus, if one has to test for cointegration when banking sector development is considered the dependent variable, the null hypothesis of $H_0 : \beta_1 = \beta_2 = \beta_3 = 0$ needs to tested using variable addition test option in Microfit Software version 4.1. The resulting F-statistics needs to be compared to critical values provided in Narayan (2005).Two set of critical values are provided and these are often referred to as lower bound critical value and upper bound critical value. If the computed F-statistics is greater than the upper critical value, then the null hypothesis of no cointegration can be rejected and one can conclude that there is cointegrating or long run relationship between variables. If the computed value of F-statistics falls between lower bound critical value and upper bound critical value, then cointegration is inconclusive.

2.3 VAR-ECM and Toda-Yamamoto Granger Non Causality test

If the variables are cointegrated, then there must be causality running at least from one direction. The present study resorts to VAR-ECM and Toda-Yamamoto Granger Non Causality test (1995) to examine the nature of causality between banking sector development, remittance and economic growth. The VAR-ECM procedure can be applied if the variables are cointegrated. In addition,VAR-ECM can be attractive, as it helps one to distinguish between short run and long run causality between variables. Accordingly, to examine the possibility of short run and long run causality between the variables the equations (4)-(6) were estimated. The lag length of 2 was adopted based on SBC criteria and all variables are defined as before. The ECT_{t-1} is obtained from the cointegrating relationship.

$$\Delta InF_t = \delta_0 + \lambda_1 ECT_{t-1} + \sum_{i=1}^{p} \phi_i \Delta InF_{t-i} + \sum_{i=1}^{p} \pi_i \Delta InY_{t-i} + \sum_{i=1}^{p} \varpi_i \Delta InR_{t-i} + e_t \qquad (4)$$

$$\Delta InY_t = \delta_1 + \lambda_2 ECT_{t-1} + \sum_{i=1}^{p} \beta_i \Delta InF_{t-i} + \sum_{i=1}^{p} \omega_i \Delta InY_{t-i} + \sum_{i=1}^{p} \theta_i \Delta InR_{t-i} + e_t \qquad (5)$$

$$\Delta InR_t = \delta_2 + \lambda_3 ECT_{t-1} + \sum_{i=1}^{p} \sigma_i \Delta InF_{t-i} + \sum_{i=1}^{p} \tau_i \Delta InY_{t-i} + \sum_{i=1}^{p} \delta_i \Delta InR_{t-i} + e_t \qquad (6)$$

The short run causality from remittances to banking sector development is investigated by testing the hypothesis $H_o : \varpi_1 = \varpi_2 = \varpi_i = 0$ where $i = 1, 2.3...p$. The rejection of this null hypothesis in favor of the alternative implies that there is short run causality from remittance to banking sector development. Likewise, if there is causality from economic growth to banking sector development, then $H_o : \pi_1 = \pi_2 = \pi_i = 0$ where $i = 1, 2.3...p$ should be rejected at least 10% significance level. Finally, long run causality from remittances and economic growth to banking sector development requires that λ_1 to be statistically significant.

One of the major limitations of VAR-ECM approach to causality testing is that it requires the variables to be cointegrated. Thus, to complement the causality results from VAR-ECM and for sake of consistency check, Toda-Yamamoto Granger Non Casuality test (1995) is applied. This procedure as indicated earlier can be applied regardless of whether the series are I(0),I(1) and I(2).Another advantage of the procedure is that it does not require the variables to be cointegrated. There are two major steps in conducting this Toda-Yamamoto Causality test (1995).In the first step , the lag length(k) of VAR is decided and then second step the maximum order of integration (d_{max}) is decided. The present study sets d_{max} value to 1 as it is considered more appropriate given the sample size. Once these two information are identified, an augmented VAR in levels is estimated with optimal lag length of p, where p= k + d_{max} using seemingly unrelated regression (SURE) technique.

$$InF_t = \alpha_0 + \sum_{i=1}^{k+d_{max}} \beta_{1i} InF_{t-i} + \sum_{i=1}^{k+d_{max}} \delta_{1i} InY_{t-i} + \sum_{i=1}^{k+d_{max}} \phi_{1i} InR_{t-i} + e_t \qquad (7)$$

$$InY_t = \alpha_0 + \sum_{i=1}^{k+d_{max}} \varphi_{1i} InF_{t-i} + \sum_{i=1}^{k+d_{max}} \gamma_{1i} InY_{t-i} + \sum_{i=1}^{k+d_{max}} \eta_{1i} InR_{t-i} + e_t \qquad (8)$$

$$InR_t = \alpha_0 + \sum_{i=1}^{k+d_{max}} \kappa_{1i} InF_{t-i} + \sum_{i=1}^{k+d_{max}} \pi_{1i} InY_{t-i} + \sum_{i=1}^{k+d_{max}} \theta_{1i} InR_{t-i} + e_t \qquad (9)$$

An important point to note while conducting causality test in Toda-Yamamoto procedure test (1995) is that last lag is not considered while testing for causality. The extra lag is included however, to ensure the asymptotically sampling distribution of the test statistic. Furthermore, since the equations are estimated in levels, it avoids loss of long run information. There is causality from remittance to banking sector development if null hypothesis $H_o : \phi_{11} = \phi_{12} = 0$, where i=1,2….k can be rejected at least 10% significance level. Likewise, there is causality from economic growth to banking sector development if null hypothesis $H_o : \delta_{11} = \delta_{12} = 0$, where i=1,2….k can be rejected at atleast 10% significance level.

3. Results and Discussions

Table 1 reports the unit root results. The result indicates that all three series are I(1). Having determined that all variables are I(1), the long run relationship can be investigated using bounds test for cointegration.

Table 2 reports the cointegration results from bounds test for cointegration. The results suggest that null hypothesis of no cointegration can only be rejected when banking sector development is considered the dependent variable.

Table 1. ADF and PP test for Unit Root

	In Y	In F	In R	ΔIn Y	ΔIn F	ΔIn R
ADF test C	-0.858	-0.762	-1.389	-4.415*	-4.707*	-3.955*
C&T	-2.104	-1.478	-3.049	-4.364*	-4.610*	-3.809**
Phillip-Perron C	-0.919	-0.837	-1.583	-4.420*	-4.712*	-4.429*
C&T	-2.197	-1.754	-2.432	-4.364*	-4.610*	-4.052**

Note: *and** denotes rejection of the null hypothesis at 1% and 5% respectively.
C denotes constant term ,C&T denotes constant and time trend

This implies that economic growth and remittance can be considered the long run forcing variables. When the economic growth and remittance are considered the dependent variables, the computed F-statistics is significantly below the lower bound critical value, thus making it impossible to reject the null hypothesis of no cointegration between variables. The finding of long run relationship between remittances, banking sector development and economic growth also suggest that there must causality running between the variables at least from one direction.

Table 2. Cointegration between remittances, banking sector development and economic growth

	Without deterministic trend	With deterministic trend
F_F(F/R,Y)	5.5633**	5.4076***
F_Y(Y/R,F)	2.5919	2.6771
F_R(R/Y,F)	0.1787	1.8376

Note: Critical values are used from Narayan (2005, pp1988-1989).Lag length of 2 was selected using SBC(Schwarz Bayesian Criterion). ** and *** denotes significance at 5% and 10%, respectively

Accordingly, we resorted to VAR-ECM and Toda-Yamamoto Granger Non Causality test to examine the nature of causality between the variables. The results are reported in Table 3, 4 and 5. Based on VAR-ECM results, there is causality from economic growth and remittances to banking sector development in the long run. Another interesting long run result found in this study is that, there is causality from remittances and banking sector development to economic growth.

Furthermore, the results suggest that the null hypothesis the economic growth does not Granger cause remittances can be rejected at 5% significance level. Thus, in the short run, there is causality from economic growth to remittances. It is also found that null hypothesis that economic growth does not Granger cause banking sector development is strongly rejected at 1% significance level in favor of the alternative that there is causality from economic growth to banking sector development. Thus, results from Table 3 indicate that there is evidence of short run as well long run causality from remittances to banking sector development in Fiji.

Table 3. Granger Causality test [VAR-ECM]

	F-Statistic [p-value]			t-statistics [p-value]
Dependent Variable	ΔIn F_t	ΔIn Y_t	ΔIn R_t	ECT_{t-1}
ΔIn F_t	-	24.3516 [.000]*	8.8864 [.012]**	-2.9536 [.008]***
ΔIn Y_t	0.0389 [.981]	-	0.3914 [.822]	-2.3145 [.031]**
ΔIn R_t	3.0991 [.212]	6.4023 [.041]**	-	-0.5194 [.609]

Note: *,and ** denotes rejection of the null hypothesis at 1%,5% respectively.

Table 4 reports the results from Toda-Yamamoto Granger Non Causality test (1995) based on bivariate framework. The results suggest that neither remittance inflows Granger causes banking sector development nor banking sector development causes remittances inflows. Given, that bivariate

causality results are not reliable due to omission of relevant variables, this study uses real GDP as proxy for economic growth (as control variable).

Table 4. Toda-Yamamoto Granger Non Causality test (1995)

Direction of Causality	Computed χ^2 value	Computed p-value
In R→In F	2.836	[0.417]
In F→In R	3.546	[0.314]

Note: Figure brackets are the computed probability values.

Table 5 reports the results from Toda-Yamamoto Granger Non Causality test (1995) based on trivariate framework. There are two notable results in Table 5.Firstly, the null hypothesis that economic growth does not Granger cause banking sector development is rejected at 1% significance level in favour of the alternative that economic growth does Granger causes banking sector development. Secondly, the null hypothesis that remittances inflow does not Granger causes banking sector development is rejected at 5% significance level in favour of the alternative that remittances inflow does Granger causes banking sector development.

Table 5. Toda-Yamamoto Granger Non Causality test (1995)

Direction of Causality	Computed χ^2 value	Computed p-value
InF→In Y	0.589	[0.745]
InR→In Y	3.888	[0.143]
InY→In F	29.626	[0.000]*
InR→In F	6.922	[0.031]**
InY→In R	4.404	[0.111]
InF→In R	2.585	[0.275]

Note:*and ** denotes rejection of the null hypothesis at 1%,5% respectively

Thus , in a nutshell, the causality analysis based on Toda-Yamamoto Granger Non Causality test (1995) and VAR-ECM suggest that remittances Granger causes banking sector development in Fiji.This is not consistent with findings of Jayaraman et al. (2011a).The authors finds evidence of causality from financial sector development(proxied by broad money as percentage of GDP) to remittances inflow in Fiji. Jayaraman et al. (2011b) found that bi-directional causality between remittances and financial sector development in the short run for Tonga and uni-directional causality from financial development to remittances inflow.

There is also consistent evidence to suggest that there is unidirectional causality from economic growth to banking sector development in Fiji. This finding is differs from recent finding of unidirectional short run causality from financial development to economic growth in Fiji by Jayaraman et al. (2011a).It also differs from findings of bi-directional causality between economic growth and financial sector development in Tonga and Samoa by Jayaraman et al. (2011b).

4. Concluding Remarks

This paper has examined the relationship between banking sector development and remittance using economic growth as a control variable. Our key results are; there is long run relationship between banking sector development, remittances and economic growth in Fiji for the period 1979-2010. The causality analysis based on VAR-ECM reveals that there is short run causality from remittance to banking sector development and that in the long run; there is causality from economic growth and remittance to banking sector development. This study provides some preliminary but consistent evidence that there is causal impact of remittance flow on banking sector development in Fiji. This in case of Fiji, there is evidence to suggest that remittances inflow could possibly facilitate banking sector development. In other words, remittances play an important role in banking sector development in Fiji.

As noted by Irving et al. (2010), given high transaction costs involved in sending remittances through banking channels in Pacific Island Economies and the results from this study, it is important

that policymakers review of fees and other charges on inward remittances. It addition, since significant remittances are sent through informal channels, re-looking at interest rates on remittances could well assist in increasing flow of remittances through formal channels and thus promote financial intermediation. Given the limited amount studies on remittances and banking sector development on other Pacific Island economies, it is believed the present study is worth extending in future by utilizing a much larger spans of data. Moreover, studies could examine the nature of long run and causal relationship between remittances inflows and non-banking sector development.

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