Role of Financial Sector in the Remittances-Growth Nexus in Fiji

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Abstract

Amongst the three kinds of non-debt creating capital transfers, welcomed by capital-short Pacific island countries (PICs) for supplementing their limited domestic savings, remittances presently top the list, the other two being foreign aid and foreign direct investment. Remittances help poor families, reducing poverty. In the long run, however, the contribution of remittances to growth in output and economic development is contingent upon financial sector development (FSD). PICs are now fostering financial sector development by promoting greater financial inclusion. This paper seeks to assess the role of FSD in the nexus between remittances and output by undertaking an empirical study of Fiji.

Keywords: Remittances; financial sector development; output; Fiji.

JEL Classification: F24, P43, O40, C13, N17

I. Introduction

Pacific island countries (PICs)[1], since their political independence in the 1970s, have been among the world's largest recipient countries of official development assistance (ODA), popularly known as foreign aid, in per capita terms as well as percent of gross domestic product. There have been several studies on the role of aid in promoting economic growth in PICs. They ranged from World Bank (1993) study, which described the contribution of aid to economic growth as a

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[1] The 14 Pacific island countries (PICs) are: Cook Islands, Fiji, Kiribati, Republic of Marshall Islands, Federated States of Micronesia, Nauru, Niue, Palau, Papua New Guinea (PNG), Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. Among the 14 PICs, PNG is an outlier as its land, population, natural resources with oil and natural gas and other minerals place the country far ahead of the other 13 countries in terms of high growth potential. Hence, our study leaves out PNG from the study focus.

Pacific paradox: no growth in the midst of plentiful aid, to a critical evaluation by Hughes (2003) who declared that aid failed the Pacific. The donors, who had already turned their focus by late 1980s, on rehabilitation of the East European states, began to speed up their phasing out their foreign aid to PICs for annual budgetary support by 2000, concentrating on growth enhancing physical infrastructure investment away from supporting government budgets.

In last two decades, notably from the early 2000s, steadily rising inward remittances sent by increasing number of migrant Pacific islanders residing and working in Australia, New Zealand, the United States and Europe, have been higher than aid to PICs. The FDI inflows to PICs were confined to the tourism sector, as manufacturing-related investments were not attractive because of the smallness of domestic markets. Thus, remittances have now become more important as they supplement domestic savings. Further, they add to real resources of the country, since they are in the form of foreign exchange, which would have to be earned under normal circumstances by exporting limited range of exports of goods, mostly tropical fruits and vegetables. The nexus between remittances and growth, according to the conventional wisdom, is through consumption by recipient families, stepping up domestic aggregate demand. Although increases in consumption expenditures on food, clothing and medicines and children's schooling facilitated by rising remittance inflows have alleviated poverty to a high degree, excess funds in the absence of any avenues for savings mobilization in rural areas tend to get frittered away on needless and avoidable consumption.

If there were opportunities for savings by way of access to financial sector institutions including commercial banks, either for rainy days or for possible investment including purchase of semi-durable goods, additions to reserves in banks would enable greater flows of credit to the would-be investors needing funds. It is well known that well-functioning financial markets, by lowering costs of conducting transactions, facilitate directing remittances to projects that yield the highest return, thereby enhance economic growth (Giuliano and Ruiz-Arranz, 2009). Further, remittances are seen as a substitute for nonexistent credit markets by helping small and medium enterprises bypass lack of collateral requirements or high lending costs and start productive activities on their own (Paulson and Townsend, 2000).

Bettin and Zazzaro (2012) and Giuliano and Ruiz-Arranz (2009) in their panel studies about 100 developing countries, which do not include any of the 14 PICs, investigated the effects of interaction of remittances and financial depth and tested the significance of the interaction term. The two studies argued in a financially deeper

system, the sign of the interaction term would be positive and statistically significant to imply that the growth effects of remittances are likely to be enhanced, establishing the hypothesis of a complementary relationship of remittances with other financial flows. On the other hand, a negative and significant sign would only reject the aforementioned hypothesis and would indicate remittances and financial development are substitutes in shallower financial systems.

Although there has been a growing pool of studies on the remittances and growth nexus in PICs (Browne and Mineshima, 2007; Jayaraman *et al.*, 2009, 2010; Rao and Takirua, 2010), there is no study so far either in regard to the role of financial sector development (FSD) or effects of interaction between remittances and FSD in any PIC. Viewed against the background and in the context of the ongoing efforts to promote all inclusive growth to mainstreaming the bypassed sections of the community through financial inclusion, a study on the role of FSD in the remittances-growth nexus in Pacific region is in order.

The objective of this paper is to fill the gap by undertaking a case study of Fiji over a period of 33 years (1980-2012). The choice of Fiji, as a case study is primarily dictated by availability of official statistics. The data series on various indicators including national income accounts are available in the case of Fiji on a relatively more consistent and reliable basis as well as for a longer period of 30 plus years. The paper is organized as follows: the following Section II gives a brief review of literature on remittances and growth with special reference to the role of FSD; Section III presents the trends in remittances; Section IV gives a brief background of Fiji's economy; Section V describes the empirical model and data sources; Section VI discusses the results while Section VII is a summary with conclusion and policy implications.

II. Review of literature on remittances and growth

Remittances, known as cross-border transfers of earnings by migrants to their countries of origin channeled through official and unofficial channels, have grown over last three decades. According to the World Bank (2011), there are three categories of transfers: (i) workers' remittances; (ii) employees' compensation; and (iii) migrants' transfers. Under the first one, current transfers to non-residents by migrants who are employed in and considered a resident of the countries that host them. The second category comprises wages, salaries and other benefits earned by individuals in countries other than those in which they are residents for work performed for and paid for by residents of those countries. The third category consists of contra-entries to the flow of goods and changes in financial terms that arise from individuals' change of residence from one country to

another, such as movement of accumulated savings when the migrant returns permanently to the home country.

The official channels are either banking systems or authorized money-transfer agencies officially recognized and authorized. Unofficial channels include sending mostly cash through fiends and through carriers who are not legally authorized. It is estimated nearly 50 percent of remittances received in Sub-Saharan Africa through unauthorized channels (World Bank, 2011). The global average transaction cost of remitting, say US$ 200, which was as high as at 25 percent two decades ago has come down to 10 percent by 2010. Although the average cost has further decreased to 7.4 percent in the last quarter of 2015, it is still higher than the targeted rate of 3 percent by 2030 as part of the United Nations Sustainable Development Goal Indicators (World Bank, 2016b), because of the continuing ease of sending money through unauthorized channels.

The World Bank (2011, 2016b) reports that remittances from migrants (who are estimated to be more than 250 million, which is 3.4 percent of the world population in 2015) to developing countries have grown from US$ 69 billion in 1990 to US$ 132 billion in 2000, and US$ 332 billion in 2010 and reached US$432 billion in 2015. Remittances have now emerged to be the most important source of external finance to developing countries, about 40 percent of which went to rural communities in the recipient countries; and further since it grew faster than FDI and ODA during a ten-year period: 2003-2012 (Mashayekhi, 2014).

The annual growth rate of remittances to developing countries was at the highest in 2010 (11.4 percent). However, it declined to 4.9 percent in 2013, 3.2 percent in 2014 and 0.4 percent in 2015, which is the lowest so far. The declines are attributed to the persistent, weak global economic conditions, compounded by falling oil prices, affecting the oil producing Gulf countries which host nearly 30 percent of the migrant population.

Positive impacts of remittances on growth are now well known. Empirical evidence gathered during last two decades, by country specific studies and panel studies (Stahl and Habib, 1989; Adleman and Taylor, 1990; Leon-Ledesma and Piracha, 2001; Edwards and Ureta, 2003; Page and Adams, 2003; Hildebrandt and McKenzie, 2005; World Bank, 2006; Yang, 2008; Bjuggren *et al., 2010;* Bettin and Zazzaro, 2012; and Giuliano and Ruiz-Arranz, 2009*)* have established remittances (i) supported the welfare of the families left behind, thereby alleviating their poverty; (ii) helped the recipient families to upgrade their dwellings and undertake investments towards

improving their farming operations; (iii) enabled families to pay education fees for children and bear expenses of medical care of the elderly; and (iv) added to the foreign reserves of the recipient country, thereby raising the level of credit worthiness for undertaking growth enhancing investments with loans from international funding agencies.

Role of Financial sector development

The developmental impact of remittances can be enhanced only when savings of remittance recipient families are mobilized by financial sector institutions for recycling them as credit. In the absence of access to savings institutions, families in the rural parts of developing countries tend to fritter away their savings on avoidable consumption. With a view to bringing the hitherto bypassed sections of the community into the financial sector fold, the post-2015 Sustainable Development Framework has laid down targets for promoting financial inclusion, which is defined as "effective access and use by individuals and firms of access of affordable and sustainable financial services from formal providers" (United Nations, 2015).

Empirical studies (Calderon *et al.*, 2008; Ramirez and Sharma, 2008; Giuliano and Ruiz-Arranz, 2009; Nyamongo *et al.*, 2012; and Bettin and Zazzaro, 2012) incorporating FSD as a variable in their studies on the remittance–growth nexus employed quantity-based indicators. These are the ratio of liquid liabilities of the financial system to GDP, the ratio of domestic credit provided by the banking sector to GDP, the ratio of bank deposits to GDP, and the ratio of claims on private sector. In addition, Bettin and Zazzaro (2012) added one more variable to represent institutional quality index, representing bank inefficiency defined as the ratio of operating expenses to total income of the banks comprising net interest income plus other income.

The dominant evidence gathered by these studies shows remittance acts as substitute. In countries where domestic credit markets are weak, households that have no access to FSD institutions borrow either from money lenders or borrow at a large premium over the risk adjusted interest rate. In such cases as well as cases where the borrowers have no collateral rely on remittances as an alternative source for funding their projects. They might even pledge their remittances as collaterals. Well-functioning banks which attract remittances on a regular basis do lower monetary cots of opening deposits and allow financial resources to be channeled to productive investments after sufficient screening and ensuring viability of projects (Freund and Sapatafora, 2008).

Giuliano and Ruiz-Arranz (2009) made it clear that only when FSD is small and weak in a given country, remittances become a substitute, contributing to promoting growth. That is in a country with a shallow FSD with thin credit markets, the marginal impact of remittances is much higher. On the other hand, in a country where FSD is strong with widespread credit markets and liquidity constraints do not pose a problem, remittances may actually be used for consumption. In the former case, the sign of the coefficient of remittances would be positive and significant; and the sign of the coefficient of the interaction term would be negative and significant. In a complementary relationship case, signs of the coefficients of remittances and interaction term would be both positive and significant.

Evidence gathered by various studies finds that there is predominant support in favour of the hypothesis of substitutability between remittances and loan finance. These studies include Calderon *et al.* (2008) on Latin American and the Caribbean countries, Barajas *et al.* (2009), Bjuggren *et al.* (2010), and Bettin and Zazzaro (2012).

III. Remittances in PICs

While foreign aid and foreign direct investment inflows have been declining both in absolute amounts as well as percent of GDP in recent years due to recession in donor countries as well as changes in donor priority considerations, the other form of unrequited transfer of resources, namely remittances are receiving greater attention by government (Table 1). It may be seen that remittances from the Pacific islanders who are resident overseas have become steady and growing during the last two decades. They have now proved more reliable than other two kinds of capital transfers.

Notable studies (World Bank, 2006; and Browne and Mineshima, 2007) stressed the importance of growing potential of temporary migration schemes for unskilled citizens of PICs, which were introduced in the mid 2000s by Australia and New Zealand on an experimental measure in regard to a few selected PICs. These schemes are known as Recognized Seasonal Employer Scheme (RSE) by New Zealand from 2008, and Seasonal Worker Programme (SWP) by Australia in 2012. While RSE is focused on horticulture for picking up fruits and related activities, SWP covers horticulture and unskilled work in other agriculture related activities, and in the tourism sector as well. These two schemes now cover all PICs including Fiji, and prove beneficial to both parties, as they help Australia and New Zealand to overcome their chronic shortage of seasonal labour to work on orchards in Australia and New Zealand and help the hitherto unemployed, unskilled labour in PICs to get jobs overseas on a temporary basis and

earn some money and send back some to the families left behind. Almost 12,000 workers from PICs have been estimated to have been employed under these two schemes so far (World Bank 2016c).

Table 1: PICs Foreign Aid, Remittances and FDI (% of GDP)

1980-2009				
Fiji	**1980-89**	**1990-99**	**2000-04**	**2005-09**
Foreign aid	3.27	2.85	1.95	1.87
Remittances	1.66	1.55	4.95	5.73
FDI	3.27	2.85	1.95	1.87
Samoa				
Foreign aid	NA	10.58	11.27	9.56
Remittances	25.09	21.83	16.61	17.93
FDI	0.13	2.76	0.11	3.09
Solomon Islands				
Foreign aid	24.35	14.64	17.62	46.93
Remittances	NA	0.49	1.34	2.03
FDI	1.47	2.92	0.32	9.40
Tonga				
Foreign aid	23.52	16.56	11.10	9.82
Remittances	23.14	18.1	31.15	27.16
FDI	0.13	0.55	1.32	3.68
Vanuatu				
Foreign aid	29.97	20.19	12.65	13.27
Remittances	6.63	7.61	7.47	1.37
FDI	5.81	11.39	6.20	6.24
2010-2014				
Fiji	**2010**	**2011**	**2012**	**2013**	**2014**
Foreign aid	2.51	2.15	2.80	2.22	2.12
Remittances	5.33	4.25	4.8	4.85	4.62
FDI	2.51	2.15	2.80	2.22	2.12
Samoa					
Foreign aid	23.12	13.91	15.73	15.49	11.96
Remittances	21.09	20.95	22.10	20.68	17.55
FDI	-0.20	1.18	1.73	3.04	2.85
Solomon Islands					
Foreign aid	68.57	50.47	32.74	27.42	18.05
Remittances	2.13	1.91	2.02	1.95	1.41
FDI	24.71	13.54	2.33	5.04	1.82
Tonga					
Foreign aid	18.45	20.59	16.68	18.28	18.20
Remittances	20.89	17.84	25.72	27.95	26.29
FDI	2.43	0.84	0.39	1.54	12.90
Vanuatu					
Foreign aid	16.02	11.80	13.82	11.40	12.07
Remittances	1.68	2.75	2.82	2.96	3.45
FDI	9.01	7.72	7.73	7.41	1.63

Source: World Bank (2016)

One of the continuing hurdles faced by migrants from PICs is the persistingly high cost of sending remittances. The World Bank study (2016c) observes PICs are some of the most expensive when it comes to sending remittances to them. The average cost is 11.5 percent, which remained steady for past five years compared to the global average of 7.5 percent (Betteridge and Howes, 2005).

Remittances have been found to be a boon for households in PICs just as elsewhere since they have been supplementing disposable incomes of the recipient families (Chami and Fullenkamp, 2013). The funds received are seen spent on consumption of clothing, food, medicine and shelter. They have also enabled them to invest in education and health care, besides investments in semi durable goods. Remittances are now seen increasingly play a supportive role on enterprising families. They help the small scale rural entrepreneurs undertake simple food processing microenterprises such as pickles, chutney and condiments for local urban markets. Thus, these families look upon remittances as a source of funding new production opportunities for commercial purposes.

As remittances relax credit constraints imposed by undeveloped financial sectors, governments realize the immense potential of remittances in triggering entrepreneurial efforts. Therefore, they are now encouraging financial institutions to help in channeling remittance inflows through formal banking channels. Banks have responded in turn by opening more branches in urban areas as well as new branches in rural areas and introducing mobile banking in inaccessible areas. These efforts are expected to facilitate enhanced financial development by realizing greater economies of scale in financial intermediation.

IV. Background of Fiji's economy

Although its population is less than a million and with no oil or gas resources or major mineral resources, Fiji is the only upper middle income island economy with its per capita income at US$ 4,530, unlike Papua New Guinea which has the largest land area (452, 860 sq.km) with a well diversified export base, comprising both mineral and non-mineral exports. Further, Fiji which has a significant manufacturing base with a relatively well-endowed skilled labour resource has become the leading tourism destination in the Pacific. Its traditional export earning sugar has now been replaced by tourism.

Fiji has been traditionally the least recipient of foreign aid amongst PICs. Its relatively broad based tax system along with a significantly large manufacturing sector has enabled Fiji to depend much less on aid. In more recent times aid has decreased, as the metropolitan

countries have imposed sanctions and reduced aid flows following the military coups of 2000 and 2006. The continued isolation of the country by donors since 2006 until very recently appears to be the chief reason for declining annual aid flows to Fiji.

Table 2. Fiji: Selected Key Indicators

Land Area (sq.km)	18,270
Population in '000 (2015)	892
Per Capita GNI (US$) (2016))	4,540
Aid Per Capita in US$ (2010-14)	105
Aid as percentage of GDP (2010-14)	2.6
Human Development Ranking (2014)	90/188
Annual Average Growth Rate (%) (2010-14)	3.7
Annual Average Inflation (%) (2010-14)	3.3
Overall Budget Balance (% of GDP) (2010-14)	-2.4
Current Account Balance (% of GDP) (2010-14)	-5.7

Source: World Development Indicators (2015)

In regard to FDI, despite the initial adverse impacts of the military coup, some initiatives by the interim government until election in 2014 and the elected government in 2015 in regard to tax reforms, adoption of investor friendly policies, and restoration of stability encouraged inflows of FDI in mineral and tourism sectors. During the crisis years of isolation (2006-2014) by international community following the military coup of 2006, remittances were a great source of support to Fiji.

Fiji's financial sector consists of six commercial banks, five of which are foreign-owned and one domestically owned; four credit institutions; two life insurance companies, seven general insurance companies; and two unit trusts. As of 31st March 2015, the size of Fiji's financial system stood at F$17.4 billion. In terms of percentages, in 2015 the banking sector held the majority of the total assets at around 54 percent of the financial sector, followed by the state-owned Fiji National Provident Funds (FNPF) and the insurance sector at 34 percent, 9 percent other financial insitutes including credit institutions, and others making up the rest. The banking sector recorded the highest growth at 17 percent, due to the entry of one domestic bank into the sector, followed by the FNPF at 7 percent (RBF, 2015, 2016).

The banks remain highly liquid, with liquid assets-to-total assets at 18 percent. Despite some pressures on margins reflecting increased competition, the banks remain highly profitable with a return on equity of 25.6 percent. The capital adequacy ratio stood at 13.7 percent at end-2013, above the minimum prudential requirement of 12 percent (RBF, 2015). As regards coverage by banks in 2014, six

banks have had in total 72 branches, four agencies and 100 agent banking centres. Fiji's level of access to a formal bank account in Fiji, though it compares well to middle income countries, is low when compared to upper-middle income countries, surveyed as part of the World Bank's Global Findex (Whiteside, 2015).

Table 3. FIJI: Key Financial Inclusion Indicators

	2010	2011	2012	2013	2014	2015
Access: Demographic [1]						
Number of cash-in and cash-out points per 10,000 adults	6.7	8.1	10.6	9.46	16.38	21.78
Number of Bank Branches per 10,000 adults	1	1.04	0.99	1.05	1.16	1.17
Number of ATMs per 10,000 adults	3.4	3.5	3.71	4.23	4.58	4.74
Number of EFTPOS per 1000 adults	31.4	48.45	59.76	80.2	87.74	93.16
Access: Geographic						
Number of cash-in and cash-out access points per 1000 sq.km	22.22	26.87	35.47	133.1	139.1	NA
Number of Bank Branches per 1000 sq.km	3.45	3.45	3.28	3.51	3.89	NA
Number of ATMs per 1000 sq.km	11.06	11.6	12.37	14.18	15.38	NA
Number of EFTPOS per 1000 sq.km	103.8	160.8	199.2	268.6	294.9	NA
Number of Agents per 1000 km	18.77	23.43	32.18	129.6	135.2	NA
Usage [2]						
Number of regulated deposit accounts per 10,000 adults	10,341	10,998	10,801	11,830	13,007	13,702
Number of regulated credit accounts per 10,000 adults	1381	1,407	1,442	1,601	1,724	2,022
Number of insurance policy accounts per 10,000 adults	4, 385	4,495	4,620	4,963	5,352	6,278
Number of National Provident Fund Accounts per 10,000 adults	5,905	6,073	6,123	6,232	6,436	6,549

Source: Reserve Bank of Fiji (RBF) (2015). [1] Access refers to the ability for households and firms to use financial products and services; [2] Adults refer to the population that are years 15 and above.

About 60 percent of adults have bank accounts while 27 percent are completely excluded from any type of financial services. Financial inclusion is lower: in the Eastern and Western provinces of Fiji and indigenous Fijians known as *iTaukei* adults; young adults (aged between 15–20 years); and among agricultural and casual workers (RBF, 2015). Nationally speaking, about 71 percent of adults saved

some money during the previous year, compared with 63 percent of adults in upper middle-income countries in the Global Findex Survey. However, out of the 71 percent of adults who saved in the past year, only 38 percent saved with a formal financial institution and 9 percent with saving clubs. Additionally, 27 percent of the respondents have retirement savings; but these are found to be more with the urban dwellers. Moreover, use of credit in Fiji is at 32 percent, which is lower in comparison to upper-middle income countries at 38 percent. The report highlights that those in the informal strand use shop credit, hire-purchases and borrowing from family and friends more than those who are banked (Whiteside, 2015).

The financial inclusion efforts began in late 2009 and early 2010, with the setting up of National Financial Inclusion Taskforce with the task to promote greater and easier access to financial services along with the necessary knowledge and skills to best utilize them. The commitment was to reach 150,000 unbanked or underserved Fijians by the year 2014. One of the objectives was incorporating financial education into the Fijian schools' curriculum.

V. Modeling, data and methodology
The Model

Our choice of the model stems from the Cobb-Douglas production function, along the lines employed by Luintel *et al.* (2008) and Rao *et al.* (2008) with constant returns and Hicks – neutral technical progress.

$$y_t = A_t k_t^{\alpha} \qquad 0 < \alpha < 1 \quad (1)$$

where

y = per capita output;

A= stock of technology;

k = capital stock per capita;

Since our objective is to study the role of financial sector in Fiji's remittances and growth nexus, we introduce a variable for representing financial sector development. Among various indicators including broad money and credit to private sector by banks, our choice is quasi-money, which is the sum of savings and time deposits. Since financial inclusion efforts are directed towards families in the rural areas, which happen to be the majority of the remittance recipients, success of mobilization of rural financial savings is reflected best in the growth of quasi money as a percent of GDP over the period. In addition to quasi money as a variable, we also introduce

an interaction term: the product of remittances and quasi money, both expressed as percentages of GDP.

It is therefore plausible to assume that:

$A_t = f$ (rem $_t$, quasi $_t$, rem $_t$*quasi $_t$)   (2)

where,

rem = inward remittances as percent of GDP;

quasi = quasi money as percent of GDP; and

rem*quasi = interaction term.

We enter rem, quasi, rem*quasi as shift variables into the production function, noting capital per capita as the fundamental and conditioning variable explaining output per capita.

The Cobb-Douglas production is modified as

$$y_t = A_0 e^{\alpha_1 rem_t + \alpha_2 quasi_t + \alpha_3 rem*quasi_t} k_t^{\alpha_4} \qquad (3)$$

The econometric model in natural logarithmic form for estimation purposes is written as follows:

$$ly_t = \alpha_0 + \alpha_1 rem_t + \alpha_2 quasi_t + \alpha_3 rem*quasi_t + \alpha_4 lk_t + \sum \beta_m dum_{mt} + e_t$$

(4)

where ly_t is natural logarithmic real gross domestic product per capita (in US dollars in 2005 prices); lk_t is natural logarithmic real capital stock per capita (in US dollars in 2005 prices). This variable is obtained from Penn Tables (University of Groningen, 2015), which has data on Fiji's capital stock up to 2012; rem_t is remittances as percent of GDP; $quasi_t$ is quasi money as percent of GDP; dum_{mt} is a vector of dummy variables (dum_{1t}, dum_{2t} and dum_{3t}) to capture effects of two military coups: one in 1987; and the other in 2006, and effects of currency devaluation that took place in 2009; and e_t is the random error term.

The hypotheses to be tested are: (i) real capital stock per capita is directly associated with per capita GDP and hence sign of lk should be positive; (ii) remittances positively influence per capita GDP; and hence the sign of rem should be positive; (iii). the dummy variable for coup is negatively associated with the per capita and hence the sign should be negative; and (iv) dummy variable for devaluation is directly associated with per capita GDP.

Meanwhile, there cannot be any a priori conclusion about the interaction term, rem*quasi if the interaction term turns out with a positive sign and happens to be significant as well, it would mean that

the growth effects of remittances are enhanced in a deeper financial system, supporting a complementary role to growth in per capita GDP. On the other hand, if the interaction term emerges with a negative sign and found significant as well, it would indicate that FSD is shallow and hence remittances act as substitute. If the interaction term is negative and not significant, the two are independent of each other.

Data

We utilize the data series of capital stock of Fiji in constant prices released from Penn Tables (University of Groningen, 2015), which are available only up to 2012. All the other data series are sourced from World Development Indicators (World Bank, 2015). Table 4 presents summary statistics of variables used in the analysis.

Table 4. Summary Statistics

Period / year	Per capita GDP (constant US$)	Capital stock per capita (constant US$)	Remittances (percent of GDP)	Quasi money (percent of GDP)
1980-89 (ave)	2721	7936	1.45	32.52
1990-99 (ave)	3053	8468	1.55	37.13
2000-04(ave)	3436	9364	4.95	28.19
2005-09(ave)	3635	10325	5.73	37.69
2010	3619	10861	5.39	40.14
2011	3686	11059	4.27	36.79
2012	3724	12100	4.72	37.61

Source: Capital stock from Penn Tables (University of Groningen 2015) and other data series from World Bank (2015).

Methodology

Methodologies adopted include augmented Dickey-Fuller tests (Fuller, 1976) and Engle-Granger cointegartion test (Engle and Granger, 1987), followed by instrumental variables estimation to control for endoeneity bias caused by endogenous remittances, quasi money supply, and their interaction.

VI. Results and interpretations
Unit Root and Cointegration Tests

Augmented Dickey-Fuller unit root test results for quantitative variables and estimated residuals in Equation (4) are summarized in Table 5. The null hypothesis of unit root is not rejected for all quantitative variables; however, their respective first differences are

found stationary at the 5 percent significance level. This provides evidence that quantitative variables are respectively integrated of order one. Furthermore, combination of these quantitative variables as shown in Equation (4) yields stationary residuals; that is, regression results based on Equation (4) will be non-spurious.

Table 5: Unit Root Test Results

Variable	Option	# lags	Test statistic	p-value
ly_t	Drift	2	-0.180	0.4293
lk_t	Drift	2	2.519	0.9909
rem_t	Drift	2	-1.109	0.1387
$quasi_t$	Constant	2	-2.281	0.1782
$\hat{e}_{t-1}$	Noconstant	0	-5.328	
Δly_t	Constant	2	-4.328	0.0004
Δlk_t	Drift	2	-1.920	0.0324
Δrem_t	Noconstant	2	-4.612	0.0001
$\Delta quasi_t$	Noconstant	2	-3.107	0.0261

Regression Results

Due to potential endogeneity problem in explanatory variables such as remittances, quasi money supply and their interaction, Equation (4) is estimated by using instrumental variables estimators. Excluded instruments are rem_{t-2}, rem_{t-3}, $quasi_{t-2}$, $quasi_{t-3}$, Δly_t, and $rem*quasi_{t-3}$. Validity of instrumental variables is tested by the Sargan test under homoscedasticity (Sargan, 1988) or the Hansen J test with presence of heteroscedasticity (Hansen, 1982); and the endogeneity of problematic regressors is tested by the Hausman test (Hausman, 1978). Four instrumental variables estimators, namely two-stage least squares (2SLS), two-stage generalized method of moments (GMM), k-Class, and limited information maximum likelihood (LIML), are used in estimating Equation (4). Diagnostic tests after OLS estimation of Equation (4) identify the problem of heteroscedasticity (see Table A1 in Appendix); therefore, robust standard errors are produced in instrumental variables estimation. Regression results together with tests statistics are summarized in Table 6.

Estimation results are consistently across four regressions in Table 6. Firstly, validity of instruments is confirmed by the Hansen J tests which yield p-values as high as above 0.59; secondly, endogeneity of remittances, quasi money supply and their interaction is proved by the Hausman tests which yield p-values as low as 0.044 in first two columns. These two tests jointly validate the usage of instrumental

variables estimators and ensure consistency of these estimators' estimates.

Given the smallest value of Root MSE in Column (i), results from 2SLS estimation are used for interpretation purpose. It is evident that capital stock per capita, remittances and quasi money supply individually have positive and significant impacts on output per capita in Fiji. More specifically, output elasticity with respect to capital stock is found 0.249, suggesting a 1 percent increase in capital per capita is associated with 0.249 percent increase in output per capita, *ceteris paribus*. Remittances have highly significant impact on output; it is found that a 1 percentage point increase in remittances-to-GDP ratio is associated with 0.081 percent increase in GDP per capita, *ceteris paribus*. Similarly, a 1 percentage point increase in quasi money-to-GDP ratio is associated with 0.007 percent increase in GDP per capita, *ceteris paribus*.

Table 6: Impacts of Remittances and Financial Sector Development on Per Capita GDP

Regressor	(i) 2SLS		(ii) GMM		(iii) k-Class		(iv) LIML	
	Coef.	(z-stat)	Coef.	(z-stat)	Coef.	(z-stat)	Coef.	(z-stat)
Intercept	5.379	(5.21) ***	4.859	(5.35) ***	6.357	(3.17) ***	6.440	(3.05) ***
Rem	.081	(2.85) ***	.078	(2.89) ***	.150	(2.09) **	.156	(2.02) *
Quasi	.007	(1.90) *	.008	(2.18) **	.017	(1.61) *	.017	(1.58)
*rem*quasi*	-.002	(-1.88) *	-.002	(-1.91) *	-.003	(-1.73) *	-.004	(-1.69) *
Lk	.249	(2.18) **	.307	(3.03) ***	.107	(0.45)	.095	(0.38)
dum$_{1t}$	-.117	(-2.85) ***	-.112	(-3.10) ***	-.197	(-1.93) *	-.204	(-1.87) *
dum$_{2t}$	.024	(2.09) **	.026	(2.40) **	.022	(1.35)	.022	(1.30)
dum$_{3t}$	.106	(3.83) ***	.096	(3.73) ***	.091	(1.95) *	.089	(1.85) *
# observation	30		30		30		30	
Centered R^2	0.8742		0.8730		0.6778		0.6555	
Root MSE	.04464		.04485		.07144		.07386	
Hansen J test Chi^2 (*p-value*)	1.913 (0.5906)		1.913 (0.5906)		0.813 (0.8465)		0.765 (0.8579)	
Endogeneity test Chi^2 (*p-value*)	7.909 (0.0479)		7.909 (0.0479)		7.909 (0.0479)		7.909 (0.0479)	

Notes: (1) *, **, *** denote significance at the 10%, 5% and 1% significance level respectively. (2) In Regression (iii) with k-Class estimator, k = 1 + (L – K)/N = 1.1.

Meanwhile, we find that both the financial development indicators, namely quasi money supply and remittances, have individually significant and positive effects on output per capita, and that the coefficient of the interaction term between remittances and quasi money supply has emerged with a negative sign and found significant. This suggests that marginal output effects of remittances and quasi money supply are respectively reduced by their interaction. Furthermore, taking the first differentiation of output with respect to remittances suggests that remittances' marginal effect on output turns negative if quasi money supply exceeds 40.5 percent of GDP. Similarly, quasi money supply's marginal effect on output turns

negative if remittances exceed 3.5 percent of GDP. This suggests that, when quasi money supply is higher than 40.5 percent of GDP and at the same time remittances are higher than 3.5 percent of GDP, any further increases in both indicators would actually lead to decline in output, *ceteris paribus*.

Our finding that the marginal impact of remittances on output is declining with the level of financial development is similar to the one reached by Guiliano and Ruiz-Arranz (2009) in their study on remittances in developing economies. The finding seems to imply that remittances have compensated for the inefficiency of the financial systems in Fiji, thereby becoming one of funding sources for productive investments. With this, we now have one more piece of evidence that remittances and financial sector development are substitutes in developing economies which have shallow financial systems.

Three dummy variables are individually influential on output as well. It is found that military coup in 1987 on average reduced output per capita by 0.117 percentage points, *ceteris paribus*; coup in 2006 slightly increased output per capita by 0.024 percentage points; and currency devaluation in 2009 increased output per capita by 0.106 percentage points.

VII. Conclusion

This paper undertook an empirical study on the role of financial sector development, represented by quasi money supply in the remittances and growth nexus of Fiji over a three decade (1980-2012). The methodologies employed included augmented Dickey-Fuller unit root test and Engle-Granger cointegration test, followed by instrumental variables estimation to control for endogeneity bias caused by endogenous remittances, quasi money supply, and their interaction.

The study results confirmed remittances and quasi-money were positively associated with growth. However, interaction term turned out with a negative sign indicating that the marginal impact of remittances on growth is decreasing with level financial development. Since it was found statistically significant, the conclusion was beyond doubt that remittances and quasi money acted as substitutes in the growth nexus and that there was no relationship of complementarity between them during the study period. Thus, the financial sector of Fiji was still shallow, despite considerable progress in the financial inclusion efforts.

Although financial inclusion efforts have pushed up the financialization of savings in terms of rise in the ratio of savings and

time deposits to GDP, deepening the financial development depends not only on one front of mobilization but also on all-round progress in various segments of the financial sector. These segments, aside from the banking system, include capital markets, market capitalization, bond market and derivatives. Fiji has a long way to go, but progress is possible with the current initiatives given greater boost in several directions.

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Appendix

Table A1. Diagnostic Tests Results after OLS Estimation of Equation (4)

Test	Null Hypothesis	Test statistic	p-value
Breusch-Godfrey LM test	H_0: error term has no serial correlation	chi2(1) = 0.076	0.7833
Breusch-Pagan/Cook-Weisberg test	H_0: error term has constant variance	chi2(1) = 6.99	0.0082
Ramsey RESET test	H_0: model has no omitted variables	F(3, 20) = 0.91	0.4537
Skewness/Kurtosis tests	H_0: error term is normally distributed	adj chi2(2) = 0.82	0.6630