Exploring the Nexus between Trade, Visitor Arrivals, Remittances and Income in the Pacific: a Study of Vanuatu

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Abstract: We explore the contributions of trade openness, remittance inflows and expansion in tourism towards improving income in Vanuatu over the periods 1983-2009 using the augmented Solow approach and the ARDL bounds test. The results show trade openness and remittances have a positive and statistically significant effect on the long run growth of the economy while tourism expansion is not statistically significant. For a broad-based development policy we propose: remittance inflows need to be encouraged and additional remittance markets to be explored; trade negotiations with specific focus on temporary movement of natural persons need to be prioritized; and ensuring access to financial services and technology to rural and outer islands in Vanuatu. To confine to diversity of the economy, there is a further need to develop tourism infrastructure besides putting policies in place to ensure that tourism sector operations benefit trickle down to the grassroots level of the society.

Keywords: economic growth; tourism expansion; ARDL Bounds Test; Vanuatu.

JEL Classification: F24; L83; N17

1 Introduction

Vanuatu is a developing Pacific Island country (PIC) with a population of some 240,000. The economy is growing at an average rate of 2.5 percent per year since 2001, and is categorized as a least developed country (LDC) among the five countries in the Pacific region. The relatively high subsistence nature of the economy has enabled Vanuatu to withstand the adverse effects of the recent global financial crisis.

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Although agriculture is the main driver of the economy, much of the agriculture is non commercial. The sector employs more than 70 percent of the working population and representing about 19 percent of the GDP. Moreover, kava used to be one of the major export commodities in the early 1990s. However, the ban imposed on kava export by the European Union (EU) has adversely affected the agricultural sector in Vanuatu. The economy is further characterized with poor and costly infrastructure, complex and outdated legal framework, limited access to services including finance, particularly in rural and remote areas, with difficulties in mobilizing land for economic and productive uses. Currently, only about 13 percent of the rural adults have bank accounts and an estimated 92,000 people (38 percent of the population) needs access to secure and convenient financial services without which many of the rural households remain dependent on subsistence farming. The bulk of the financial sector loans are also invested in real estate projects (ADB, 2010).

Nevertheless, over the last three decades, remittance inflows have gained momentum thus playing a critical role in the development process of the country. In 2006, an initiative by the New Zealand government to introduce the Recognized Seasonal Employer Scheme and later, the Australian government's introduction of the Seasonal Pilot Worker Scheme, have provided access to rural and island unskilled workers to participate in fruit picking work in the horticulture and viticulture industry. Therefore these schemes are expected to reduce population pressures and provide remittances to the islands (Bedford, Bedford and Ho, 2010) whilst providing some degree of resilience from external shocks.

In light of this, we explore the contribution of remittances, trade openness (Rose, 2004), and tourism expansion towards per worker income using the augmented Solow approach (Solow, 1956). The study is important in at least three ways. Firstly, we provide a formal approach to measuring factor contribution to per worker income; secondly, the importance of remittances is underscored; and thirdly we put forward some directions towards development discourse for the economy of Vanuatu. The rest of the paper is outlined as follows. A brief literature survey is provided followed by a brief discussion on trends relating to the variables under study. Thirdly, the data, method and model are discussed followed by the analysis. Finally, we conclude with some policy suggestions.

2. A Brief Literature Survey

Remittance inflows are defined as private income transfers from one or more family members living and working abroad back to the remaining family unit in the home country (Chami, Cosimano, & Gapen, 2006). Over the last four decades, remittances have surpassed official development assistance (ODA) of developing

countries, and have been growing substantially increasing from US$22 billion in 1985-1989 to US$308 billion in 2009 (World Bank, 2011a).

When relatively poor families use remittances to increase consumption and to some degree in capital investment, it has poverty reducing effect on the household (Buch and Kuckulenz, 2004; Connell, 2005; Maclellan & Mares, 2005; Ratha, 2007) and subsequently has higher tendency to enhance productive capacities of the economy. Further, remittances also provide income to support growth in human capital (education), healthcare needs, entrepreneurial development, and provide the much needed 'buffer cash' during economic crisis and natural disasters (Browne and Leeves, 2007; UNESCAP, 2010). Remittance expenditure on things like housing, sanitation, health care, food and schooling, results in improvement in welfare and human capital, which in turn have the possibility to increase productivity, freedom of choice and capacity to participate in public debate (De Haas, 2005; Sen, 1999).

A number of researches have been conducted on migration and remittances from development perspective. Subsequently, understanding the migration patterns in the Pacific provides some answers to the relatively uneven flow of remittances in the region as well as development.

In an IMF study, Browne (2006) identified three phases of emigrants' motivations to remit. In the first phase, remittances are used for meeting basic consumption needs of families living in home countries which also extends to the expenditures covering (mobile) phones, sound systems, computers and outboard motors among other things. The second phase is for human capital investment for the next generation, which includes support for schooling in the home country and later for support for higher education abroad. The last phase focuses on future retirement needs if migrants decide to return home, including long term needs such as real estate purchases and house building as well as for business investment purposes.

The most common means of sending remittances in the Pacific region are through postal mail, and via visiting migrant's or migrant's relatives or friends. Brown and Ahlburg (1999) in their study on PICs confirm that remittances sent are largely through informal channels than through formal channels. The formal channels used by the remitters in the region include Western Union money transfers, bank drafts and automated teller machines (ATM). The transaction costs involved in sending remittances to PICs through banking channels have been high (Irving, Mohapatra, & Ratha, 2010). A host of market factors have been said to influence the transaction cost of remittances. According to Ratha & Riedberg, (2005) and Irving, et al. (2010), some of these are: (a) the number of competitors (service providers), which depends on the size of that particular remittance corridor and legal regulations; (b) the cost of remittance providers, which depends on the method and technology available to them for use; (c) the needs and preferences of customers; and (d) the extent to which consumers are aware of the various choices of services

available to them. Further, the preferences of customers are equally dependent on the availability and accessibility of existing remittance-transfer services, the selection of which are largely based on the speed, the needs at the destination, and the sender's legal status.

Reviewing the migration history in the Pacific, it is noted that in the late nineteenth and early twentieth century, after a spate of outright abduction of men and women, referred to as 'black birding' there followed a period of greater surveillance by the British navy and a more regularized form of Pacific islander labour migration to Queensland, New South Wales, Fiji, and New Caledonia. However this labour migration primarily from Melanesian countries such as the Solomon Islands and Vanuatu ceased by the third decade of the century. So for most of the twentieth century, Melanesian countries unlike Micronesian and Polynesian countries were not engaged in labour migration or were recipients of any significant amount of remittances (Scarr, 1967; Shineberg, 1999).

Moreover, despite the argument that migration has become an outlet for many PICs including smallest islands states, such as Niue, Kiribati, Tuvalu, and Wallis and Futuna, which has been further exacerbated by globalization, in the past, Pacific access to Australia and New Zealand had been confined to only selected countries which had close historical ties (Appleyard & Stahl, 1995) with very little chances of migration and work for those who were unskilled (Maclellan & Mares, 2005; Naidu & Pillay, 2001). Later on, the introduction of the Pacific Access Category (PAC) allocated quotas to countries likes Tonga, Fiji, Kiribati and Tuvalu for permanent residence in New Zealand, with stringent conditions relating to employment (Bedford, et al., 2010).

However, the trends are changing now as the developing PICs have greater degree of access to international borders with some conditionality. Growth in out-migration in the Pacific therefore has been said to be compensated by growing remittance inflows which is likely to provide some resilience from external shocks and decline in other capital inflows (Connell, 2005). In a recent study of the PICs, using case studies of Tonga, Samoa and Fiji, Jayaraman et al. (2011, 2010, 2009) show that remittances and financial development are pertinent to the development discourse in these islands. However, integrating the two remains a critical challenge for many developing countries given the poor accessibility and high cost of financial services (Kumar, 2011a). Kumar (2011b) in a study on Vanuatu analyzed the impact of ODA, financial development and foreign direct investment (FDI) with trade openness and remittances, and concluded that only the latter two have a significant and positive effect on income.

In regards to trade openness, a study by Wacziarg and Welch (2008) show that trade liberalization has resulted in higher growth for many countries, and those which experienced negative or no effect were mainly due to political instability,

unfavorable macroeconomic policies, or high protection barriers. Winters, McCulloch & McKay (2004) argue that trade liberalization, if managed properly, can be an important component of a pro-poor development strategy. Kar, Peker, & Kaplan (2008) using Turkey as a case study finds that trade liberalization, financial development and the interaction between the two have positively contributed to economic growth in the long term.

International tourism is vital for many developing countries. Together with developments in information and communication technology, the industry has gained greater prominence over the past decades than the previous efforts invested in import substitution strategies and agriculture thus revolutionizing the structure and organization of tourism (Sheldon, 1997).

In a case study of Mauritius, Durrbarry (2004) estimates tourism effect on growth with real gross domestic investment (capital), secondary school enrolment (human capital), and disaggregated exports, such as sugar, manufactured exports and tourism receipts. Durbarry finds that tourism contributes to about 0.8 percent in the long run. Lee & Chang (2008) using a heterogeneous panel cointegration technique for OECD (Organization for Economic Co-operation and Development) and non-OECD countries find that tourism development has a greater impact on GDP in non-OECD countries than in the OECD countries. Nowak, Shali & Cortes-Jimenez (2007) using Spain as a case study, show that tourism exports when used to finance imports of capital goods can have positive effect on economic growth. Despite differences in methods used, several other studies also conclude that tourism has significant positive effect on economic growth (Brida & Risso, 2011; Brida, Carrera & Risso, 2008; Fayissa, Nsiah, & Tadasse, 2008; Seetana, 2011).

In a panel data analysis for selected PICs (Fiji, Tonga, Samoa and Solomon Islands), Narayan et al. (2010) show that overall, tourism exports contribute to about 0.7 percent to economic growth in the long run and 0.2 percent in the short run. In a recent study on Fiji Islands, Kumar & Kumar (2012) show that ICT development and tourism have significant positive effect on per worker income both in the long run and the short-run with the former having a relatively larger effect. Moreover, Holzner (2011) studied some 134 countries of the world and concluded that tourism dependent countries do not face real exchange rate distortion and deindustrialization but higher than average growth rates as a result of growth in tourism and transport infrastructure, and that investment in physical capital support tourism sector development. On the contrary, not all studies support the tourism-led-growth hypothesis. For examples, Katircioglu (2009) in a case study of Turkey using the bounds test and Johanesen approach, and Oh (2005) in a case study of Korea shows that tourism does not have any significant effect on output level.

2.1. Recent Trends of the Key Economic Drivers in the Developing PICs

It is interesting to note that Vanuatu has recorded a positive growth despite increasing population growth (Table 1). Using 2001-2005 growth rates as a guide, Fiji, Kiribati, and Tonga have negative or lower GDP growth rate relative to their respective population growth.

Table 1. Selected PICs: GDP growth rate versus population growth (%): 1961-2010[a]

Year	Fiji	Kiribati	PNG	Samoa	Solomon Islands	Tonga	Vanuatu
1961-1970	5.22	n.a.	6.88	n.a.	n.a.	n.a.	n.a.
	(2.83)	(1.84)	(2.02)	(2.63)	(3.05)	(3.65)	(2.94)
1971-1980	5.02	-0.50	2.57	n.a.	n.a.	n.a.	-11.40
	(1.97)	(1.72)	(2.25)	(0.85)	(3.54)	(-0.15)	(3.03)
1981-1990	1.55	1.68	1.29	1.18	n.a.	1.84	4.78
	(1.33)	(2.12)	(2.56)	(0.40)	(3.15)	(-0.24)	(2.37)
1991-2000	2.41	3.63	4.36	2.54	2.73	2.89	18.19
	(1.03)	(1.57)	(2.66)	(0.90)	(2.81)	(0.42)	(2.33)
2001-2005	2.44	1.77	1.64	5.04	1.21	1.99	1.13
	(0.65)	(1.81)	(2.54)	(0.27)	(2.62)	(0.66)	(2.64)
2006	1.90	1.90	2.58	2.15	6.95	0.13	7.19
	(0.64)	(1.67)	(2.45)	(0.02)	(2.53)	(0.60)	(2.61)
2007	-0.90	0.41	7.20	2.27	10.70	-0.90	6.74
	(0.64)	(1.61)	(2.41)	(-0.03)	(2.50)	(0.56)	(2.56)
2008	0.20	-1.10	6.70	4.99	7.30	2.60	6.34
	(0.64)	(1.56)	(2.37)	(-0.04)	(2.46)	(0.48)	(2.52)
2009	-3.00	-0.65	5.50	-5.53	-1.20	1.67	3.50
	(0.61)	(1.53)	(2.33)	(-0.01)	(2.42)	(0.39)	(2.49)
2010	0.11	1.80	8.00	1.00	7.00	-0.33	3.00
	(0.57)	(1.52)	(2.29)	(0.05)	(2.37)	(0.28)	(2.48)

a. Figures in parentheses denote population growth rate the interval years are averages calculated by the author.

Source: World Bank (2011b)

The aid inflow dynamics have been impressive for some countries. Using aid (as a percent of GDP) a measure of aid dependency, it is noted that Solomon Islands, Kiribati, Vanuatu, Samoa, and Tonga heavily depend on aid for their development (Table 2).

Table 2. Selected PICs: Aid (US$ millions): 1961-2009[a]

Year	Fiji	Kiribati	PNG	Samoa	Solomon Islands	Tonga	Vanuatu
1961-1970	4.9 (3.2)	n.a.	58.5 (12.3)	n.a.	n.a.	n.a.	n.a.
1971-1980	20.7 (3.2)	13.0 (37.8)	250.3 (17.0)	n.a.	21.4 (22.8)	n.a.	41.2 (35.5)
1981-1990	39.4 (3.3)	15.7 (58.3)	325.5 (11.5)	28.2 (27.4)	36.7 (15.0)	19.1 (24.7)	33.2 (26.1)
1991-2000	44.7 (2.6)	17.7 (30.4)	342.3 (7.9)	39.5 (24.4)	46.9 (10.4)	27.2 (15.3)	39.6 (17.3)
2001-2005	48.6 (2.0)	19.4 (22.0)	232.8 (6.4)	37.6 (12.4)	93.0 (24.1)	24.4 (11.7)	34.0 (10.4)
2006	55.7 (1.8)	26.9 (24.5)	278.9 (5.0)	47.1 (10.7)	204.5 (44.8)	21.4 (7.3)	48.8 (10.9)
2007	50.8 (1.5)	27.0 (21.1)	324.5 (5.1)	37.5 (7.6)	246.1 (42.0)	30.9 (10.1)	56.7 (10.4)
2008	45.3 (1.3)	27.1 (20.5)	304.4 (3.8)	40.3 (7.0)	224.4 (34.7)	25.9 (7.4)	92.3 (14.9)
2009	71.1 (2.5)	27.2 (21.2)	414.8 (5.2)	77.4 (15.6)	202.9 (33.7)	41.3 (12.7)	98.1 (15.9)

a. Figures in parentheses denote percentages to GDP; the interval years are averages calculated by the author.

Source: World Bank (2011b)

Remittances as a percent of GDP have been relatively high for Tonga, Samoa, Kiribati and Fiji. Interestingly, for Tonga, Samoa and Fiji, remittance has surpassed the aid inflows relative to their respective GDPs indicating the possible gains achieved from migration over time.

Table 3. Selected PICs: Remittances (US$ millions): 1971-2009[a]

Year	Fiji	Kiribati	PNG	Samoa	Solomon Islands	Tonga	Vanuatu
1971-1980	4.2 (0.4)	1.6 (4.7)	9.3 (0.5)	12.5 (n.a.)	n.a.	4.5 (16.2)	n.a.
1981-1990	18.8 (1.6)	3.6 (13.6)	6.9 (0.2)	29.0 (29.3)	n.a.	16.6 (21.8)	8.2 (6.5)
1991-2000	29.4 (1.6)	6.7 (11.3)	15.2 (0.3)	40.8 (22.5)	3.3 (0.7)	20.4 (15.0)	20.0 (8.3)
2001-2005	133.0 (5.7)	7.0 (8.2)	7.0 (0.2)	66.6 (20.2)	5.6 (1.5)	63.5 (30.6)	14.2 (5.0)
2006	184.7	7.0	4.4	108.0	1.9	78.9	5.0

	(6.0)	(6.4)	(0.1)	(24.5)	(0.4)	(26.7)	(1.1)
2007	160.5	7.0	7.6	119.8	2.1	101.3	5.5
	(4.7)	(5.5)	(0.1)	(24.3)	(0.4)	(33.2)	(1.0)
2008	123.4	9.0	14.8	135.0	1.7	94.1	7.0
	(3.5)	(6.8)	(0.2)	(23.3)	(0.3)	(27.1)	(1.1)
2009	153.6	8.2	12.0	124.4	2.4	86.8	6.5
	(5.4)	(6.4)	(0.2)	(25.1)	(0.4)	(27.9)	(1.0)

a. Figures in parentheses denote percentages to GDP the interval years are averages calculated by the author.

Source: World Bank (2011b)

Tourist arrival and tourism receipts (percent of GDP) have increased for Vanuatu, Samoa and Tonga over the years while Fiji experienced a decline in visitor arrival since 2006 (Table 4). Tourism receipts (as a percent of GDP) have increased for Vanuatu from 23 percent (1996-2000) to 26 percent (2007).

Table 4. Selected PICs: Tourist arrival (thousands): 1970-2009[a]

Year	Fiji	Kiribati	PNG	Samoa	Solomon Islands	Tonga	Vanuatu[b]
1996-2000	348.7	4.8	60.2	76.7	11.4	29.2	50.2
	(18.2)	(3.8)	(0.3)	(17.1)	(2.0)	(5.2)	(22.5)
2001-2005	445.2	4.4	58.4	93.8	7.2	38.4	55.0
	(21.4)	(5.0)	(0.2)	(17.9)	(1.1)	(4.7)	(24.8)
2006	549.0	4.4	78.0	116.0	11.0	39.0	68.0
	(22.0)	n.a.	(0.1)	(20.7)	(7.7)	(5.3)	(24.3)
2007	540.0	4.7	104.0	122.0	14.0	46.0	81.0
	(21.5)	n.a.	(0.1)	(21.0)	(6.4)	(5.0)	(26.1)
2008	585.0	3.9	114.0	122.0	16.0	49.0	91.0
	(23.6)	n.a.	(0.0)	(19.5)	(6.3)	(5.6)	n.a.
2009	542.0	3.9	n.a.	129.0	n.a.	51.0	101.0
	(21.5)	n.a.	(0.0)	(23.4)	(8.7)	n.a.	n.a.

a. Figures in parentheses denote tourism receipts as percentages of GDP the interval years are averages calculated by the author.

b. For Vanuatu, average number of visitor arrival for 1981-1990 was 28.3 thousand and for 1991-1995, it was 42.5 thousand.

Source: World Bank (2011b) and Vanuatu National Statistics Office, Port Vila, Vanuatu

Further, trade as a percent of GDP has increased for Samoa, Tonga and Vanuatu since 1991-2000 periods (Table 5). On average, between 30 to 40 percent of trade comes from trade in services for countries like Fiji, Samoa and Tonga. For Vanuatu, trade in services (as a percent of Trade) is comparatively high (around 55 percent), thus indicating the economy's heavy focus on service sector expansion. In exploring the sectoral contributions to income, Kumar and Kumar (2011) note that services (value added) as a percent of GDP is close to 68 percent for Fiji and

Vanuatu, indicating services sector expansion and the potential for long term growth in this sector.

Table 5. Selected PICs: Trade (%GDP) and Trade in Services Share (% Trade): 1970-2009[a]

	Fiji	Kiribati	PNG	Samoa	Solomon Islands	Tonga	Vanuatu
1961-1970	92.4 (n.a.)	n.a.	55.5 (n.a.)	n.a.	n.a.	n.a.	n.a.
1971-1980	96.0 (29.3)	100.6 (n.a.)	86.0 (15.9)	n.a.	n.a.	96.2 (28.0)	74.9 (n.a.)
1981-1990	98.8 (37.3)	139.1 (n.a.)	93.7 (17.3)	n.a.	99.9 (27.8)	93.2 (43.1)	104.2 (43.4)
1991-2000	118.9 (41.4)	78.6 (n.a.)	101.7 (23.5)	89.6 (53.6)	93.8 (31.1)	71.8 (40.6)	96.6 (57.5)
2001-2005	125.0 (34.5)	71.4 (n.a.)	125.7 (26.1)	95.3 (40.8)	64.6 (37.6)	72.9 (39.5)	89.5 (62.7)
2006	119.4 (36.0)	n.a.	147.9 (23.2)	93.8 (45.9)	93.4 (28.4)	68.6 (32.1)	87.7 (55.2)
2007	111.9 (36.3)	n.a.	149.1 (24.4)	94.0 (43.6)	93.1 (28.5)	65.6 (34.4)	85.5 (56.2)
2008	128.7 (34.3)	n.a.	136.4 (20.2)	85.8 (41.7)	95.1 (28.5)	70.1 (38.4)	98.0 (n.a.)
2009	108.8 (37.6)	n.a.	115.1 (23.3)	92.0 (49.8)	80.5 (32.4)	71.7 (n.a.)	n.a.

a. Figures in parentheses denote share of trade in services as a percentage of total trade; the interval years are averages calculated by the author.

Source: World Bank (2011b)

Vanuatu, whose key indicators are given in Table 6, is the focus of this paper. Noting the growth in remittances, expansion in trade (and trade in services), and tourist arrivals, we explore the long term impact on the income level.

Table 6. Vanuatu: Selected key indicators*

Land Area (Sq.km.'000)	12.2
Population (2010: '000)	239.7
Per Capita GDP (US$) Current Prices (2010)	3041.7
Aid Per Capita in US$ (2009)	419.4
Aid as percentage of GDP (2005-2009)	12.4
Annual Average Growth Rate in percent (2005-2009)	5.8
Annual Average Inflation in percent (CPI) (2005-2009)	3.4
Fiscal Balance of Central Government as percent of GDP (2004-2008)	2.1
Current Account Balance as percent of GDP (2004-2008)	-8.3

* interval periods are averages calculated by the author.

Source: World Bank (2011b), ADB (2009), UNESCAP (2007)

3. Data, Method and Results

The study looks into the nexus between remittances, trade openness, tourism and per worker income for a 27-year period (1981-2009). The capital stock utilized for the study has been built up by a perpetual inventory method.1 In regards to labour stock, annual population data is used as a proxy since there is no consistent time series data on employment.

Therefore, (i) remittances, expressed as percent of GDP (REM); (ii) trade (total of imports plus exports) as a percentage of GDP (TRDt) which is used as a measure of trade openness or liberalization (c.f. Dollar and Kraay, 2004), and the total tourist arrivals (TURt) (as a proxy of tourism expansion2 – c.f. Kim, Chen, and Jan, 2006; and Wang and Godbey, 1994), are used in the analysis. Data on annual aggregate tourist arrival is obtained from the Vanuatu National Statistics Office. All other variables are retrieved from the World Development Indicators and Global Development Finance database (World Bank, 2011b). All variables are duly transformed into log-form for estimation. Using the conventional Cobb-Douglas production function, with the Hicks–neutral technical progress, the per worker output (yt) is defined as:

$$y_t = A_t k_t^{\alpha}, \qquad 0 < \alpha < 1 \tag{1}$$

where A = stock of technology and k = capital per worker, and α is the capital share. The Solow model assumes that the evolution of technology is given by

$$A_t = A_o e^{gT} \tag{2}$$

where A_0 is the initial stock of knowledge and T is time. It is also plausible to assume for our purpose that

$$A_t = f(T, TRD_t, REM_t, TUR_t) \tag{3}$$

where TRD_t = trade openness as a percent of GDP, REM_t = remittances as a percent of GDP, and TUR_t = tourist/visitor arrival.

The effect of TRD_t, REM_t, and TUR_t on total factor productivity (*TFP)* can be captured when they are entered as shift variables into the production function:

$$A_t = A_o e^{gT} TRD_t^{\beta} REM_t^{\lambda} TUR_t^{\delta} \tag{4}$$

$$y_t = (A_o e^{gT} TRD_t^{\beta} REM_t^{\lambda} TUR_t^{\delta}) k_t^{\alpha} \tag{5}$$

Since the number of observations is small, the bounds testing approach under autoregressive distributed lag (ARDL) procedure developed by Pesaran (Pesaran, Shin and Smith, 2001) is deployed. In bounds testing approach, pre-testing of unit roots is not required and it is possible to investigate cointegration of the levels of the variables, irrespective of their order. However, to ensure that variables are at

[1] Initial capital stock is assumed to be 1.1 times the real GDP at 1979 (in Vatu) with a depreciation rate of 8 percent.

[2] There is no consistent time series data available on tourism receipts.

most I(0) or I(1), we carried out the unit root tests using the ADF and Phillips-Perron (PP) test statistics. From the test results, all variables were nonstationary in their levels and, stationary in their first difference.[1]

The next step is to examine the existence of a long run relationship between per worker output,(y_t) capital per worker (k_t), trade (TRD_t), remittances (REM_t) and tourism (TUR_t) using the bounds test. The ARDL specification is given as follows:

$$\begin{aligned}\Delta Ly_t &= \beta_{10} + \beta_{11}Ly_{t-1} + \beta_{12}Lk_{t-1} + \beta_{13}LTRD_{t-1} + \beta_{14}LREM_{t-1} + \beta_{15}LTUR_{t-1} \\ &+ \beta_{16}TREND + \sum_{i=1}^{p}\alpha_{11i}\Delta Ly_{t-i} + \sum_{i=0}^{p}\alpha_{12i}\Delta Lk_{t-i} + \sum_{i=0}^{p}\alpha_{13i}\Delta LTRD_{t-i} \\ &+ \sum_{i=0}^{p}\alpha_{14i}\Delta LREM_{t-i} + \sum_{i=0}^{p}\alpha_{15i}\Delta LTUR_{t-i} + \varepsilon_{1t}\end{aligned} \quad (6)$$

There are two steps in examining the relationship between Ly_t, Lk_t, $LTRD_t$, $LREM_t$, and $LTUR_t$. First, Equation (6) is estimated by ordinary least squares techniques.[2] Second, the existence of a long-run relationship can be traced by imposing a restriction on all estimated coefficients of lagged level variables equating to zero. Hence, bounds test is based on the F-statistics (or Wald statistics) with the null hypothesis of no cointegration ($H_0 : \beta_{i1} = \beta_{i2} = \beta_{i3} = \beta_{i4} = \beta_{i5} = 0$) against its alternative hypothesis of a long-run cointegration ($H_1 : \beta_{i1} \neq \beta_{i2} \neq \beta_{i3} \neq \beta_{i4} \neq \beta_{i5} \neq 0$). The results of the bounds test are reported in Table 7, confirming the presence of a long run cointegration when only real output per worker (Ly_t) is set as the dependent variable. The computed F-statistics for Ly_t is 4.64 which is significant at 5 percent critical value upper bound.

Table 7. Results of Bound Tests

Dependent Variable	Computed F-statistic	
Ly_t	4.64**	
Lk_t	2.45	
$LTRD_t$	2.35	
$LREM_t$	2.44	
$LTRU_t$	1.91	
	Pesaran, Shin and Smith. (2001)[a]	
Critical Value	Lower bound value	Upper bound value
5 per cent	3.47	4.57
10 per cent	3.06	4.06

[a] Critical values are obtained from Pesaran, Shin and Smith. (2001), Table CI.iii: Case III with unrestricted intercept and no trend, p. 300. * indicates significance at 1% level

[1] To save space, unit root results are not provided here, however is available upon request to the corresponding author.

[2] To save space, we do not specify the other equations where Lk_t, $LTRD_t$, $LREM_t$ and $LTUR_t$ are specified as dependent variables however they are tested during the analysis and the results are given in Table 7.

Having confirmed the existence of a long-run relationship between y_t and k_t with TRD_t, REM_t, and TUR_t, the estimation of the long-run and short run equations are carried out. As the first step in the regression, the results for the ARDL estimates (Table 8) confirm the positive significance of remittances ($LREM_t$), capital accumulation (Lk_t) and lag one growth policy (Ly_{t-1}) respectively.

Before pursuing to the long-run and short-run estimates, the ARDL estimates diagnostic test results were inspected (lower panel of Table 8). These test includes (a) Lagrange multiplier test of residual serial correlation; (b) Ramsey's RESET test using the square of the fitted values for correct functional form; (c) normality test based on a test of skewness and kurtosis of residuals; and (d) heteroscedasticity test based on the regression of squared residuals on squared fitted values – all of which indicated that the equation performed well as the disturbance terms are normally distributed and serially uncorrelated with homoscedasticity of residuals thus confirming the models have correct functional forms. Besides, the CUSUM and CUSUM of Squares plot showed that the parameters of the models are relatively stable over time.[1]

Table 8. Autoregressive Distributed Lag (ARDL) Estimates

ARDL(1,0,1,0,0) selected based on Akaike Information Criterion

Dependent variable is Ly_t

30 observations used for estimation from 1980 to 2009

Regressor	Coefficient		Standard Error	t-Ratio
Ly_{t-1}	0.32445	*	0.17915	1.8111
Lk_t	0.21814	**	0.10045	2.1715
$LTRD_t$	0.13747		0.08430	1.6308
$LTRD_{t-1}$	0.25226	**	0.10384	2.4293
$LREM_t$	0.02837	**	0.01365	2.0781
$LTUR_t$	0.01198		0.03184	0.3762
C_t	3.69220	**	1.51380	2.4390

R^2	= 0.84664	$\bar{R}^2$	= 0.79821
S.E. of Regression	= 0.02559	F-statistics [F(6, 19)]	= 17.4823
Mean of Dependent Variable	= 12.2892	S.D. of Dependent Variable	= 0.05698
Residual Sum of Squares	= 0.01245	Equation Log-likelihood	= 62.4854
Akaike Info. Criterion	= 55.4854	Schwarz Bayesian Criterion	= 51.0820
DW-statistic	= 1.93270	Durbin's h-statistic	= 0.42141

[1] The CUSUM and CUSUM of Squares plots are not reported in order to conserve space. However, the results are available upon request.

Diagnostic Tests						
Test Statistics	LM Version			F Version		
			p-value			p-value
(A):Serial Correlation	$\chi^2(1)$ =	0.0110	0. 916†	F(1, 18) =	0.0076	0.931†
(B):Functional Form	$\chi^2(1)$ =	3.3315	0. 068‡	F(1, 18) =	2.6454	0.121†
(C):Normality	$\chi^2(2)$ =	0.9287	0. 629†	Not applicable		
(D):Heteroscedasticity	$\chi^2(1)$ =	4.0031	0.045‡	F(1, 24) =	4.3676	0.047‡

*, and **, refers to acceptance of coefficient at 1% and 5% level of significance respectively; † and ‡indicates rejection of null hypothesis of (A)-(D) biasness at 1% and 5% level of significance.

The long-run and short run estimates are presented in Table 9. The results show that remittances have been significant in contributing to the worker income. In the short-run, (long-run) a 1 percent increase in remittances will result in 0.03 (0.04) percent growth in per worker income. Notably, the impact of remittances on income level is positive, however small. This is largely the case for many developing countries and PICs are no exception. The reason for the small positive effect is due to the structural characteristics of the developing island nation such as Vanuatu which includes geographical isolation from the major international markets and a low capital absorption capacity of the economy over time (Betram, 1999; Tisdell, 2002, Cohn, 2000).

Tourism expansion is positive, however not statistically significant both in the short-run and the long-run, which is a concerning issue since Vanuatu is heavily dependent on tourism.[1] Therefore, one may assert that tourism plausibly would improve conspicuous consumption but not necessarily income level and hence the need to develop tourism infrastructure is vital.

Trade openness (measured by trade as a percent of GDP) is statistically significant and positive in the long-run, contributing to about 0.58 percent towards income. Trade is positive but not significant in the short run. This is plausible given that the benefits of trade is often realized over a long-term horizon for developing countries as they mature and develop over time and as capital investment in trade expansion takes time to materialize on the back of weak economic institutions.

The capital share is about 0.32, which is very close to the stylized value of one-third (Ertur & Koch, 2007; Rao, 2007). The error-correction term (ECT_{t-1}), which is the measure of reconciling short-run with long-run equilibrium, has a correct (negative sign) (-0.68) and significant at 1 percent level, indicating a reasonably speedy convergence to long-run equilibrium.

[1] Note that expansion in tourism might have indirect impact on income generation, however, the direct effects on income is not statistically significant.

Table 9: Dependent variable: Ly_t [ARDL(1,0,1,0,0)]

Long-run coefficients				Short-run coefficients			
Regressor	Coefficient	t-ratio		Regressor	Coefficient	t-ratio	
Lk_t	0.32291	3.1104	***	ΔLk_t	0.2181	2.1715	**
$LTRD_t$	0.57691	3.8988	***	$\Delta LTRD_t$	0.1375	1.6308	
$LREM_t$	0 .0420	2.8852	***	$\Delta LREM_t$	0.0284	2.0781	**
$LTUR_t$	0.01773	0.3576		$\Delta LTUR_t$	0.0120	0.3762	
C_t	5.4655	3.7860	***	C_t	3.6922	2.4390	**
				ECT_{t-1}	-0.6756	-3.7709	***

Error Correction Representation Statistics (Short-Run Dynamics)			
R^2	= 0.6651	$\bar{R}^2$	= 0.5594
S.E. of Regression	= 0.0256	F-statistics [F(5, 20)]	= 7.5472
Mean of Dependent Variable	= 0.0061	S.D. of Dependent Variable	= 0.05698
Residual Sum of Squares	= 0.0124	Equation Log-likelihood	= 62.4854
Akaike Info. Criterion	= 55.4854	Schwarz Bayesian Criterion	= 51.0820
DW-statistic	= 1.93270		

*** - Significant at 1% level, ** - significant at 5% level and * - significant at 10% level.

4. Conclusions and Policy Implications

The objective of this paper was to study the long and short run effects of TRD_t, REM_t, and TUR_t on the income level in Vanuatu using an augmented Solow growth model. We find that besides trade openness, remittance inflows are singled out as one of the critical contributors to per worker income. However, tourism expansion, although positive is not statistically significant.

Therefore, short-term migration and the consequent remittance prospects is part of a broad-based strategy for development in Vanuatu. Recently, Vanuatu government has signed a bi-lateral trade agreement with New Zealand government to participate in the Recognized Seasonal Employer Scheme. However, maximizing benefits from these schemes requires that remittances transfer back home is cost-effective, and that appropriate socio-cultural policies and trainings are in place at village and community levels primarily focused on housing development, remittance linked micro-finance initiatives and other productive small business initiatives.

Another important aspect is trade liberalization. Vanuatu has recently become the 154th member of the World Trade Organization (WTO) which means that the country has an opportunity to pursue its trade ambition in the multilateral arena.

Therefore, discussions on labour mobility would be a critical area in the development dialogues. While developing countries like Fiji, Vanuatu and other small island states in the Pacific region and India and China in the Asian context are supportive of this initiative and require developed countries to provide greater access under the Mode 4 commitments on labour mobility, the EU and the United States (US) are less enthusiastic given the security and immigration issues of the past. Many developing countries therefore have opted for bilateral agreements on labour mobility or have incorporated this concept in the regional commitments with the Association of East Asian Nations (ASEAN) and the Caribbean Forum on Africa, Caribbean and the Pacific (CARIFORUM).

Moreover, the focus needs to be in ensuring that barriers to trade are minimized and proper strategy is deployed to gain from trade, with greater emphasis on effective negotiation along sectoral lines under the Mode 4 of General Agreement on Trade in Services (GATS), which covers services provided through temporary movement of natural persons (TMNP) to another country.

Moreover, despite little evidence of tourism expansion having significant effect on per worker income in Vanuatu, it is vital for policy makers to ensure that any inherent loopholes in the sector be ironed out and that tourism infrastructure is well developed and linked to pro-growth and development initiatives. Consequently, re-looking tourism industry operations with a view to making it more effective and ensuring that the consequent real benefits are shared with the grassroots level is vital.

In regards to the commitments in the current Doha rounds, it is imperative that Vanuatu consider commitments in the tourism sector which will ensure that market access is granted to investors to have commercial presence in the economy. This as a result will boost the economy and give leverage to employment and infrastructural development.

At the regional trade front, Vanuatu being a member of the Melanesian Spearhead Group (MSG) also challenged with negotiating with other member countries including Fiji, PNG and Solomon Islands with specific focus on labour mobility of professionals within the MSG group. While successful negotiations on labour mobility will boost remittance profile for Vanuatu, it is vital to consider that the issue of brain-drain on the back of skilled migration and consequent remittances inflows do not hold back or retard in-country development as local people look for better opportunities internationally. A greater challenge looming ahead for Vanuatu is to successfully negotiate TMNP with the fourteen members of the Forum Island Countries (FICs).

Notably, the trade in services (as a percent of total trade) is relatively high for countries like Vanuatu and Fiji indicating the heavy reliance on services sector. Consequently, making this sector more effective and finding alternative ways to

expand the sector could be part of the development discourse. It would be of further interest to Vanuatu to refine its commitments in services to suit the economic needs of the present. For instances, opening up financial, tourism and ICT sector at a larger scale would be of benefit to the economy in the long run. Conclusively, financial and technology inclusion within the lexicon of growth, remittances, tourism and trade development, and capital accumulation and productivity can be part of a broader development strategy.

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