

Transport Connectivity of the Pacific and its Trade Implications

Optimal Exchange Rate Choices in the Pacific

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I.

Transport Connectivity of the Pacific and its Trade Implications

Main research questions:

1. How important is transport connectivity for trade?
2. How does goods' trade and services' trade differ?

Main research tool:

Gravity equation analysis exploiting unique datasets on shipping and air connectivity

Bilateral trade and tourism data:

Trade Data:

- UN COMTRADE
- 3-year average: 2011-2013
- Import data improved by mirror statistics
- 1126 positive observations

Tourism Data:

- UNWTO (outbound tourist)
- 3-year average: 2011-2013
- 645 positive observations

2.

Data

Bilateral connectivity data:

Shipping Data:

- Sea-web (based on AIS signals)
- All connections between Pacific DMCs and ROW in 2013
- 1148 direct links

		Origin			
		Pacific DMC	Other Pacific	Asia	ROW
Destination	Pacific DMC	196 (821)	126 (428)	210 (428)	140 (21)
	Other Pacific	126 (474)			
	Asia	210 (426)			
	ROW	140 (45)			

Pacific DMC = Pacific developing member country, ROW = rest of world.

Note: Frequency of voyages are in parentheses.

Source: Sea-web, and author's calculations.

2.

Data

Flight Connectivity Data:

- Openflights (openflights.org)
- All connections between Pacific DMCs and ROW in 2013
- 57 direct connections (22 within, 35 with outside)

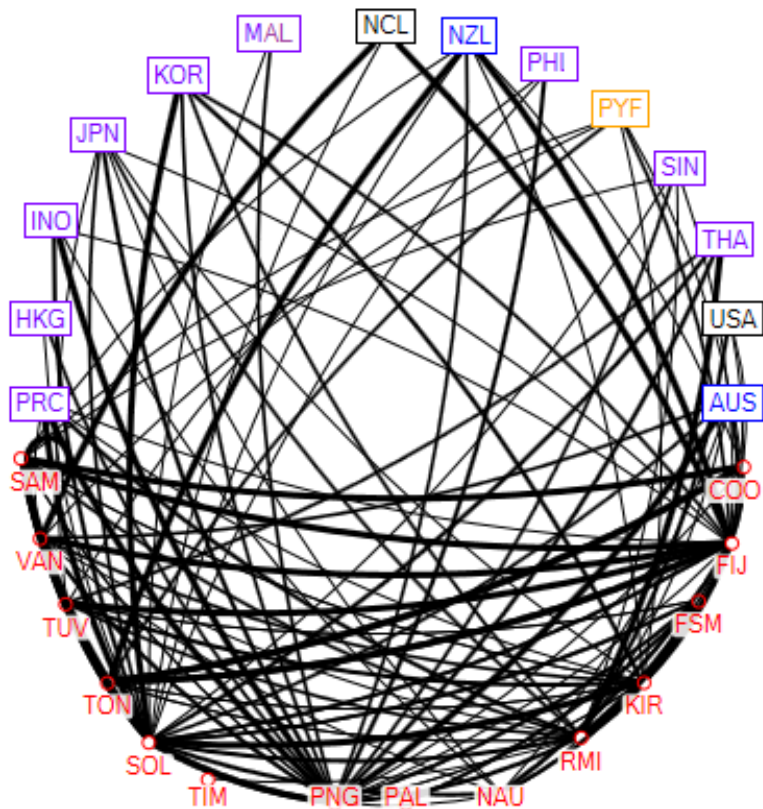


Source: Openflights and author's research.

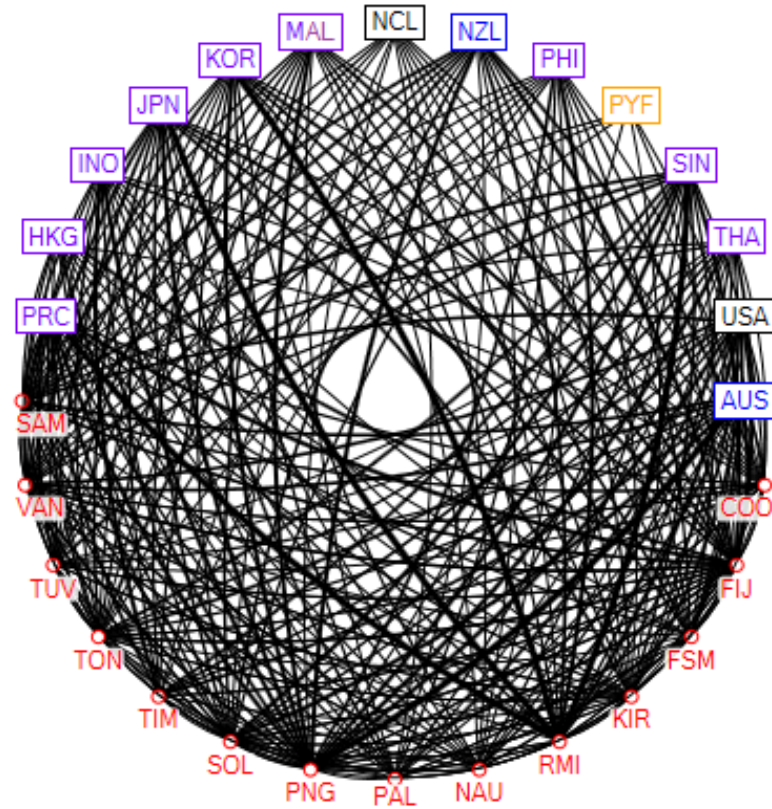
2.

Trade Flows vs. Shipping Connections

Node Diagrams of Direct Shipping Connections and Trade Flows between Asia and the Pacific and within the Pacific



Ships Traveling To and Within the Pacific DMCs, 2013
(Thicker lines = more ships)



Average Trade Flows (Imports) To and Within the Pacific DMCs 2010-2012
(Thicker lines = more trade)

Pacific DMC = Pacific developing member country.

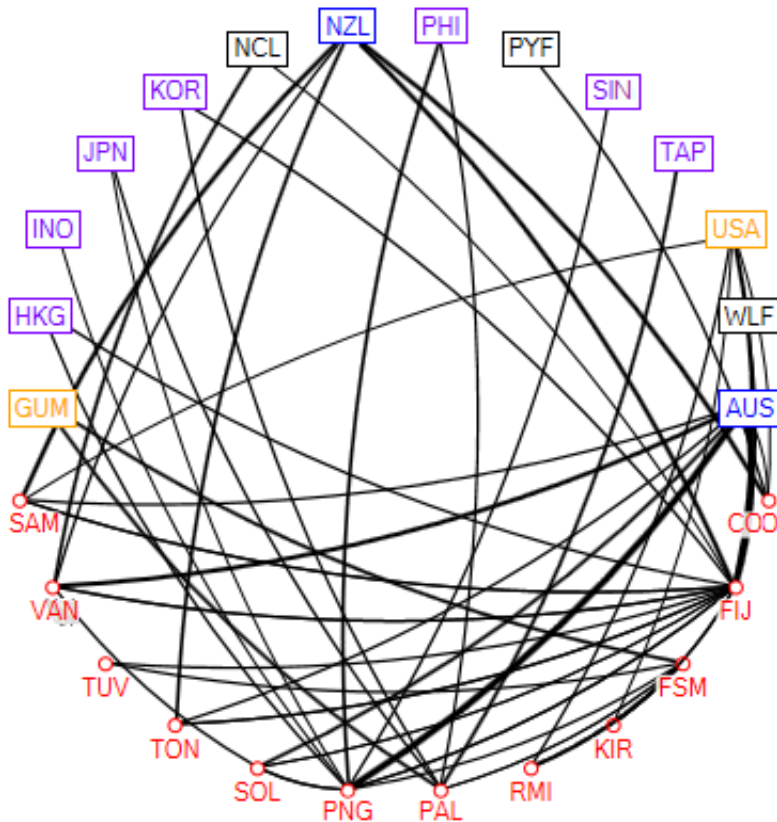
Note: Only those 14 economies with the most shipping connections to the Pacific DMCs are included.

Source: Author.

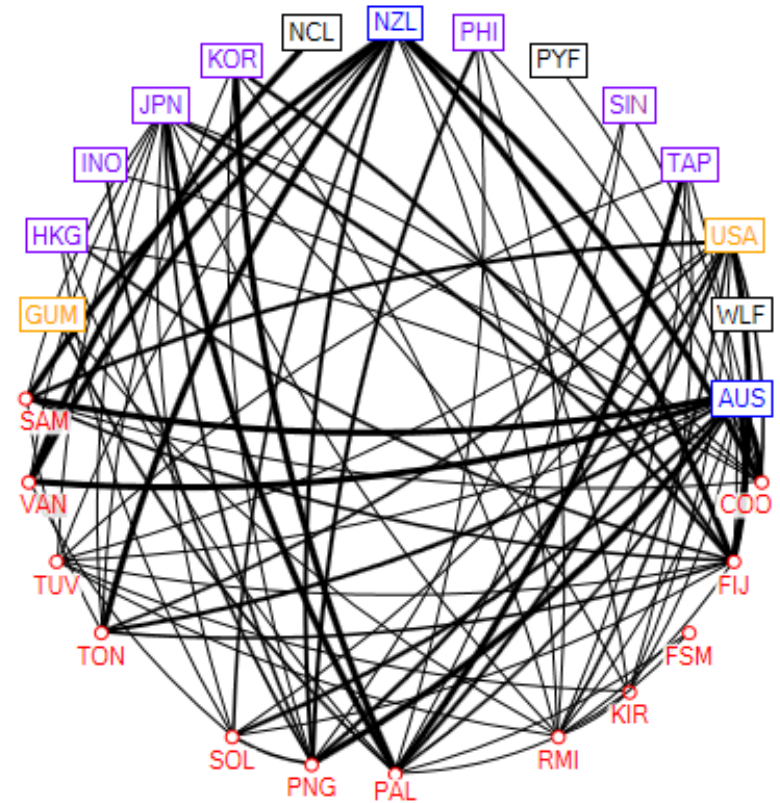
2.

Tourism Flows vs. Flight Connections

Node Diagrams of Direct Flight Connections and Tourism Flows between Asia and the Pacific and within the Pacific



Flight Routes To and Within the Pacific DMCs
(Thicker lines = more frequently flown routes)



Average Tourist Flows To And Within the Pacific DMCs, 2010-2012
(Thicker lines = more tourists)

Pacific DMC = Pacific developing member country.

Note: Only economies with at least one flight connection to one of the Pacific DMCs are included in the diagram.

Source: Author.

3.

Gravity Equation Approach

Methodology:

- General gravity model formulation (Head and Mayer, 2014):

$$X_{ni} = GS_iM_n\theta_{ni}$$

- X_{ni} : Trade/Tourist flows to the destination market n from i
- S_i : Demand in economy i
- M_n : Characteristics of the destination market n
- θ_{ni} : Bilateral travel costs between n and i
- G : Constant

- Poisson ML estimator (Sanot and Tenreyro, 2006)

3.

Gravity Equation for Trade Flows

Table: Gravity Estimation Results of Trade Flows

	(1)
Variables	Log(Trade)
Log (Distance)	-1.36*** (0.343)
Common official language	0.73* (0.422)
Common other language	-0.78** (0.355)
Ever in colonial relationship	0.68 (0.535)
Common colonizer	0.56* (0.302)
Direct shipping connection	
Log (Frequency)	
Observations	1,126
R-squared	0.60
Origin and Destination FE	Yes
Estimation Technique	OLS

Notes: Robust standard errors are in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors' calculations

3.

Gravity Equation for Tourism Flows

Table: Gravity Estimation Results of Tourism Flows

	(1)
Variables	Log(Tourist)
Log (Distance)	-2.48*** (0.487)
Common official language	0.40 (0.572)
Common other language	0.41 (0.330)
Ever in colonial relationship	0.99*** (0.351)
Common colonizer	0.61 (0.566)
Direct flight connection	
Log (Frequency)	
Observations	171
R-squared	0.91
Origin and destination FE	Yes
Estimation technique	OLS

Notes: Robust standard errors are in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Source: Authors' calculations

4.

Robustness Checks

1. Instrumental Variable Approach

	Possible Endogenous Variable	Instrument
Shipping	Direct connection	Flight connection
	Frequency of connection	Flight frequency
Flight	Direct connection	Shipping connection
	Frequency of connection	Shipping frequency

2. Shortest Distance: Shortest transport connection between A and B

Result: Coefficient remain almost identical, endogeneity less a problem for tourism flows.

5.

Conclusions

Summary:

- Pacific countries also face a disadvantage when engaging in international trade or when attracting international tourists, even when controlling for remoteness.
- Gravity estimates show that a direct transportation link with trading partners more than doubles trade and tourism flows.
- Higher frequency in transportation less important in tourism than in goods trade.
- Various extensions possible: Time series data, assess impact of different policies

II.

Optimal Exchange Rate Choices in the Pacific

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Matthias Helble (Research Fellow, ADBI)

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Pacific Update Conference

Suva, Fiji

15 July 2015

1.

Exchange Rate Policy Regimes

Exchange Rate Arrangements in Pacific Developing Member Countries

Pacific DMC	Name of currency	De facto classification (IMF)	Pop. (2013)	GDP per capita (cur. USD, 2013)
Cook Islands	New Zealand dollar (NZD)	External currency	15,225	21,490
F.S. Micronesia	US dollar (USD)	External currency	102,908	3,057
Fiji	Fijian dollar (FJD)	Currency-basket	863,073	4,652
Kiribati	Australian dollar (AUD)	External currency	111,117	1,528
Marshall Islands	US dollar (USD)	External currency	54,550	3,333
Nauru	Australian dollar (AUD)	External currency	10,660	7,502
Palau	US dollar (USD)	External currency	17,862	13,761
PNG	PNG kina (PGK)	Managed floating	7,570,686	2,043
Samoa	Samoan tala (WST)	Currency-basket	187,372	3,641
Solomon Islands	Sol. Island dollar (SBD)	Currency-basket	626,247	1,858
Timor-Leste	US dollar (USD)	External currency	1,306,000	1,063
Tonga	Tongan pa'anga (TOP)	Currency-basket	103,347	4,619
Tuvalu	Australian dollar (AUD)	External currency	11,099	3,434
Vanuatu	Vanuatu vatu (VUV)	Managed floating	271,089	2,951

DMC = developing member countries; GDP = gross domestic product; IMF = International Monetary Fund.

* Population and economic figures are from 2013.

Source: International Monetary Fund (2013); Asian Development Outlook Database (2015).

1.

Exchange Rate Policy Regimes

External currencies:

- Independence of monetary policy is lost
- Too much burden for fiscal policy
- But advantageous for tourism

Basket currency system:

- Instrument for monetary policy by using of different weights in basket

Managed float:

- Adequate foreign reserves are needed
- Arbitrary policy, not rule-based.

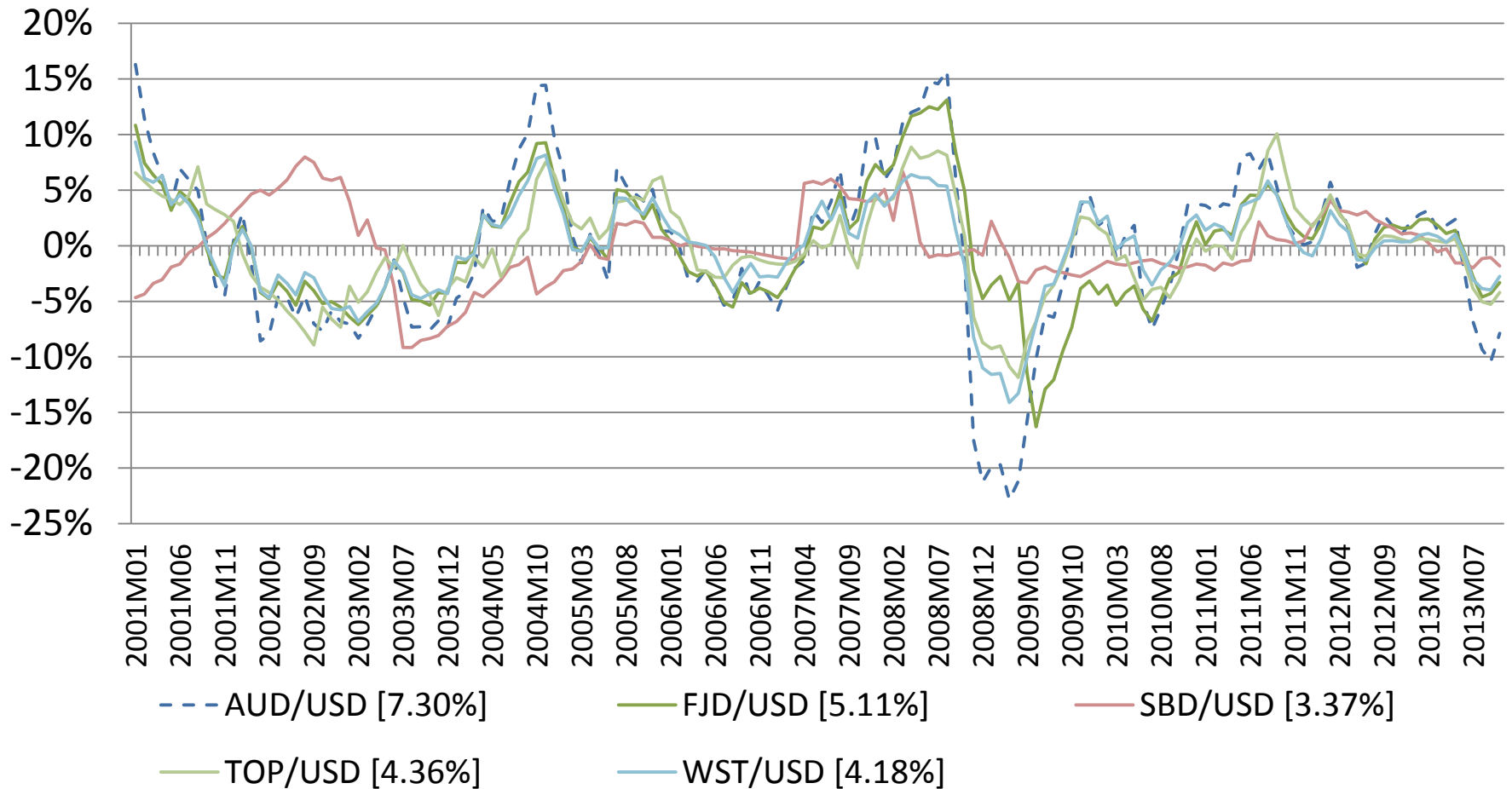
Free float:

- Too much volatility of exchange rate

2.

Comparison of Exchange Rate Volatility

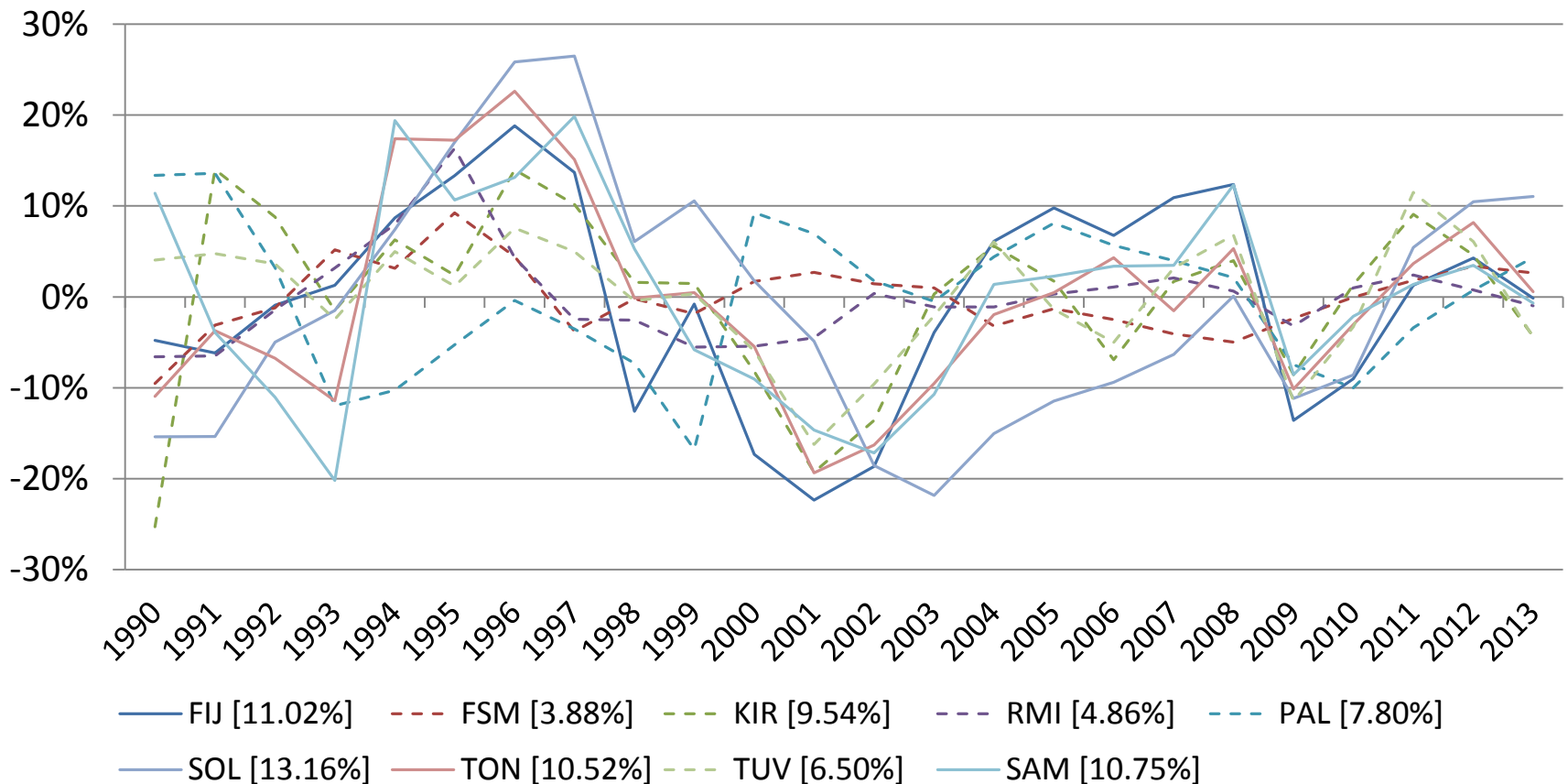
Fluctuation of Monthly-Averaged-Exchange-Rates-to-US Dollar of the Pacific Developing Member Countries with Currency Boards Compared to the Australian Dollar–US Dollar Exchange Rate



2.

Comparison of GDP Volatility

Fluctuation of Gross Domestic Product in the Pacific Developing Member Countries with Currency Boards versus Pacific Developing Member Countries with External Currencies

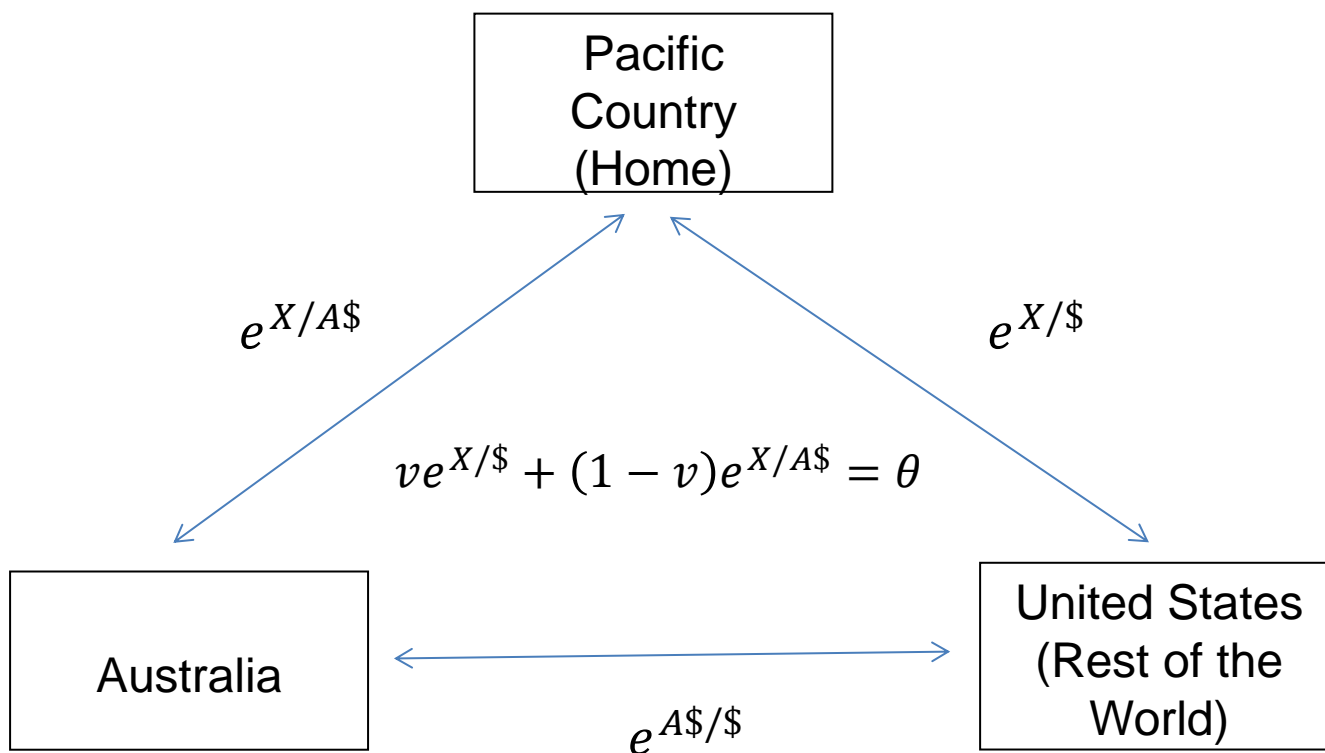


3.

A Model of Optimal Basket Weights

Building on Yoshino et al. (2003): How to optimally manage the shares in the basket currency optimally to reduce GDP volatility?

Tripartite Exchange Rate Relationship Chart



3.

A Model of Optimal Basket Weights

Government objective function:

$$\text{Min } w_1(e^{X/\$} - \bar{e}^{X/\$})^2 + w_2(e^{X/A\$} - \bar{e}^{X/A\$})^2 + (1 - w_1 - w_2)(y - \bar{y})^2$$

We further assume: $(y - \bar{y}) = c_0 + c_1(r - \bar{r}) + c_2(G - \bar{G}) + c_3(CA - \bar{CA})$

$$(CA - \bar{CA}) = (BT - \bar{BT}) + (TOUR - \bar{TOUR})$$

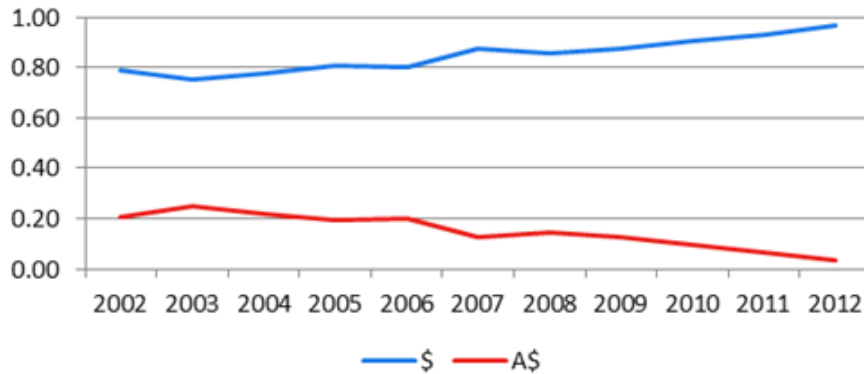
Optimization:

$$\begin{aligned} v = & \left[(w_1 + w_2 + (1 - w_1 - w_2)(l^2k^2 + lk^2))e^{A\$/\$} \right]^{-1} \left[(w_1 \right. \\ & + (1 - w_1 - w_2)(a_2 + b_1)(l^2k + lk)) \left(\theta + e^{A\$/\$} - \bar{e}^{\frac{X}{\$}} \right) \\ & + (w_2 + (1 - w_1 - w_2)(a_3 + b_2)(l^2k + lk)) \left(\theta - \bar{e}^{\frac{X}{A\$}} \right) \\ & + (1 - w_1 - w_2) \frac{(l^2k + lk)}{c_3} (c_0 + c_3(a_0 + b_0) + c_1(r - \bar{r}) \\ & \left. + c_2(G - \bar{G}) + c_3b_3(Y_w - \bar{Y}_w)) \right] \end{aligned}$$

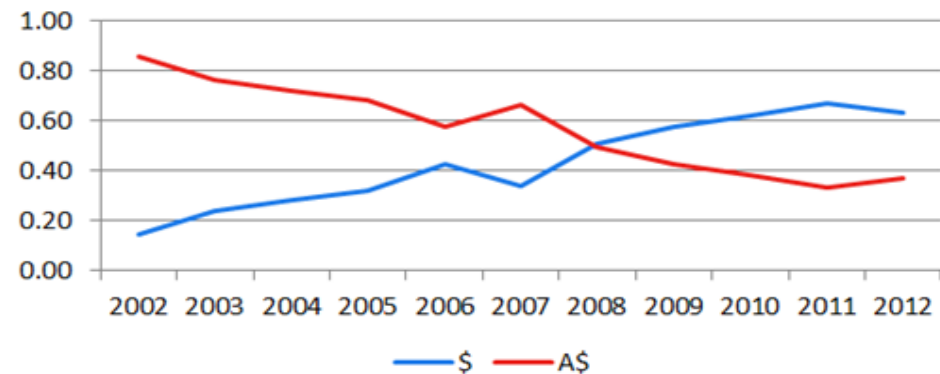
3.

Optimal Shares for Samoa for four different scenarios

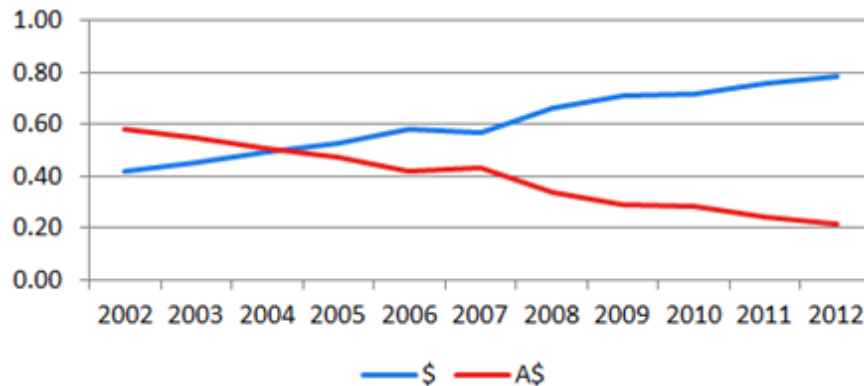
Optimal Share of US Dollar and Australian Dollar when $w_1 = 1$ (Minimize Exchange Rate Fluctuations to the US Dollar)



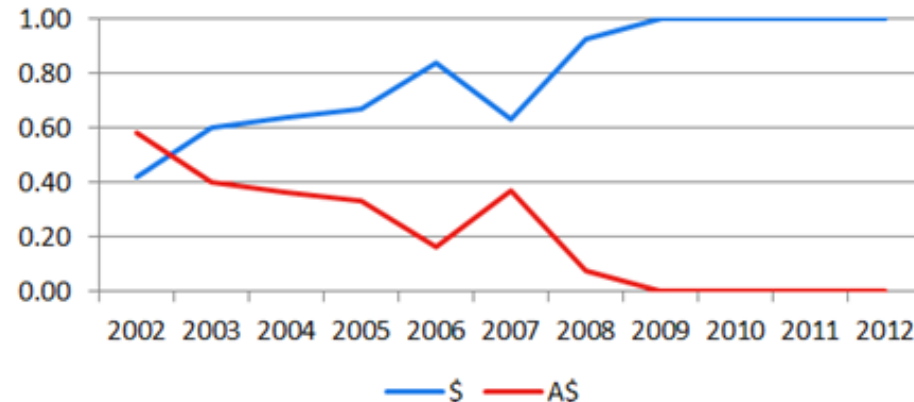
Optimal Share of US Dollar and Australian Dollar when $w_2 = 1$ (Minimize Exchange Rate Fluctuations to the Australian Dollar)



Optimal Share of US Dollar and Australian Dollar when w_1 and $w_2 = 0$ (Minimize Gross Domestic Product Fluctuations)



Optimal Share of US Dollar and Australian Dollar when w_1 and $w_2 = 0.33$ (All Objectives with Equal Weights)



4.

Conclusion

- Simulations for various loss functions indicated that irrespective of the loss function,
 - the Fiji Islands and Tonga would be better off pegging their currency to the US dollar.
 - Solomon Islands would be better off pegging their currency to the Australian dollar.
 - For Samoa, a basket currency would be the best policy to implement.
- Overall, results suggested that Pacific DMCs with intermediate currency regimes put strong emphasis on stabilizing the exchange rate, rather than using the exchange rates as a shock absorber for external economic shocks.

**Thank you very much
for your attention**

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Sharing development knowledge
about Asia and the Pacific