


# Impact of Smallness and Remoteness on GDP Growth: The Special Case of the Pacific Island Countries

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# Outline

- ▶ Smallness and Remoteness
    - Definition, Disadvantages
    - Theory, literature and Motivation
  - ▶ Data and Empirical Strategy
  - ▶ Results
  - ▶ Conclusion and Policy Implications
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# Smallness and Remoteness – Definition

- ▶ Smallness
  - Inverse of population
- Remoteness
  - Average distance from a capital city to every other capital city globally

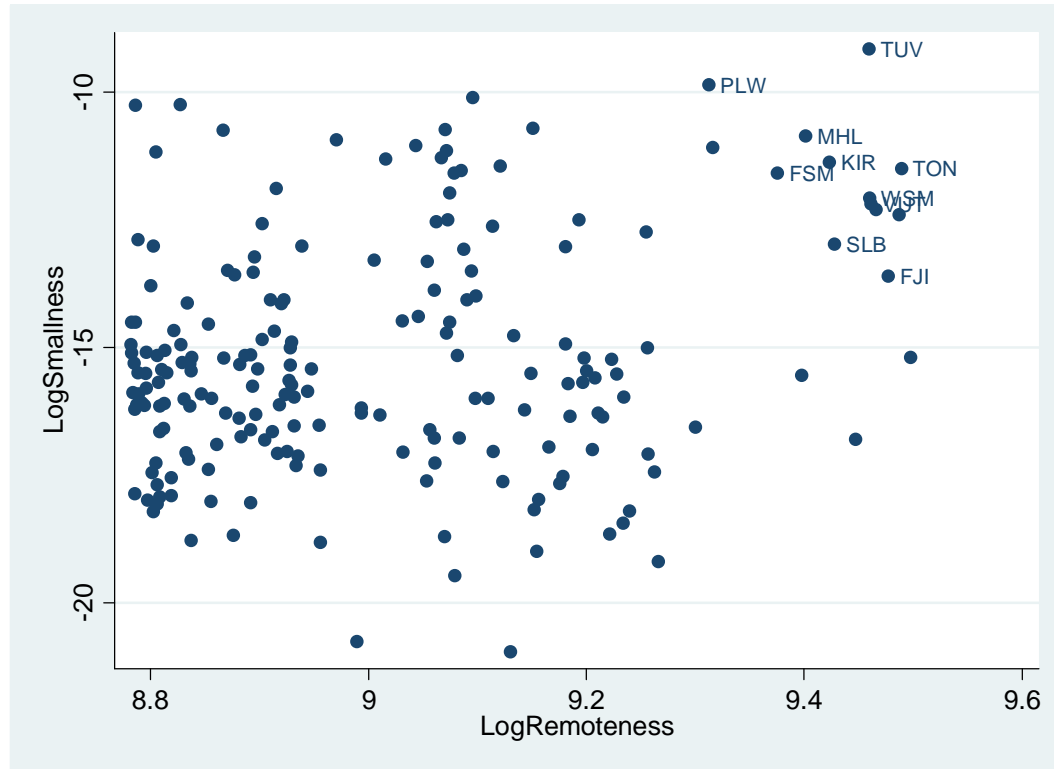


# Smallness and Remoteness on Economic Growth – Definition



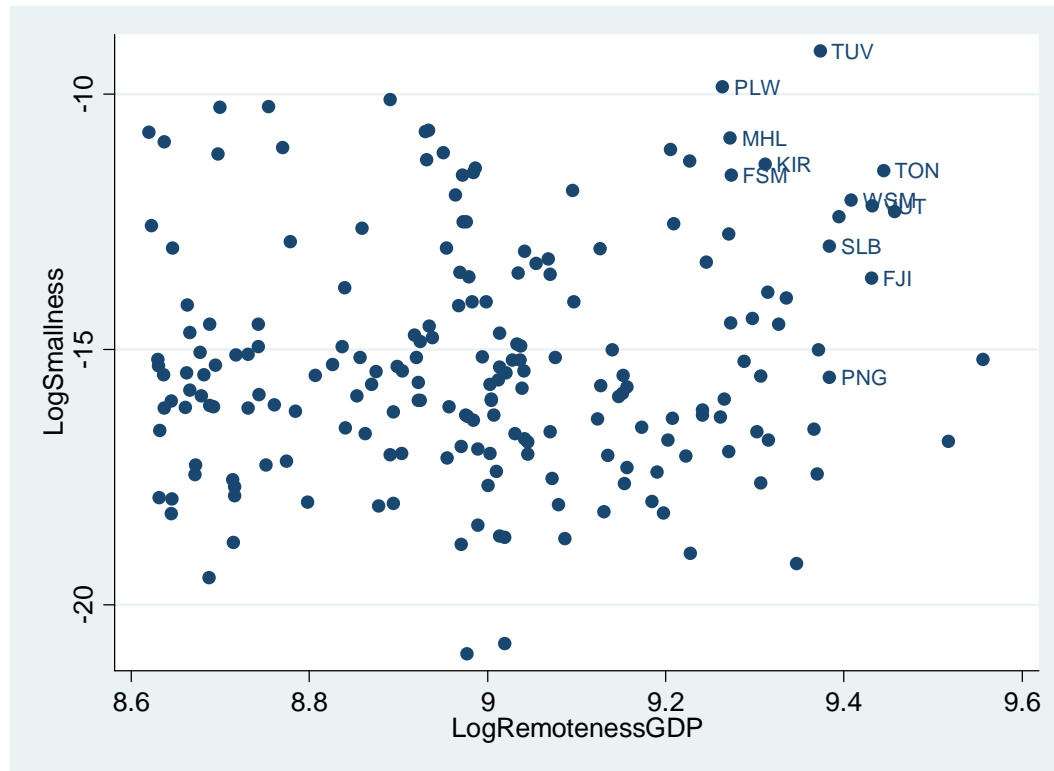
- Remoteness (GDP-Weighted)
  - Country 'i' =  $\sum_{n=1}^N \frac{GDP_n}{GDP_A} \times \text{distance}_{in}$
- Other measures of remoteness

# Smallness and Remoteness – Graph





# Smallness and Remoteness (GDP-Weighted) – Graph





# Smallness and Remoteness – Disadvantages

- ▶ Smaller countries
  - Capacity
  - Less domestic demand/economies of scale
  - Vulnerable to shocks due to high trade-openness



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- ▶ Remote countries
  - High transport costs
  - Limited knowledge transfers



# Smallness and Remoteness – Disadvantages

- ▶ **Smaller countries**
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  - Less domestic demand/economies of scale
  - Vulnerable to shocks due to high trade-openness
  
- ▶ **Remote countries**
  - High transport costs
  - Limited knowledge transfers
  
- ▶ **Small and Remote countries**
  - Issues with smallness and remoteness exacerbated
  - Can't produce efficiently to export competitively



# Smallness and Remoteness – Literature

- ▶ Smallness
  - Easterly and Kraay (2000)
  
- ▶ Remoteness
  - Armstrong and Reid (2006)
  
- ▶ Smallness and Remoteness
  - Winters and Martin (2004)



# Smallness and Remoteness on Economic Growth – AusAID/WB

- ▶ AusAID in their “Pacific 2020”; smallness and remoteness is not a constraint for growth
- ▶ World Bank; the focus of effectiveness should not be on Economic Growth for the Pacific.


# Smallness and Remoteness on Economic Growth – Motivation

- ▶ Both AusAID and World Bank agree that smallness and remoteness is a disadvantage; can that disadvantage be overcome?

# Smallness and Remoteness on Economic Growth – Motivation

- ▶ We add to literature;
  - Impacts smallness and remoteness have on GDP growth
  - Creating an Index
  - Use panel analysis (possible as GDP-weighted distance varies over time)
    - Literature uses cross-sectional analysis

# Data

- ▶ Data from
    - World Development Indicators
    - Penn World Tables
    - IMF data
    - National Geospatial–Intelligence Agency (CEPPI)
  - ▶ Data period 1995–2009
  - ▶ Cross–sectional and Panel analysis
- 

# Smallness, Remoteness & Economic Growth

- What does the data show (1995–2009)

	PIC	Small Countries	Large Countries	Remote Countries	Non-Remote Countries	All Countries
GDP per capita Growth	1.01%	2.13%	2.72%	1.61%	3.00%	2.39%
Small and Remote countries are considered the top 20 small and remote countries not including PIC						
Large and Distant countries are considered the top 20 large and distant countries not including PIC						
PIC do not include PNG and Timor-Leste. GDP per capita growth is calculated as the GDP per capita compound growth rate.						



# Cross-Sectional OLS analysis

- ▶ ◦  $Y_i = \beta_{1i} + \beta_2 X_{2i} + \beta_3 X'_{3i} + \mu_i$
- 
- Average GDP per capita growth (compound)%
- $X_2$ ; Smallness and Remoteness Indexes x 2
  - Normalization
  - World Bank Governance Indicators; similar approach
  - UN
- $X_3$ ; Control Variables
  - $X_3$ ; initial GDP per capita, trade openness, population density, human capital and investment
  - Robustness checks including governance indicators



Table 3 - Determinants of Annual Compound GDP Per Capita Growth (%)

Dependent Variable: Annual Compound GDP Per Capita Growth (%) using 1995 to 2009 Average Data

OLS Cross-Sectional Analysis

	(A)	(B)	(C)	(D)	(E)
Model	OLS	OLS	OLS	OLS	OLS
Small and Remoteness Index	-0.417***		-0.477***		
	(0.095)		(0.122)		
Small and Remoteness (GDP Weighted) Index		-0.531***		-0.535***	
		(0.109)		(0.118)	
Log (GDP per Capita 1995)	-0.272***	-0.367***	-0.954***	-0.996***	-0.996***
	(0.101)	(0.105)	(0.177)	(0.176)	(0.180)
Log (Population density)	0.101	0.094	0.127	0.109	0.089
	(0.096)	(0.098)	(0.112)	(0.114)	(0.119)
Secondary School Enrollment (Gross %)			0.035***	0.031***	0.029***
			(0.011)	(0.011)	(0.011)
Investment/GDP			0.078*	0.078*	0.083**
			(0.041)	(0.041)	(0.041)
Openness			0.007	0.007*	0.011**
			(0.004)	(0.004)	(0.005)
Log (Population)					0.202**
					(0.083)
Log (Average Distance GDP Weighted)					-2.308***
					(0.678)
F Statistic	8.370	9.130	10.540	10.210	9.650
Adjusted R-squared	0.067	0.089	0.403	0.409	0.423
No. of observations	174	174	169	169	169

For all variables, the first row represents the coefficient while the second row in parenthesis represents the standard error. \* Significance at the 10 percent level; \*\* Significance at the 5 percent level and \*\*\* Significance at the 1 percent level. Average

# System GMM analysis

- ▶  $\Delta Z_{iT} = a_i + \gamma_1 Z_{i,T-1} + \gamma_2 X_{2iT} + \gamma_3 X'_{3iT} + \varepsilon_{iT}$ 
  - 'T' represents three yearly data from 1995 to 2009
  - $\Delta Z_{iT}; X_{2iT}, X'_{3iT}$
  - Panel analysis eliminates fixed effects over time and accounts for endogeneity
  - System GMM is preferred for Panel analysis in small time series and large cross-country data

Table 4 - Determinants of Logged GDP Per Capita Growth

Dependent Variable: Change in Logged GDP per Capita using 1995 to 2009 3 Year Average Data

Fixed Effects and Two-Step System GMM

Panel Analysis

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
Model	OLS FE	OLS FE	OLS FE	OLS FE	OLS FE	System-GMM	System-GMM	System-GMM
Small and Remoteness Index	-0.007**		-0.016***			-0.017***		
	(0.003)		(0.006)			(0.007)		
Small and Remoteness (GDP Weighted) Index		-0.011***		-0.017***			-0.022***	
		(0.004)		(0.006)			(0.007)	
Log (GDP per Capita Lagged)	-0.009***	-0.010***	-0.042***	-0.043***	-0.043***	-0.063***	-0.058**	-0.058**
	(0.003)	(0.003)	(0.006)	(0.006)	(0.006)	(0.024)	(0.024)	(0.023)
Log (Population density)			0.011**	0.010**	0.010**	0.011**	0.010*	0.009
			(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)
Secondary School Enrollment (Gross %)			0.002***	0.002***	0.002***	0.002	0.002	0.002
			(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)
Investment/GDP			0.000	0.000	0.000	2.71E-04	3.08E-04	0.000
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Openness			0.002***	0.002***	0.002***	0.004	0.003	0.004*
			(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.002)
Log (Average Distance GDP-Weighted)					-0.068***			-0.088*
					(0.023)			(0.052)
Log (Population)					0.007			0.009
					(0.005)			(0.006)

Table 6 - Penalties for Smallness and Remoteness (GDP Weighted)

Rank	Country	Smallness and Remoteness GDP Weighted Rating	GDP per capita growth penalty (percentage points)	Percentage GDP per capita growth (Av. 1995 to 2009)	Percentage GDP per capita growth (Av. 1995 to 2009) without penalty)
1	<b>Tuvalu</b>	11.86	N/A	N/A	N/A
2	<b>Palau</b>	6.00	-4.48	-0.21	4.27
3	Turks and Caicos Islands	3.18	-2.38	N/A	N/A
4	<b>Tonga</b>	2.95	-2.21	1.00	3.21
5	<b>Marshall Islands</b>	2.81	-2.10	-0.64	1.46
6	New Zealand	2.75	-2.06	1.38	3.44
7	<b>New Caledonia</b>	2.48	-1.86	N/A	N/A
8	Australia	2.46	-1.84	1.96	3.79
9	<b>Vanuatu</b>	2.37	-1.77	0.58	2.36
10	<b>Samoa</b>	2.28	-1.70	2.65	4.36
11	<b>Kiribati</b>	2.27	-1.70	1.02	2.71
12	Gibraltar	2.19	-1.64	N/A	N/A
13	Northern Mariana Islands	2.07	-1.55	N/A	N/A
14	<b>French Polynesia</b>	2.04	-1.53	N/A	N/A
15	<b>Fiji</b>	1.99	-1.49	0.75	2.23
16	San Marino	1.98	-1.48	N/A	N/A
17	Seychelles	1.88	-1.41	1.96	3.37
18	<b>Micronesia, Fed. Sts.</b>	1.83	-1.37	-0.27	1.10
19	<b>Solomon Islands</b>	1.80	-1.34	-1.63	-0.28
20	Papua New Guinea	1.59	-1.19	-0.45	0.73



# Conclusion & Policy Implications

- ▶ Smallness and remoteness is significantly and negatively correlated with GDP growth
- ▶ Results don't suggest we should ignore aid for growth
- ▶ Rather growth should not be a focus of aid effectiveness for PICs
  - MDGs
  - Specific Interventions

# Questions

