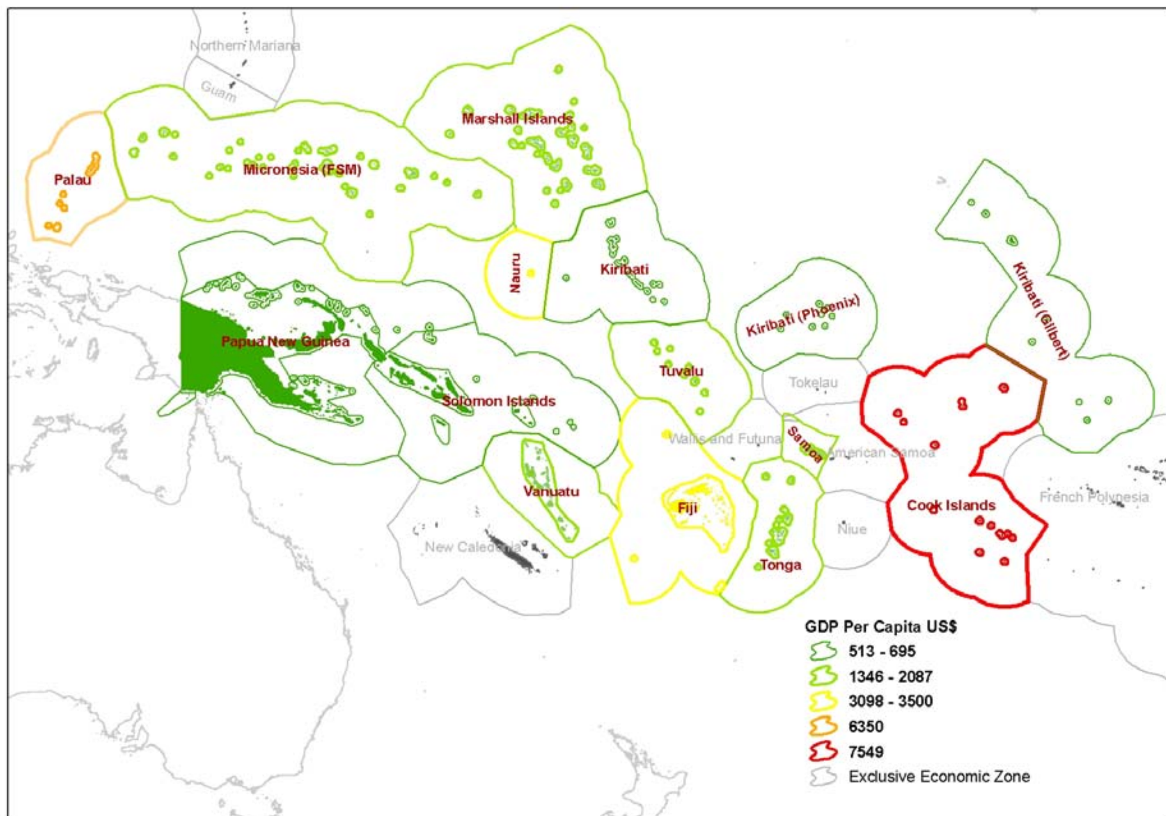
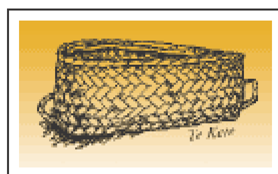
Are Pacific Island Economies Growth Failures? Geo-Political Assessments and Perspectives



John Gibson
University of Waikato
and
Visiting Research Fellow
Macmillan Brown Centre for Pacific Studies
And
Karen L. Nero
University of Canterbury
Macmillan Brown Centre for Pacific Studies



Are the Pacific Island Economies Growth Failures?
Geo-Political Assessments and Perspectives

John Gibson*
University of Waikato
and
Visiting Research Fellow
Macmillan Brown Centre for Pacific Studies

And

Karen L. Nero☼
University of Canterbury
Macmillan Brown Centre for Pacific Studies

Abstract:
Many Pacific Island economies have found it difficult to achieve sustained economic growth and hence sustained growth in living standards. This is despite very high per capita inflows of external finance, in the form of both overseas aid and remittances. Consequently, many external assessments and a growing minority of internal opinion are critical of this apparently poor performance. Questions have been raised both about the viability of some Pacific economies and about the appropriate policy responses. This chapter 1) assesses how well Pacific economies are performing and identifies two analytical biases in recent assessments relative to other economies of comparative size and characteristics, 2) seeks to better understand Pacific economies, using GIS modelling to help visualise and identify factors contributing to national and regional differences in Pacific economies, and identifying data bias problems in donor and National System Accounts data (missing or under-estimated food production, contributions of citizens overseas), and 3) discusses the implications for future research and donor approaches to supporting Pacific nation economies and the Millennium Development Goals especially of reducing poverty.

JEL: O40, O56, R11
Keywords: Economic Performance; Growth; Pacific Islands; Remittances; Safety Nets; SNA-93 Household Sector; Wealth Systems

*Department of Economics, University of Waikato, Private Bag 3105, Hamilton, New Zealand. Fax: (64-7) 838-4035. E-mail: jkgibson@waikato.ac.nz.

☼ Macmillan Brown Center for Pacific Studies, University of Canterbury, Private Bag 4800, Christchurch, New Zealand. Fax (64-3) 364-2002. E.mail: karen.nero@canterbury.ac.nz.

Are Pacific Island Economies Growth Failures?

Geo-Political Perspectives

Introduction

Many Pacific Island economies have found it difficult to achieve sustained economic growth, and Pacific Island governments and Pacific Islanders, both in the islands and in Aotearoa, seek ways to achievable sustainable economic growth to fund improvements in education, health, and general living standards. While external assessments generally miss or undercount food production and its related generation of cash standard statistical account assessments focused upon the market economy concur that Pacific economies perform poorly. For example, Sampson (2005) finds that after controlling for OECD membership and whether a country is an oil exporter, the Pacific states grew more slowly than countries in any other region of the world over 1995-2003. This is despite high per capita inflows of external finance, in the form of both overseas aid and remittances. Many experts are critical of this apparently poor performance, placing the blame on poor institutions (Chand 2001), aid inflows (Hughes 2003), bad policy settings (Chand 2003, Gosarevski, Hughes and Windybank 2004), and especially governance (Duncan 2005). The perspective that Pacific Island economies are poor performers has become the template through which current economic updates are portrayed, despite considerable differences among nations within the region. Are these perspectives now colouring analyses of both regional and national economies and affecting the proposed solutions?

In Part 1 of this chapter we critically analyse how poorly the region's nations are doing in comparison with other similar nations (and how such similarity is best measured), and the degree to which governance issues contribute to economic performance. There is a large geographic component to our analyses. This is appropriate given that this region covering one-third of the globe that primarily consists of small volcanic and atoll islands plus the few large continental islands of the southwest Pacific. Analyses of spatio-economic factors (i.e. size, natural endowments, environmental fragility and vulnerability) have been augmented by more detailed analyses of economic remoteness and spatial-correlations. Socio-cultural factors (ie. size and diversity of residents, rates of migration and overseas workers, cultural practices) considered include type of relationship and economic strength of former colonial powers. In this section we present some key variables in the form of thematic maps.

How can we best understand Pacific economies? In Part 2 we assess the systematic ways in which poor data hinder our analyses. Poor data especially on the Household Sector of National Accounts result in systematic and widespread under-estimations of the contributions of local fisheries and agricultural food production that provide the primary support both of food and access to cash income for a significant percentage of Pacific peoples. In this part of the chapter we consider well-documented problems that have been identified in valuing the household sector and food production (which continues to be the most productive sector of many Pacific nations). We consider how Pacific wealth production and "capital" creation differ from those of Western societies, and the role of women in these processes. We briefly review a few cases

demonstrating key features of the systems through which Pacific peoples generate wealth in a complex interchange between food production, labour, and soft (textile) and hard (stone and bead) currencies. We consider the mechanisms through which Pacific peoples continue to connect food production and wealth, today linking customary and introduced monetary systems.

Pacific Islanders draw upon and adapt their production and existing wealth systems to provide support for the education of their children, access medical services at home and overseas, and provide capital to fund housing, clinics and transportation, as well as for development projects that to a large extent Western banking practices have been unable to fund. These transfers serve both as short-term "insurance or safety nets" within and across nation-states, and long-term investment in both social and financial capital systems. Remittance transfers are one of the key mechanisms through which Pacific peoples attempt to mediate their participation with increasingly globalised market economies; at best most analyses capture cash remittance transactions but do not value the goods, materials and textiles also transferred, often with a bias toward transfers to the islands rather than looking at the net effects that include transfers from the islands to the richer countries that host the Pacific diaspora.

We attempt to bridge the historical disjuncture between Western understandings and valuation of Pacific food production systems and attempts to "develop" the systems, and more recent archaeological, anthropological and development analyses. We anticipate that with better understanding of these contemporary production and wealth systems, they can be supported and developed through international aid and trade, rather than undermined in ways that retain the legacies of earlier colonial eras through which labourers, minerals (i.e. phosphate) and agricultural products (i.e. sugar, coconuts) were removed from the region. Pacific nations reassumed political sovereignty in the mid to late 20th Century; supporting contemporary economic power throughout the region is vital not only to the Pacific nations but to their partners in Aotearoa/New Zealand and Australia.

While recognizing hardship and poverty in the Pacific (see especially Abbott and Pollard 2004) and avoiding simplistic views of rarely attained sustainable rural development resulting in shared wealth (Schoeffel 1997), we argue that a greater analytical focus on the intersections between indigenous production sectors and national and international transactions and supporting effective strategies may assist the region to meet its Millennium Development Goals (MDG). Regional and national networks constantly shift people, moneys (remittances) and products among Pacific Islanders in the islands and in Aotearoa and Australia. How may remittances from Pacific family members overseas be best understood and maximized? What are the contributions of women and the exchanges of the women's production of textile wealth? While we recognize the MDG goals of universal primary education and health (Goals 2, 4, 5, 6), we focus on the MDG goals 1) eradicate extreme poverty and hunger, 3) promote gender equality and empower women, 7) ensure environmental sustainability and 8) global partnership for development. Good governance may be part of the solution, but we focus on identifying conceptual problems in regional analyses and reducing misunderstandings of Pacific production and wealth. In the process of identifying data and conceptual gaps from both regional and grounded perspectives, we seek ways to contribute to design ways to better support two of the

ADB's strategies of Inclusive Social Development and Sustainable, Pro-Poor Economic Growth" (Abbott and Pollard 2004:84).

The implications of this critical review are developed in Part 3. At present much of the Pacific is often omitted from international comparisons, due to poor or incomplete data. What differences might these omissions make? Our analyses of conceptual and factual problems in current data are presented not to correct existing data, but to help identify possible actions that might be taken and practical ways in which better data might make differences in policies and practices, and problems that might be avoided with better data. For instance regional aid and NGO assistance might help conceptualize and strengthen National Accounts protocols for collecting data on the Household Sector. OECD statisticians now recognize these activities as foundational to the Household Sector (System of National Accounts (SNA-93) and also that in a number of Pacific nations these activities represent the most productive sector. The SNA further recognizes the need to model and develop the tools that can more efficiently and better capture this production in ways that can be used comparatively. Better data should assist Pacific nations to work with overseas aid donors and NGOs to achieve sustainable economic growth.

What percentage of donor attention and support are currently directed toward this Household Sector including subsistence and the informal economy? How could existing donor programmes effectively serve as models toward the alleviation of poverty and other Millennium Development Goals (MDGs)? Increased well-designed donor support for food production could have important ramifications for increased participation in entrepreneurial market and transportation developments. NZAID and other donors are working in this direction through their support of agricultural seed banks to retain diversity (Solomon Islands), supporting urban agricultural production (Port Moresby), and earlier and current projects providing communication and transportation support to local entrepreneurs reach distant markets. Without good data communities and nations seeking export dollars may be drawn into export projects without the necessary environmental or economic assessments to ensure their sustainability, and in the process could lose food production capability as well as lose the desired export income. In the case of poorly planned development or environmental disasters better data are needed to support restitution. Working with banks to reducing costs of sending remittances could make significant contributions to national economies.

Most important, we must move beyond a template of failure that too often centres the causes upon local communities and their governance or institutional practices without providing at least equal attention to partnerships between Pacific Forum nations and international organizations as they assess and respond to regional transportation, information technology (IT) and assessments of global weather change and effective responses in this especially vulnerable world region.

Before moving into the substantive part of the chapter it is also important to emphasize what is not done in this study. In particular, the present chapter makes no attempt to repeat general surveys of the Pacific economies, such as AusAid (2006). For one thing, the sizes and growth rates of these economies as conventionally measured have already been thoroughly documented, and there is no need to repeat that work here. But more importantly, the informal sectors of the Pacific economies,

and agriculture and fisheries in particular, are a fundamental feature of the region. The contribution of the subsistence and food exchange sectors are of such importance that ignoring them leads to a serious understatement of the standard of living in many Pacific Islands countries. Moreover, it is crucially important that any policy prescriptions which aim to increase the traded sectors do not undercut production which is less well counted, as this can lead to rising GDP levels while standards of living stagnate or even decline. The present chapter therefore takes a more comprehensive view of Pacific Islands' productivity, as a reminder that appropriate policies should build on the full range of existing strengths, and be careful to avoid unbalanced developments which may be an improvement in some respects while damaging in others.

Part I: Regional Approaches and Comparisons

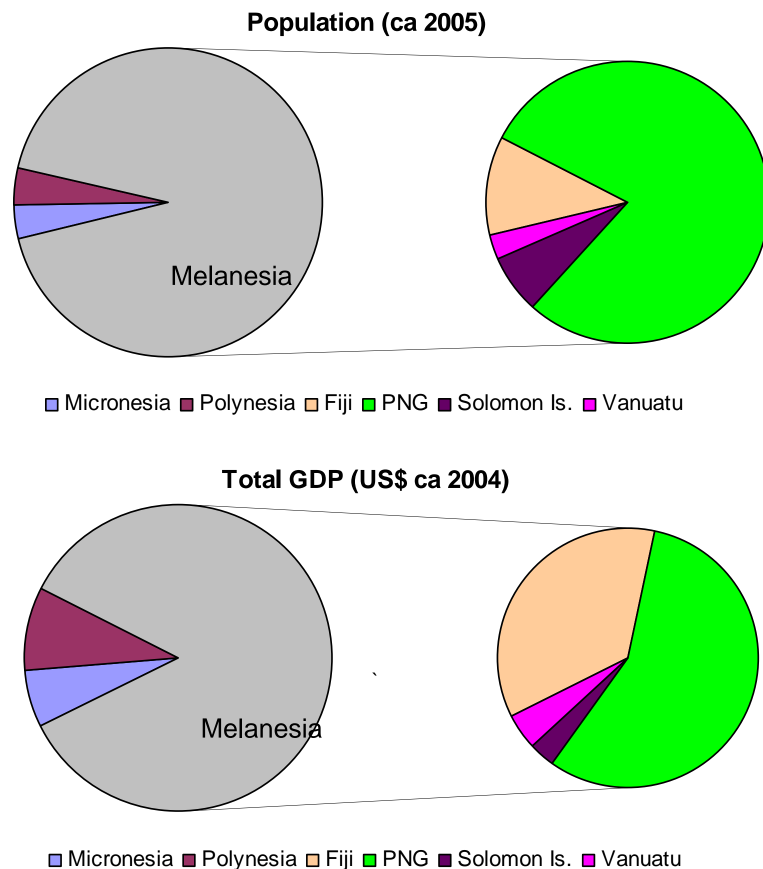
How best can we understand Pacific nations and their economies? First, we must interrogate how we understand the region itself.

Two caricatures of Pacific Island economies often seem to occupy the attention of the New Zealand public and policy makers. One is likely to be based on first hand observation from pleasant holidays in Polynesian atolls and frames these economies amidst a background of pleasant ocean breezes, beaches and coconut trees. The other seems to be based more on media reports and other commentary and sees them as actual or potential failed states, with unruly and sometimes undemocratic rulers, breakdowns in governance and law and order.

Polynesia as a part of the Pacific Region

Like most caricatures, there are elements of truth in both but also a substantial amount of relevant detail that is omitted. The problem with the first view, of pleasant Polynesian atolls, is that it focuses attention on a tiny minority. The largest single population group in the Pacific are the Highlanders of Papua New Guinea who now number well over two million –as many as the combined total population of all other countries in the Pacific Islands. This population live very far from beaches and coconut trees, at altitudes above 1200 metres, and cultivate largely temperate crops.

Figure 1 Pacific Population and GDP Pie Charts



Source: Calculations from data presented in ADB (2006), AusAID (2006)

Thus the part of the Pacific that New Zealand knows best – Polynesia – is a tiny and not necessarily representative fraction of the total Pacific. Specifically, in terms of population, Polynesia is only four percent of the total (Figure 1).[1] Although Polynesians are richer on average than Melanesians, even in economic terms Polynesia is dwarfed by the Melanesian nations (Polynesia is home to nine percent of regional GDP).

The second caricature, of failed states and poor governance, is reinforced by recent tragic events in Fiji, Tonga and the Solomon Islands. Academic research also highlights the human cost of these failures. According to estimates made by Duncan (2005), in the absence of poor governance, per capita GDP in Papua New Guinea (PNG) would have been double what it actually was in 2003 and one-third higher for Fiji. The problem with such claims is that although good governance helps economic growth on average there are plenty of exceptions, so it is neither a necessary nor sufficient condition. A case in point is Italy, which is:

> "…notorious for its political instability, inflation, massive public debt, and clientelism. Its political and economic institutions are often derided and labelled dysfunctional. Yet, in historical perspective, the country has frequently performed better than its more stable and "efficient" European neighbours…"
>
> Tolliday (2000), pp. 241

A closer example is New Zealand, which despite comprehensive economic reform and textbook public management since the mid-1980s still has only a mediocre growth experience (McCann, 2006). Hence the reverse could also hold: despite Pacific Island countries doing many things wrong, they perhaps would not have grown much faster doing things right. The difficulty of examining this claim, compared with the ease of observing the growth and governance anomaly that is Italy, is that simple comparisons with neighbouring countries are unlikely to be valid. The Pacific Island countries differ dramatically in terms of scale, remoteness and insularity when compared to their neighbours. We eventually examine this issue of suitable comparators but start first with the issue of governance.

Effects of Governance on Pacific Economies

Expert commentary on the Pacific Island countries highlights the importance of governance failure (Duncan, 2005). Yet evidence that these countries have unusually poor governance and that this is costly in terms of slower economic growth and overall poorer economic performance is not widely available. We therefore use indicators for six components of governance from a major World Bank research project that creates consistent indicators from the perceptions of enterprises, citizens and expert respondents in most countries around the world (Kaufmann, Kraay and

[1] These population and economic data are for the 13 Pacific states that are members of the Asian Development Bank, so excludes French Polynesia and New Caledonia and also some of the smallest counties, who would make no difference to the regional comparisons illustrated in the pie charts.

Mastruzzi, 2006). These components are: voice and accountability; political stability; government effectiveness; regulatory quality; rule of law; and control of corruption.[2]

We use these data on governance indicators to answer two questions:

- First, taking account of some basic features of Pacific Island economies (geography, population and land area; trade and volatility; and initial economic, political, and social conditions, which are each described in more detail in Table 3 below), is the level of governance according to these quantifiable indicators lower in the Pacific than elsewhere?
- Second, what difference do these governance indicators make to the growth performance of the Pacific Island economies, once again taking account of such basic features as geography, population and land area, trade and volatility, and initial economic, political, and social conditions?

To answer these questions we use a sample of approximately 170 countries, which is chosen on the basis of data availability and is also used in other analyses reported later in the chapter. This sample includes up to 14 Pacific Island economies which are listed in the notes to Table 1 below.

According to the results in Table 1, Pacific Island countries have lower levels of governance for only three of the six indicators (and in two of these cases the coefficient is only weakly significant). Moreover, the results in Table 1 do not allow for the possibility of common unexplained components in governance for neighbouring countries (due either to contagion or to unobserved variation from common location or institutions). This common unexplained component for nearby countries, which is referred to by its more technical name of *spatial autocorrelation* below, tends to reduce the precision of estimated statistical relationships like those presented in Table 1. Consequently, only for the "control of corruption" would there be firm grounds for concluding that governance was worse in the Pacific.

In terms of the second question, of whether governance indicators matter for economic growth, the addition of each of the governance indicators to a cross-country growth equation has very little effect. In particular, the difference in average growth rates between the Pacific Island countries and the rest of the world (after taking account of geography, population and land area, trade and volatility, and initial economic, political, and social conditions) is hardly altered as governance indicators are also included in the growth equation. For example, according to the results in the column headed "government effectiveness" the average growth rate of the 14 Pacific Island economies included in that particular equation is -0.14 standard deviations below that of other countries, after controlling for various features of all of the countries in the sample but not controlling for differences in government effectiveness. Adding government effectiveness to the set of controlling variables reduces the unexplained difference in growth rates only slightly, to -0.115. In other words, differences in government effectiveness between the Pacific and elsewhere seem to contribute only 17% (=1-(-0.115/-0.139)) to the slower growth of the Pacific Island economies. Moreover, none of these differences in average growth rates are

[2] While these are available for the 1996-2005 period, although with many gaps for individual countries, the analysis uses averages over 1996-2003 since many of the other explanatory variables are dated from about 2003.

statistically significant and they also do not take into account spatial autocorrelation which further reduces statistical significance (see below).

Table 1: Comparison: Deviation of Average Level of Governance and Growth

Deviation of Average Level of Governance or Growth in Pacific Island Countries From Overall Global Average, Controlling for Geography, Population and Land Area, Trade and Volatility and Initial Conditions

	Voice and Accountability	Political Stability	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
Coefficient on Pacific Island Countries in Equation for Governance	0.127 (1.51)	-0.042 (0.34)	-0.104 (1.70)+	-0.121 (1.88)+	-0.077 (0.97)	-0.174 (2.42)*
Coefficient on Pacific Island Countries in Growth Equation without Governance indicator	-0.148 (1.63)	-0.131 (0.97)	-0.139 (1.54)	-0.122 (1.31)	-0.122 (1.31)	-0.122 (1.31)
Coefficient on Pacific Island Countries in Growth Equation with Governance indicator	-0.180 (1.93)+	-0.117 (0.90)	-0.115 (1.27)	-0.086 (0.91)	-0.106 (1.15)	-0.104 (1.08)
Sample size	172	165	173	171	171	171
Pacific countries missing from sample	COK, PYF	COK, FSM, KIR, MHL, NRU, PYF, TON, TUV	PYF	NRU, PLW, PYF	NRU, PLW, PYF	NRU, PLW, PYF

Note: Results are OLS estimates for models that also include the control variables listed in Table 3.
The coefficients for the growth rate equations are for models explaining average per capita GDP growth over the 1987-2003 period, for samples of approximately 170 countries.
t-statistics in ( ) from robust standard errors. +=significant at 10% level, * at 5% level, ** at 1% level.
The codes for the Pacific Island economies omitted from each sample (due to lack of governance indicators are): COK Cook Islands; FSM Federated States of Micronesia; KIR Kiribati; MHL Marshall Islands; NRU Nauru; PYF French Polynesia; PLW Palau; TON Tonga; TUV Tuvalu.

The implication that we take from the evidence in Table 1 is that claims of governance failure in the Pacific may be overstated. There is clearly a failure to

control corruption but the evidence is less clear-cut for other components of governance. Moreover, the impact of any governance deficiencies is difficult to discern, at least in terms of average economic growth rates. Therefore, although several of the analyses reported below are motivated by the literature claiming growth failures in the Pacific, there are some grounds for doubting the specific role that governance failure is often given in this literature.

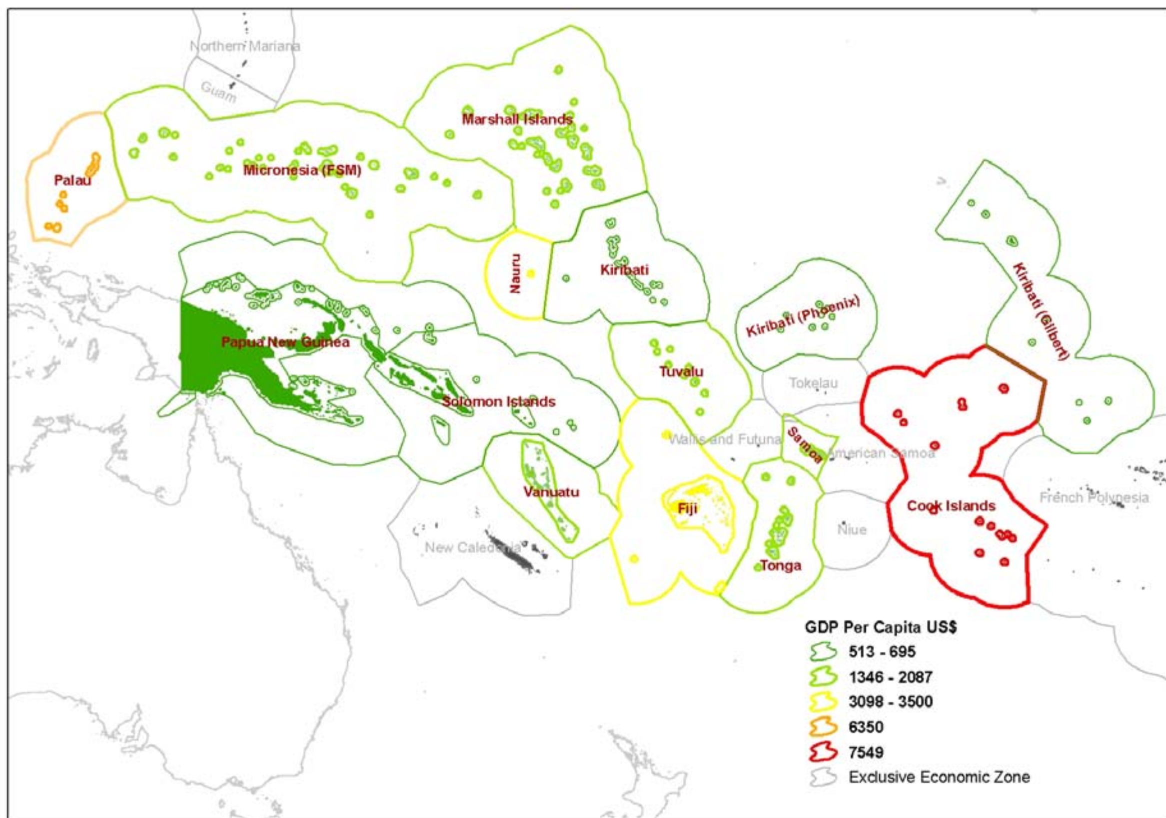
GIS Mapping of Regional Variables

We have used Geographical Information System (GIS) maps to engage the reader in reconsidering the complex ways in which geographical factors (ie. size and type of island, proximity to other islands and strong economies, land and sea resources) intersect with geo-political factors (nature of ongoing links to former colonizer). We have prepared a series of GIS maps of the region highlighting different variables. Due to the small and almost invisible outlines of the smaller Pacific states at this map scale, the island nation's land mass are shown with the 12-mile limit, and is encircled within its 200 Mile exclusive economic zone (EEZ) to depict country borders in all maps.[3] One complication of using the EEZ is that the EEZ for Kiribati is not contiguous. GIS Map 1 (also the Frontispiece), demonstrating Per Capita Gross Domestic Product (GDP) of Pacific Forum countries, exemplifies the type of map used throughout – on which we have colour-coded into five levels of the variable/s under consideration.

The frontispiece depiction of Pacific Forum nations by Gross Domestic Product (GDP) per capita, and the following depiction of Pacific Forum Nations by Gross National Income (GNI) per capita and urban/rural distribution, suggest anomalies in apparent economic performance that may point to complex interactions of both political and geographical realities. For example the complexity of the intersections of geographical and geo-political factors are demonstrated in Map 1 which identifies Palau and the Cook Islands as the top two performers of the Pacific Forum nations, based on per capita GDP. These two countries also have the highest level of per capita GNI and are amongst the most urbanized (Map 2). In this view, the larger nations of Papua New Guinea and the Solomon Islands that enjoy much richer land resources are at the lowest levels of performance. Both Palau and the Cook Islands are Freely Associated with their former colonizer (US and New Zealand respectively). However other Freely Associated States (the Federated States of Micronesia, the Marshall Islands, and Niue are less successful so this factor by itself is insufficient to explain the variations in performance.

[3] These EEZ geographic data were obtained from the Pacific Islands Applied Geoscience Commission (SOPAC) website. Population data for these maps are from the SPC, and economic indicators from the ADB.

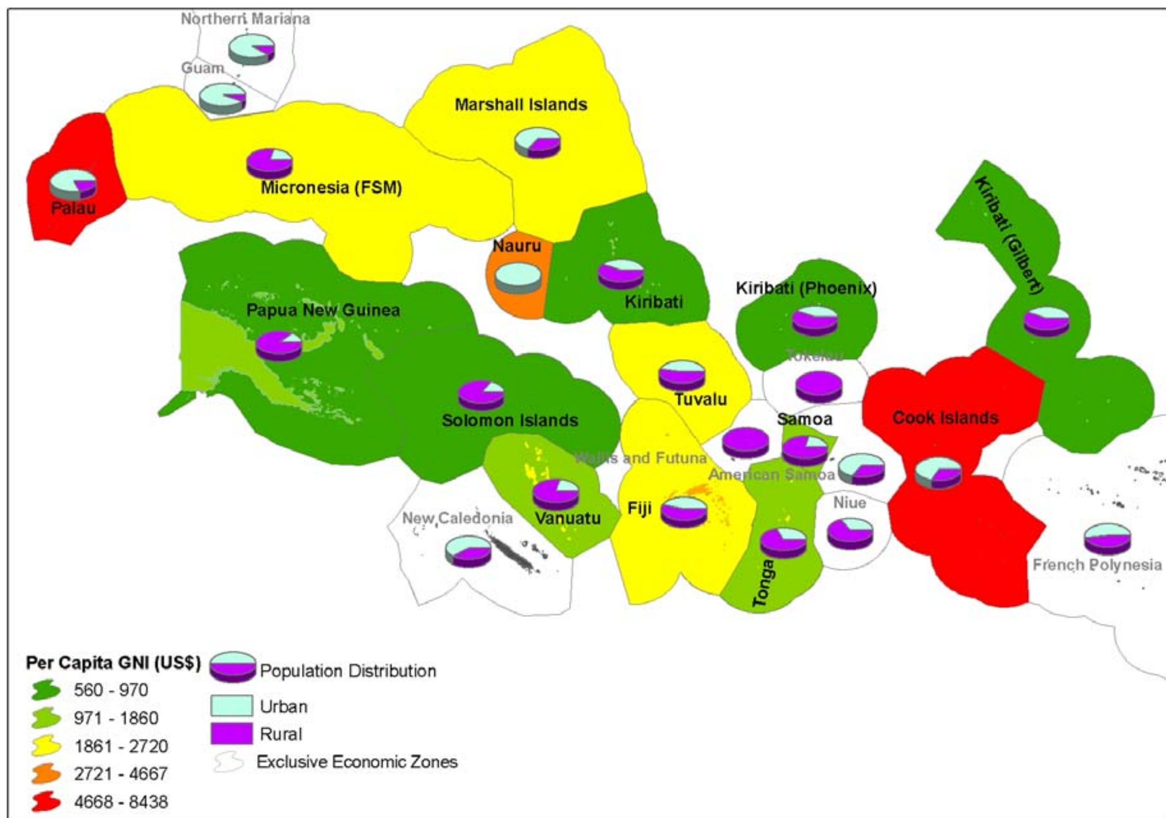
Map 1: Per Capita GDP



Remoteness is also a key factor, which we have assessed here in relationship to proximity to neighbouring countries, weighted by the neighbour's GDP. As discussed in detail in the next section, out of 219 countries in the world with available data, the Pacific Islands as a group are the most remote. According to the measure of average GDP-weighted distance to any other country, the Pacific Island countries, as a group, rank 197th out of the 219 countries in 2003. Within the Pacific, the Cook Islands are among the most remote – ranked as the 213th most remote country, whereas Palau was only on 171st (due to its proximity to high GDP Asian countries). From another perspective Palau is the most distant of the US Freely Associated States to the US, which provides the majority of its financial support and imports, but Palau also benefits from its proximity and especially tourism market from Japan and Taiwan. Thus both Asian and American geo-political linkages contribute to Palau's ability to benefit from its border position between world regions. In contrast, the greater remoteness of the Cook Islands is bridged by its Free Association relationship with New Zealand and the close personal and familial networks between Cook Islanders in their home islands (26% of total population) and in Aotearoa (74%).

This GIS visualization of indicators of economic success may to help in identifying and assessing a complex set of variables. In particular, one aim of the authors is to encourage questioning about whether it is these fundamental geo-political realities that mainly affect the economic performance of Pacific Island countries.

Map 2: GIS Map by ADB Population Distribution GNI pc (USD)



In addition to raising questions about the role of geo-political factors in influencing economic performance we also question the common assumption that the Pacific contains a number of growth failures. In order to fail one needs to have some standard of success. Hence what is required to assess how well the Pacific Island economies are performing and what countries like New Zealand can do to help them perform better is a valid counterfactual of what their economic performance should have been.

Such a counterfactual is necessarily complex because of the interplay of geographic and political factors along with the more readily apparent economic ones. We are hardly the first authors to understand the need for a counterfactual; Duncan (2005) also discusses this and uses Mauritius as a comparator to Fiji and Botswana as a comparator to PNG. However, as we show below, using key characteristics of what makes a "Pacific island" economy (remoteness, small population, and less political independence than in many regions) identifies very few nations that could realistically be considered comparable. This makes the assessment task of how well (or badly) the Pacific Island countries are doing even more difficult.

Another feature of our analysis that may already be apparent from the use of maps is that we pay close attention to geography as a fundamental growth constraint that Pacific Island countries have little control over. In addition to using comprehensive measures of remoteness in explaining economic growth in the Pacific relative to elsewhere, we also account for the feature that economic growth rates may depend on the growth rates of nearby countries. This spatial autocorrelation can arise because nearby countries have unobserved factors in common (e.g., climate, topography, institutions) and because of interaction between one country and another (e.g. through

common customs borders, cross-border flows of goods and labour, and shared use of key assets) so that growth depends on the growth rate of neighbouring countries. This second possibility, of dependence on neighbourhood growth rates, clearly favours regional solutions.

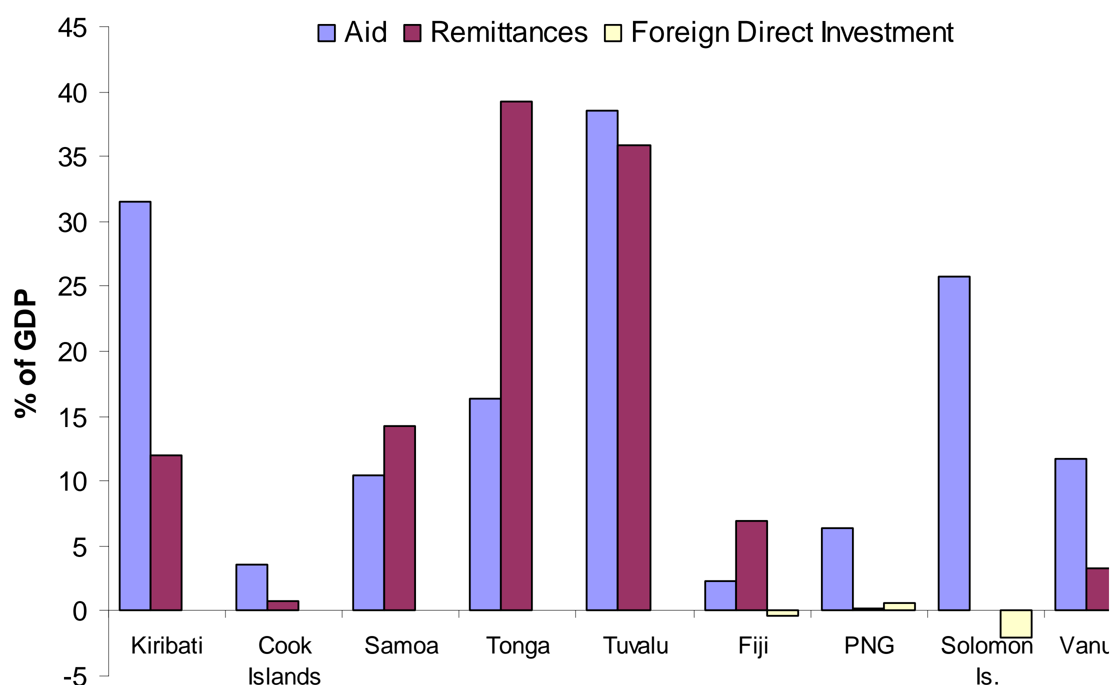
How Well are Pacific Economies Performing?

Previous Literature: Small States and Small Island States

The difficulty many Pacific Island economies have found in achieving sustained economic growth has been noted above. Recall, for example, that Sampson (2005) finds that after controlling for OECD membership and whether a country is an oil exporter, the Pacific states grew more slowly than countries in any other region of the world over 1995-2003. This lack of growth may appear puzzling given the high per capita inflows of external finance, in the form of both overseas aid and remittances.

Evidence on these in-flows of external finance are shown in Figure 2 for the most recent year available for each of the Melanesian and Polynesian countries and for Kiribati. Data on remittances to the other Micronesian countries are less easily available from international sources. Even for the countries with reported data, it is likely that remittances are understated due to some transfers occurring through informal means such as travellers carrying cash back with them. Moreover, the data in Figure 2 only relate to monetary remittances rather than the provision of goods in-kind, for which there are no comparable cross-country data.

Figure 2: Financial Flows in the Pacific



Source: AusAID (2006), ADB (2006)

For the countries in Figure 2, aid is equivalent to 16.3 percent of GDP, on average. This is somewhat higher than remittances, which are 12.5 percent of GDP and much

higher than foreign direct investment, which is only 0.6 percent of GDP. Total remittances to the nine countries in Figure 2 are ca. US$350 million per year, with total aid at over US$400 million. Thus, across all Pacific Island economies (including those not in Figure 2) it is likely that the combined total external finance is almost NZ$200 per capita, which is very high by world standards.

To have such modest economic growth with this generous inflow of external finance has many experts placing the blame on poor institutions (Chand, 2001), aid inflows (Hughes, 2003), bad policy settings (Chand, 2003; Gosarevski, Hughes and Windybank, 2004) and especially governance failures (Duncan, 2005). There is less of a consensus that smallness *per se* is a source of disappointing growth experiences. The literature on small countries (which includes all of the Pacific except for Papua New Guinea) notes that small size means a small domestic market and dependence on export markets and a narrow range of products, limited ability to influence prices, limited ability to exploit economies of scale, limitations on domestic competition, and problems of public administration (e.g. small labour force from which to draw experienced and efficient administrators). Insularity and remoteness give rise to problems associated with transport and communications such as high per-unit transport costs, uncertainties of supply, and the need to hold relatively large stocks. Proneness to natural disasters is a problem since the impact of a given disaster covers relatively more of a small country (Briguglio, 1995).

Despite these apparent disadvantages, Easterly and Kraay (2000) find that small states have the same range of growth experiences as other states. Their results are based on a dataset of 157 countries, 33 of which are small states (defined by population below one million).[4] They also find that there is no growth difference for small states after controlling for their region in the world, whether an oil producer, and whether an OECD member. The absence of a clear growth disadvantage of small states is due to offsetting effects of openness to international trade, which is favourable to growth, and greater output volatility, which harms average growth rates. This output volatility is partly due to the relatively larger terms of trade shocks experienced by small states.

Bertram (2004) finds that the level of GDP per capita of small island economies depends directly on the GDP per capita of their metropolitan patron and on the strength of their political ties with the metropolitan patron. For example, for a group of 20 Pacific Island states and territories (which excludes PNG and Hawaii) it appears that being politically fully integrated with a patron economy in the global core added about US$6,016 to per capita income. Put another way, Bertram and Karagedikli (2004) show that on average across the Pacific islands region, politically integrated units exhibit per capita incomes nine times higher than sovereign island states (including both Hawaii and PNG – it is three times larger if these two units are excluded). Similarly, Armstrong and Read (2000) show that dependent territories have higher GNP per capita than the sovereign states, even when controlling for a range of other factors such as economic structure, island status, and aid transfers.

Armstrong and Read (2006) note that the Pacific states are more likely to be smaller, islands, archipelagos, remote, and mountainous than other small states. However, they

[4] Only four of the 33 were from the Pacific (Fiji, Solomon Islands, Vanuatu and Samoa). Sampson (2005) shows that this conclusion is not robust to changes in sample coverage and time period.

conclude that neither small size itself, islandness, being mountainous nor being archipelagos is a serious handicap for the small Pacific states. Remoteness, however, almost certainly is. In their study they measure remoteness as the great circle distance from the capital city of each small state to the nearest one of three global economic hubs (Tokyo, Japan; Washington or Los Angeles, USA; and Brussels, EU). Since it is arguable that Auckland, Sydney and even Brisbane are important hubs for parts of the Pacific, it is clear that this measure of remoteness is only a partial one. It is therefore useful to describe just how economically remote the Pacific Island countries are, using more comprehensive measures than are available in the literature. In subsequent parts of this chapter these measures of remoteness will be included in cross-country growth models, to examine the hypothesis that geographic isolation is a fundamental growth constraint for Pacific Island economies.

How Remote Are the Pacific Islands?

The comprehensive measure of country remoteness used here is based on a matrix of bilateral distances for 219 countries with data available. Full details on the construction of these distance measures are reported in Gibson (2006c). The great-circle distance from each of the 19 Pacific Island states and territories (that have data available) to each of the other 218 countries in the rest of the world (ROW) is then weighted by either (i) the GDP of each of those 218 countries or (ii) the population of each of those 218 countries.[5]

Table 2: Potential Market Remoteness Measures for the Pacific and Caribbean Islands

Island Group	2003 GDP-weighted distance (km)	GDP-weighted distance rank (2003)	Population-weighted distance rank (2003)	GDP-weighted distance rank (1988)
Micronesia	10377	176	146	179
Polynesia	11942	207	201	208
Melanesia	11972	207	170	208
Pacific Islands (mean)	11456	197	176	199
Caribbean (mean)	8103	100	176	98

Source: Summary averages from country-level results reported in Gibson (2006c). Distances are the weighted average distances from the countries in each island group to the countries in the rest of the world (ROW), weighted either by the ROW country's GDP or population. The rank is out of 219 countries, with #1 the most accessible, #219 most remote.

Table 2 reports the average distances for three Pacific Island groups, derived from country-level information reported by Gibson (2006c). The average Pacific Island country is 11,500 kilometres from any other randomly selected country (weighted by ROW GDP). Micronesian countries are slightly less remote than either Polynesian or Melanesian countries since more of the world's GDP is in the Northern Hemisphere. Out of the 219 countries for whom this calculation has been made, the Melanesian and Polynesian countries have an average rank as the 207th most remote, while the Micronesian countries have an average rank of 176th most remote (shown in column 2 of Table 2). A useful comparison is with the Caribbean islands, whose average GDP-weighted distance from the rest of the world (8100 kilometres) is only 70 percent of the average for Pacific Island countries. In terms of ranking, the average Caribbean

[5] GDP-weighted great circle average distance to all other countries has also been used as a measure of remoteness by Silva and Tenreyro (2006).

island is the 100th most remote, compared with the average Pacific Island which is the 197th most remote.

The final two columns of Table 2 report the rankings for two different measures of distance – one using population weights rather than GDP and one using GDP 15 years earlier. Pacific Island countries, and especially Micronesia, are less remote from population centres than they are from the centres of the world's GDP. The values in the final column suggest a slight decline in potential remoteness for Pacific Island countries over the 15 years from 1988 to 2003. Their average remoteness rank improved from 209th to 207th, no doubt due to the rising share of world GDP located in Asia.

Whether proximity to rich (or populous) countries equals actual accessibility depends on transport links. One metric for examining 'economic distance' based on transport links is to consider airfares. Map 3 shows the average airfares from each Pacific Island country to three 'hubs' surrounding the Pacific – Auckland, Sydney and San Franscisco. According to these average cost calculations the Pacific Island countries appear more remote than island countries in other parts of the world. While the Pacific Island countries are, on average, 40 percent further from the locations of world GDP than the island states in the Caribbean they are much further away in terms of airfare-based measures of distance (Table 3).

Map 3: Average Cost of Air Fares

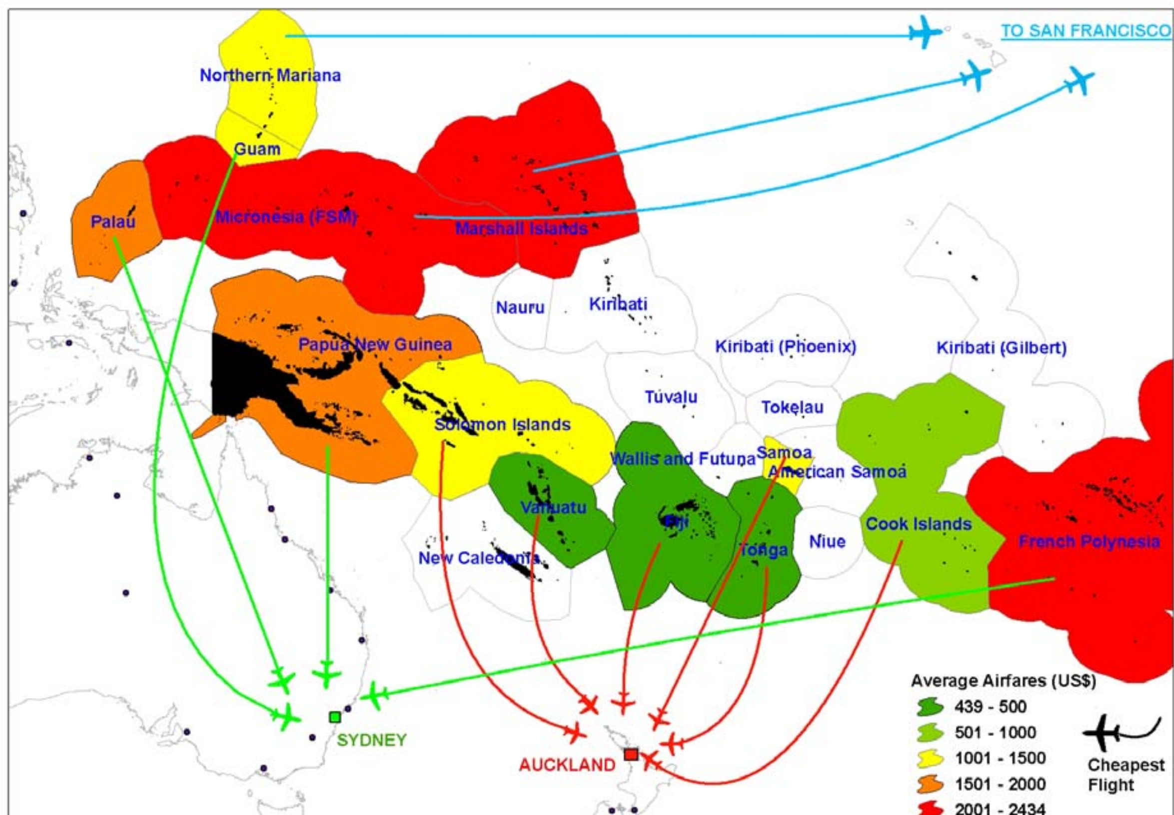


Table 3: Air Fare Measures of Remoteness for the Pacific and Caribbean Islands

Island Group	Average cost of fares to three key metropolitan cities (US$)	Average fare to closest of three key metropolitan cities (US$)	Average fare to most distant of three key metropolitan cities (US$)
Micronesia	1773	1768	1361
Polynesia	1067	727	1699
Melanesia	905	585	1586
Pacific Islands (mean)	1289	1084	1534
Caribbean (mean)	545	395	902

On average, traveling from a Caribbean island to any one of three main metropolitan cities with strong links to the Caribbean (Miami, New York and London) costs US$545. A similar calculation for the Pacific Islands, but with Auckland, San Francisco and Sydney as the metropolitan cities, gives an average fare of US$1289. Thus, by this metric the Pacific Island countries are more than twice as remote as the Caribbean islands. The cost disadvantage is even more apparent when considering travel to the closest metropolitan city, which is likely to act as a deterrent to both freer movement of labour (e.g. seasonal migration schemes) and the export of services to in-bound tourists. This example serves as a warning that the potential market access and distance measures used in the rest of this paper are imperfect proxies for more economic concepts of distance. However, such imperfect proxies have to be relied upon because of limited data on better economic proxies for distance.[6]

A Spatio-Econometric Analysis of Economic Growth in the Pacific Islands

In this section of the chapter we use regression modeling to examine the economic growth performance of the Pacific Island economies. There are two notable features of the analysis; first, it uses the comprehensive measures of geographic remoteness reported above, to test the hypothesis that geography is a fundamental constraint on growth in the Pacific. The second feature is that the analysis recognizes that economic growth for a given country may depend on the growth of nearby countries. Surprisingly, despite the spatial nature of cross-country data on economic growth there is little mention of *spatial autocorrelation* in the literature. The main results are due to Conley and Ligon (2002) who reject the hypothesis of independent growth rates for countries that are less than 2000 miles from each other.[7] Studies of the economic performance of small states (Easterly and Kraay, 2000; Armstrong and Read, 2002, 2006) also ignore this spatial autocorrelation, despite small states being clustered in the Caribbean and Pacific oceans, so that omitted spatial interactions may bias estimates of the effects of "smallness". Similarly, none of the studies of slow growth in the Pacific account for possible spatial effects despite the geographic clustering (by definition) of the countries in this region.

---

[6] Even in the Conley and Ligon (2002) study, where 'economic distance' is proxied by the cost of sending a 20 kilogram package by UPS between the capital cities of country pairs, only a limited number of pairs (n=26) were obtained which were then used as 'hubs' for completing the matrix of shipping costs from all countries to all other countries. For measures of distance based on airfares, Conley and Ligon chose 15 hub cities.

[7] In terms of their other distance metrics they find a significant positive spatial correlation between the growth rates of countries where the cost of UPS shipping measure of distance was less than US$270 and where the airfare cost measure of distance was less than US$1100.

Table 4 describes the variables used in the cross-country growth model. A sample of 174 countries has full data available, including the remoteness measures described above and average annual GDP per capita growth rates over 1987-2003. The 15 Pacific Island countries in this sample (PNG, Fiji, Solomon Islands, Vanuatu, Samoa, Tonga, Cook Islands, Tuvalu, French Polynesia, New Caledonia, FSM, Kiribati, Marshall Islands, Nauru, Palau) have, on average, grown more slowly in per capita terms than have other countries over the 1987-2003 period. This result holds even more strongly when restricting the comparison to other 'small' countries (defined by population below three million). Whether this gap (and its statistical significance) persists after accounting for the greater remoteness and other characteristics of Pacific Island countries can only be answered with the regression models.

The selection of explanatory variables to be used in the model is guided by the results of previous studies of economic growth in either 'small' or Pacific Island economies, especially Easterly and Kraay (2000), Bertram (2004) and Armstrong and Read (2006). In addition to the distance measures described above in Table 2 the other geographic variables included in the models are indicators for Pacific Island countries and for landlocked countries. The next set of variables relate to population. The literature uses several population thresholds for 'small' countries, ranging from 1-5 million. To provide more generality a continuous (log) population variable is used. The logarithm of land area for each country is also included to implicitly give a measure of population density. Density affects growth by allowing easier knowledge spillovers and lower per capita infrastructure costs but also may have negative effects due to congestion and competition for resources, especially on small atolls.

In the literature, greater trade openness and output volatility of small countries appear to be offsetting factors affecting growth (Easterly and Kraay, 2000). Both are included in the model. Sovereign status and a history of colonization are important geopolitical factors affecting growth since former colonies seem to converge to their colonial power (Bertram, 2004). Another factor that may hinder growth, at least in Melanesia, is language diversity. This diversity may increase the transactions costs of internal commerce, and raise the costs and lowers the returns to human capital formation. Language diversity is also a proxy for ethnic fractionalization which may lead to more group conflict (Alesina et al., 2003). Finally, initial income levels are likely to affect growth, although the direction is widely debated. Convergence, whereby countries with higher initial income have lower subsequent growth, appears to be limited to subsets of countries, while across the world as a whole the dominant feature is divergence (Pritchett, 1997).

The average characteristics of the three groups of countries in Table 4 suggest that the Pacific Island countries face a number of potential disadvantages in addition to being very remote. Their population and land area are much smaller than for other states, even just comparing with states whose population is less than three million. Hence limited domestic markets may reduce their income (Redding and Venables, 2004). They are also less open to international trade, due either to protectionist policy choices or to their greater remoteness causing transport costs to be a larger source of 'natural protection'. The Pacific countries also have greater language diversity. While less likely to have been colonized than other small countries their last colonial power grows more slowly than the colonial power for other small countries, which matters if incomes converge to those of the colonial power.

Table 4: Description of Data Used in Regressions

	Pacific Islands	Other Countries	Non-Pacific Small
Average annual growth rate of GDP per capita (US$), 1987-2003	0.020 (0.023)[a]	0.022 (0.034)	0.027 (0.030)
GDP-weighted average distance to all other countries in 1987-89 ('000 kilometres)	11.632 (0.793)	8.234 (1.764)	8.429 (1.592)
Change in GDP-weighted average distance to all other countries between 1988-2003 (kilometres)	-141.767 (8.519)	67.054 (87.999)	83.302 (61.793)
Population, average over 1987-2003 (logarithm of '000s)	4.704 (1.688)	8.849 (1.920)	6.306 (1.240)
Land area (logarithm of square kilometres)	7.455 (2.755)	11.697 (2.507)	9.041 (2.710)
Landlocked country (=1, otherwise = 0)	0.000 (0.000)	0.201 (0.402)	0.150 (0.362)
Openness to trade, exports plus imports as a share of GDP 1987-2003	0.715 (0.181)	0.945 (0.695)	1.442 (0.990)
Volatility, standard deviation of annual GDP growth, 1988-2003	0.114 (0.071)	0.149 (0.121)	0.111 (0.115)
Language diversity, number of languages spoken by at least 20% of the population	1.867 (0.743)	1.629 (0.784)	1.775 (0.698)
Never a colony (=1, otherwise = 0)	0.067 (0.258)	0.170 (0.377)	0.025 (0.158)
GDP per capita growth rate (1987-2003) of last colonizing country	0.031 (0.012)	0.034 (0.012)	0.042 (0.014)
Initial income, (log) GDP per capita (US$) in 1988	7.385 (1.104)	7.309 (1.451)	7.653 (1.232)
Number of countries	15	159	40

Source: World Bank and Asian Development Bank for data on GDP, growth rates, population, openness and volatility. Data on land area, whether landlocked, language diversity and colonizers are from a database constructed by the Centre d'Etudes Prospectives et d'Informations Internationales.

[a] Small countries defined as having average population less than 3 million, outside the Pacific Islands region.

[b] Standard deviations in ( )

On the other hand, some factors may favour faster growth in the Pacific than elsewhere. First, between 1988 and 2003 the Pacific became 'closer' to the world economy due to the rising share of world GDP produced in surrounding countries. In contrast, other small countries became further away from the centres of world GDP. Second, none of the Pacific Island countries are landlocked, which is typically found to be an impediment to growth (Hausmann, 2001). Third, the volatility of their growth rates, which has been shown to reduce average growth (Easterly and Kraay, 2000), is no different than for other small states. Finally, their initial income (as proxied by log GDP per capita in 1988) is lower than for other small countries, which may favour faster growth if convergence is occurring.

Basic Regression Results

The results of estimating the cross-country growth model with Ordinary Least Squares (OLS) are reported in Table 5. This estimator does not take account of any spatial autocorrelation, whose impact in considered subsequently in Table 6. The results in Table 5 are presented in five columns, where the first four each deal with a set of factors likely to affect growth rates and finally all factors are considered at once. An indicator variable for the Pacific Island countries is included in each model, to give average growth rates in the region (relative to the mean) conditional on each set of factors.

While remoteness might be expected to excuse lower growth, once geographic constraints are controlled for the Pacific Island countries still appear to grow more slowly (column 1, Table 5). The negative effect of remoteness (-0.18) seems to be outweighed by the effect of the fall in GDP-weighted distance between 1988 and 2003 (-0.42). In addition, none of the Pacific Island countries are landlocked, which gives a further reason for expecting faster growth. Since the Pacific Island countries, on average, did not grow as fast as the geographic factors predict, the indicator variable for the Pacific registers a negative, significant coefficient.

These results suggest a 'potential growth failure' of the Pacific Island countries not fully exploiting the opportunity provided by being close to where the greatest growth occurred in the global economy. Note though that the distance measures are based on potential market access. Suitable transport and trade systems need to be in place to turn this into actual market access; being near rapidly growing countries may be of little use if there is no cheap, easy, or reliable way to get to them. The average airfares in Table 3 show that actual remoteness of the Pacific Islands exceeds what potential remoteness measures indicate. Likewise, actual remoteness may not have fallen by the extent that potential remoteness calculations suggest.

When account is taken of each of the other groups of factors in Table 4 (population and land area; trade and volatility; and initial economic, political, and social conditions) there is no significant Pacific Island effect. In other words, one cannot reject the hypothesis that the Pacific Island countries grew at the rate that would be expected once account is taken of their smaller size (both population and area), level of trade openness and growth volatility, language diversity, initial income and the growth rate of their colonizers. However, such inferences rely on ignoring the effects of remoteness and other geographic factors (which are re-introduced in column 5). In terms of the individual coefficients in columns 2-4, the largest effects on average growth rates for this sample of 174 countries appear to be population (larger is better), land area (smaller, meaning greater density, is better), growth volatility (more is bad for average growth rates), language diversity (more is bad for average growth) and the growth rate of the last colonizing country (faster is better).

Table 5: OLS Regression Estimates of Long Run Growth Equations

	Explanatory Factors				
	Geographic constraints	Population density	Trade and volatility	Initial conditions	All Factors
Pacific Island country (=1, otherwise=0)	-0.182 (2.80)**	-0.058 (0.91)	-0.039 (0.75)	0.018 (0.29)	-0.148 (1.70)+
GDP-weighted distance (1987-89)	-0.187 (2.46)*				-0.109 (1.28)
Change in GDP-weighted distance (2003 vs 1988)	-0.403 (5.48)**				-0.318 (4.04)**
Landlocked country	-0.138 (1.75)+				-0.063 (0.81)
Population		0.484 (3.70)**			0.254 (1.80)+
Land area		-0.676 (5.89)**			-0.274 (1.88)+
Openness to trade			0.169 (2.88)**		0.100 (1.56)
Volatility of per capita GDP growth rate			-0.406 (5.32)**		-0.339 (4.93)**
Language diversity				-0.198 (2.65)**	-0.161 (2.71)**
Never a colony				0.023 (0.27)	-0.067 (0.91)
Colonizer growth rate				0.227 (2.33)*	0.108 (1.34)
Initial income level [(log) GDP per capita in 1988]				0.233 (3.33)**	0.108 (1.49)
Constant	0.000 (0.00)	-0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)
R-squared	0.149	0.136	0.215	0.135	0.401
Log-likelihood	-232.411	-234.649	-225.304	-233.804	-201.811

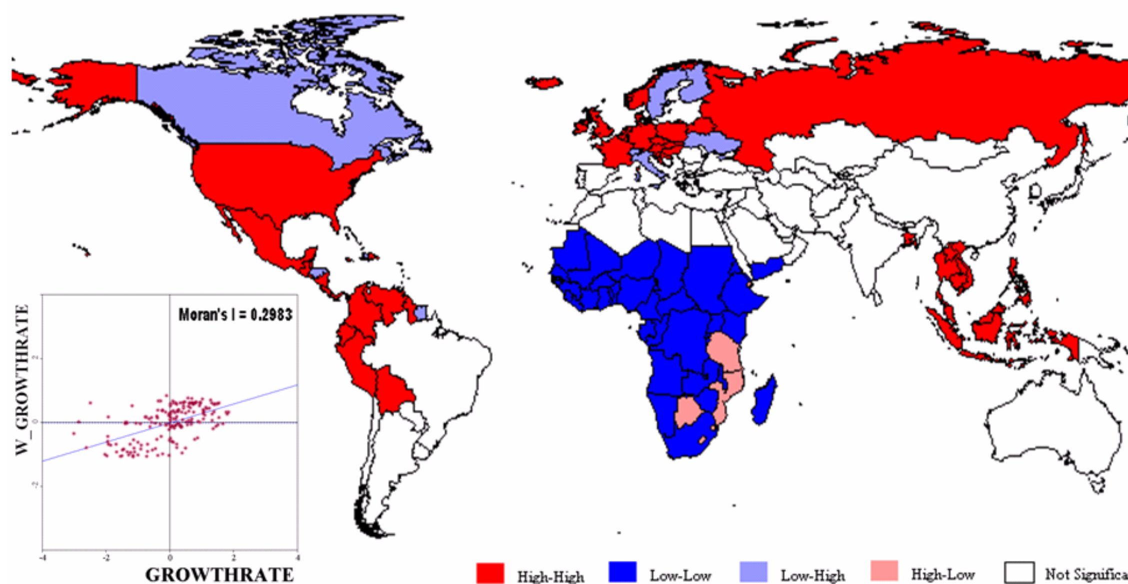
Note: Standardized (beta) coefficients are reported, showing the effect of a one standard deviation increase in the explanatory variable on the standard deviation of average per capita GDP growth over 1987-2003, for N=174 countries. Definitions for all variables are reported in Table 4.
Heteroscedasticity robust t-statistics in ( ). + significant at 10%; *at 5%; **at 1%

When geographic factors are combined with all of the other factors in the regression model, the average growth rates of the Pacific Islands are significantly lower than for other countries. While the effect is statistically significant at only the 10 percent level, it is nevertheless suggestive of a growth failure since so many of the constraints that bind in the Pacific have been accounted for. However this conclusion depends on the appropriateness of the statistical model used in Table 5. While the 'industry standard' Ordinary Least Squares method is used, there are good reasons to believe that this method is inadequate for studying patterns of economic growth across countries.

In particular, there is substantial spatial autocorrelation in economic growth rates. This is shown in the form of a cluster map which highlights countries where there is a statistically significant relationship between the growth rate of that country and its neighbours (Figure 3). A variety of statistical tests reported in the working paper version of this section (Gibson, 2006c) indicate that an appropriate neighbourhood for looking for these correlations is for countries that are within 35 degrees of latitude or longitude of one and other (a distance of approximately 3900 kilometres at the equator).

According to Figure 3, most of Africa has statistically significant (with a confidence level of 95 percent) low-low clusters of economic growth. In contrast, Europe, the United States and parts of Latin America, and much of Southeast Asia have significant high-high clusters. There are very few high-low and low-high combinations. These patterns are indicative of significant positive spatial autocorrelation in average GDP growth rates whereby growth rates are similar to the growth rates of neighbouring countries.

Figure 3: Cluster Map for Local Spatial Autocorrelation in Country Average Economic Growth Rates, 1987-2003



Source: Author's calculation using GeoDa software of Anselin Syabri and Kho (2006), based on a weight matrix with countries within 35 degrees of each other as 'neighbours'.

Another way to observe this spatial autocorrelation is with a particular type of scatter plot, known as a Moran scatter plot. This shows the relationship between the spatially weighted average growth rate of neighbours, Wg and the growth rate of each country, g. So the high-high clusters correspond to countries in the positive-positive ('northeast') quadrant of a Moran scatterplot, which has Wg on the y-axis and g on the x-axis. The low-low clusters correspond to the negative-negative quadrant. The Moran scatter plot in Figure 3 indicates positive spatial autocorrelation, since there is

a positive relationship (slope=0.298) between the spatially weighted average growth rate of neighbours, W_GROWTHRATE and the GROWTHRATE of each country.

If this clustering of growth rates is transmitted into the residuals of a growth equation it violates the assumption of randomness of residuals that estimation methods like OLS require. In fact, a variety of diagnostic tests reported by Gibson (2006c) suggest that the regression results in Table 5 are suspect because there is an absence of spatial randomness in the growth residuals. These tests also suggest that the appropriate model instead is a so-called spatial lag model, where the growth rate of each country is affected by the spatially weighted average of growth rates of other nearby countries, even after controlling for observable factors that might be common for the countries, such as measures of remoteness or dummy variables for belonging to a particular region of the world. In other words, OLS estimates of the growth model that are used in Table 5 and in all previous statistical studies of economic growth in the Pacific (and in small countries) are likely to be biased because they omit a relevant variable – the spatially weighted average growth rate of nearby countries.

To see whether this bias matters the model in the last column of Table 4 was re-estimated as a spatial lag model. The preferred estimates use the spatially weighted average growth rate of countries within a 35 degree neighbourhood, with the countries that are closer within that neighbourhood receiving a large weight in the formation of the weighted average (the weights decline with distance). This neighbourhood of approximately 3900 kilometres is similar to the finding of Conley and Ligon that the spatial autocorrelation between country's growth rates is highest at around 2000 miles (3200 kilometres). But as a sensitivity analysis more extreme neighbourhoods of 25 degrees and 75 degrees are also used, along with a variant where all countries within the 35 degree neighbourhood are given equal weights.

According to the preferred estimates in Table 6, each one point increase in the spatially weighted average growth rate of countries within a radius of 35 degrees raises the GDP growth rate of the country at location i by 0.54 points. This dependence on the growth rate of neighbouring countries is even after controlling for remoteness, other geographic constraints, population, openness and volatility and initial economic, social, and political factors.

The use of the spatial lag model has a dramatic effect on the coefficient on the Pacific Islands dummy variable, which is the focus of attention. This coefficient now is only one-half as large as in the OLS estimates and is statistically insignificant. The same fall in magnitude and statistical significance of the dummy variable for Pacific Island countries occurs when the spatial lag model is estimated with the other weights matrices and neighbourhoods.

In contrast to the fragility of the result for the Pacific Islands dummy variable, several of the other growth determinants have the same effect in the spatial lag model as they had in the OLS estimates. These more robust variables include land area, openness to trade and the volatility of the growth rate. The positive effect of population becomes even more apparent in the spatial lag results than it was with OLS. Some of the other variables, including language diversity and the change in GDP-weighted distance between 1988 and 2003 become smaller but are still statistically significant. This may reflect the fact that these variables are also somewhat spatially clustered. Thus it

appears that geographic variables, including regional dummies, are susceptible to biased coefficients from a failure to include relevant spatial lags in cross-country growth models.

Table 6: OLS and Spatial Lag Regression Estimates of Long Run Growth Equations

	OLS regression	Inverse-distance weights, neighbourhood:			Equal weight
		25 degrees	35 degrees	75 degrees	35 degrees
Pacific Island country (=1, otherwise=0)	-0.148 (1.70)+	-0.070 (0.86)	**-0.066** **(0.80)**	-0.102 (1.21)	-0.058 (0.68)
GDP-weighted distance (1987-89)	-0.109 (1.28)	-0.042 (0.55)	**-0.039** **(0.52)**	-0.058 (0.77)	-0.031 (0.41)
Change in GDP-weighted distance (2003 vs 1988)	-0.318 (4.04)**	-0.154 (2.01)*	**-0.133** **(1.74)**+	-0.184 (2.51)*	-0.121 (1.58)
Landlocked country	-0.063 (0.81)	-0.048 (0.69)	**-0.049** **(0.72)**	-0.049 (0.70)	-0.045 (0.63)
Population	0.254 (1.80)+	0.276 (2.07)*	**0.262** **(2.13)***	0.285 (2.26)*	0.274 (2.22)*
Land area	-0.274 (1.88)+	-0.257 (1.89)+	**-0.252** **(2.00)***	-0.261 (2.00)*	-0.269 (2.14)*
Openness to trade	0.100 (1.56)	0.116 (2.00)*	**0.114** **(2.00)***	0.123 (2.05)*	0.114 (1.94)+
Volatility of per capita GDP growth rate	-0.339 (4.93)**	-0.337 (5.03)**	**-0.324** **(4.76)****	-0.324 (4.91)**	-0.314 (4.52)**
Language diversity	-0.161 (2.71)**	-0.111 (2.12)*	**-0.107** **(2.07)***	-0.119 (2.25)*	-0.112 (2.16)*
Never a colony	-0.067 (0.91)	-0.079 (1.14)	**-0.071** **(1.03)**	-0.062 (0.89)	-0.060 (0.86)
Colonizer growth rate	0.108 (1.34)	0.065 (0.82)	**0.071** **(0.96)**	0.080 (1.07)	0.081 (1.10)
Initial income level [(log) GDP per capita in 1988]	0.108 (1.49)	0.005 (0.07)	**-0.008** **(0.13)**	0.033 (0.50)	0.005 (0.08)
Spatial weighted average of neighbors' growth rates	n.a.	0.439 (5.04)**	**0.542** **(5.80)****	0.643 (5.24)**	0.592 (5.74)**
Constant	0.000 (0.00)	-0.015 (0.27)	**-0.006** **(0.11)**	0.005 (0.10)	0.013 (0.25)
R-squared[a]	0.394	0.475	**0.492**	0.471	0.483
Log-likelihood	-201.811	-192.706	**-190.404**	-193.256	-191.302

Note: Standardized (beta) coefficients are reported, showing the effect of a one standard deviation increase in the explanatory variable on the standard deviation of average per capita GDP growth over 1987-2003, for N=174 countries. Definitions for all variables are reported in Table 3. Preferred estimates are reported in bold.
Robust t-statistics in ( ) for OLS and robust z-statistics for the spatial lag. + significant at 10%; *at 5%; **at 1%.
[a] For spatial lag models the squared correlation between actual and predicted values is reported.

Spatio-Economic Effects: A Summary

We have reported tests of the hypothesis that geographic factors, and particularly remoteness, can account for the slow rate of economic growth by the Pacific Island countries. More comprehensive measures of remoteness are used than in previous studies and the estimation method allows for spatial autocorrelation, due to interactions between the growth rates of nearby countries.

The results show that the Pacific Island countries are some of the most economically remote in the world. However, they have become potentially less remote in recent years as world economic activity has shifted towards the Pacific. In a cross-country growth equation the reduction in remoteness emerges as the more important factor. Surprisingly, therefore, the addition of geographical factors to a standard growth model makes the growth performance in the Pacific appear even slower than expected.

However, standard cross-country growth models that use Ordinary Least Squares estimation are shown to be biased since they do not account for the highly significant spatial lag, reflecting dependence on neighbouring country growth rates. Once this lag is accounted for the hypothesis that per capita GDP growth in the Pacific Island countries is no lower than in other countries is not rejected.

The fact that the spatial effects occur in the form of spatially lagged growth rates rather than as correlated errors also implies the need for a regional focus in any solutions to growth problems. In the preferred spatial regression model the average growth rate of neighbouring countries directly enters into the equation predicting the growth of a specific country. In some parts of the world, this spatial lag may reflect cross-border flows of goods and factors of production but in the Pacific intra-regional trade is not especially important. Instead, shared use by Pacific Island countries of key assets such as transport infrastructure could create a dependence on the growth of neighbours, since this growth affects the viability of transport links for all the countries sharing the service.[8] Possible contagion of civil unrest across borders may also be important in the Pacific. Regardless of the exact source of spatial dependence in growth rates, it appears that it is hard for a single country to have a strong growth performance if it is surrounded by other countries that are growth failures.

Determining Relevant Comparisons to Pacific Island Nations

The results in Table 6 suggest that claims of growth failure in the Pacific Island countries are not robust. Specifically, once interactions between the growth rates of nearby countries are accounted for, there is only a small (less than 0.1 of a standard deviation) and statistically insignificant effect of being a Pacific Island country on the average growth rate of GDP per capita.

In this section, the issue of appropriate comparators for evaluating the counterfactual growth rate of the Pacific Island countries is studied. A drawback of regression methods such as those used in Table 5 and 6 is that implicitly they force all countries in a sample to be comparators for a specific country, regardless of their dissimilarity. Other *ad hoc* methods of selecting of comparators, such as done by Duncan (2005) in

[8] A discussion of shared use of air and sea transport in the Pacific is provided by Vitasagavulu (2005).

using Botswana and Mauritius as comparators for PNG and Fiji, also may not yield the same counterfactual growth comparisons as more comprehensive methods.

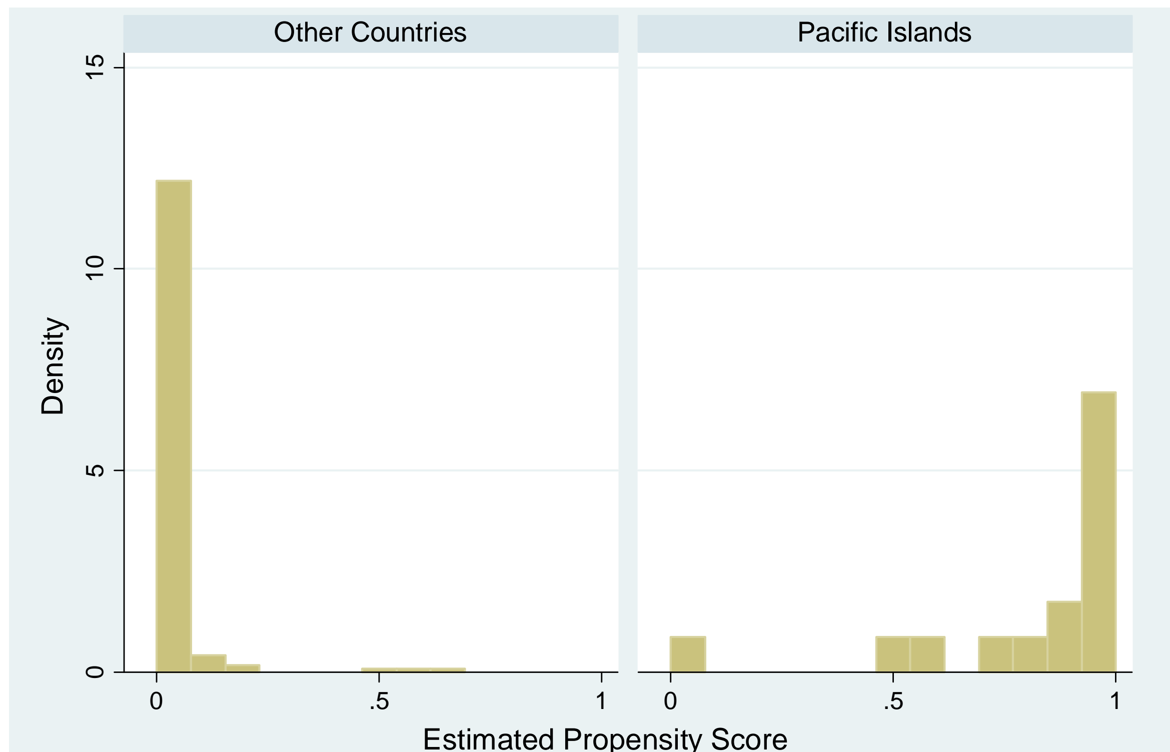
The approach used here is based on a method increasingly used in labour and public economics called *propensity score matching*. The basic idea is to use a probabilistic (probit) model showing the characteristics most closely associated with the propensity to be a Pacific Island country. For example, the following model explains over 80 percent of the variation in the indicator variable showing which of the sample of 174 countries are Pacific Island countries (PIC):

$$PIC = -5.87 + 1.00 GDP_DISTANCE - 0.77 LOGPOP - 1.03 INDEPENDENT$$

(2.10) (3.30) (3.10) (1.03)

where z-statistics are in ( ). The explanatory variables are the GDP-weighted average distance to all other countries in 2003, the logarithm of each country's population and a dummy variable for whether the country is politically an independent state. The coefficients show that Pacific Island countries are more remote, have smaller populations and are less likely to be politically independent than are other countries. Based on these characteristics, the propensity for each country (in the sample of 174) to be a Pacific Island country is estimated, with the results shown in Figure 4.

Figure 4: Distribution of Propensity Scores: Being a Pacific Island Country



The left-hand panel of Figure 4 shows that most countries outside of the Pacific Islands have very small propensity to be a Pacific Island country. What does this seemingly self-evident statement mean? Intuitively it says that in terms of remoteness, population size and political independence there are very few countries outside of the Pacific that are like the Pacific Island countries. Who amongst the non-Pacific countries are the good comparators? The only propensity scores from the non- Pacific

Island countries that exceed 0.25 are for New Zealand (0.69), Timor Leste (0.54) and the Seychelles (0.53). In other words these are the countries that are most like the Pacific Islands in terms of remoteness, population and political autonomy. So researchers searching for counterfactuals of how the Pacific Island countries might have grown if they had adopted different policies would do better to look at the growth experience of these three comparators than at some other countries chosen in an ad hoc manner.

Of the two comparators used by Duncan (2005) Mauritius has the fourth highest propensity score (0.23) amongst the non- Pacific Island countries, while Botswana has only the 11th highest score (0.07). Thus they can be considered reasonable but not necessarily the best choices of comparators. Does the use of ad hoc methods of selecting comparators matter? The average growth rate of Mauritius and Botswana was 4.0 percent per year (4.6 percent if weighted by the propensity score). In contrast, if all 11 non- Pacific Island countries that have propensity scores at least as high as Botswana are used, the average growth rates are only 2.9 percent (or 3.0 percent weighting by the propensity score). Just restricting attention to the top three comparators of New Zealand, Timor Leste and the Seychelles, the average growth rate amongst this gang of three is also 3.0 percent. So a more systematic method of selecting comparators would lead to a lower counterfactual growth rate for evaluating how badly the Pacific Island countries have done compared with choosing Mauritius and Botswana.

The other feature apparent from Figure 4 is the considerable heterogeneity amongst the Pacific Island countries. The histogram for the propensity scores in the right hand panel shows that most Pacific Island countries have a very high propensity (of about 100 percent) of being a Pacific Island country. However, one country (PNG) has a very low probability. This reflects the difficultly of grouping PNG with the rest of the Pacific Islands, at least in terms of population size. This heterogeneity within the treatment group provides further reason for expecting differences between the treatment and control groups (the comparator countries) to not necessarily be statistically significant.

An attempt to examine such differences formally is presented in Table 7. Two types of comparisons are made. The first compares the average growth rate of the 15 Pacific Island countries (the ‘treatment group’) and 14 other countries that have what is called a ‘common support’. This condition limits the comparisons to countries where there are overlapping propensity scores in the treatment and control groups. The second comparison uses all of the 159 non- Pacific Island countries. Each treated country is matched with a weighted average of all control group countries within a certain propensity score distance, with weights declining in that distance. In other words, the counterfactual average growth rate of the control group of countries places most weight on the non- Pacific Island countries with the highest propensity scores.

Table 7: Treatment Effects: Average GDP Growth Rate

	Restricting to Common Support	Using All Countries
Number of countries in treatment group	15	15
Number of countries in control group	14	159
Difference in mean average growth rate (Treatment minus control)	-0.004	-0.004
Standard error of difference	0.009	0.009
t-statistics	0.41	0.41

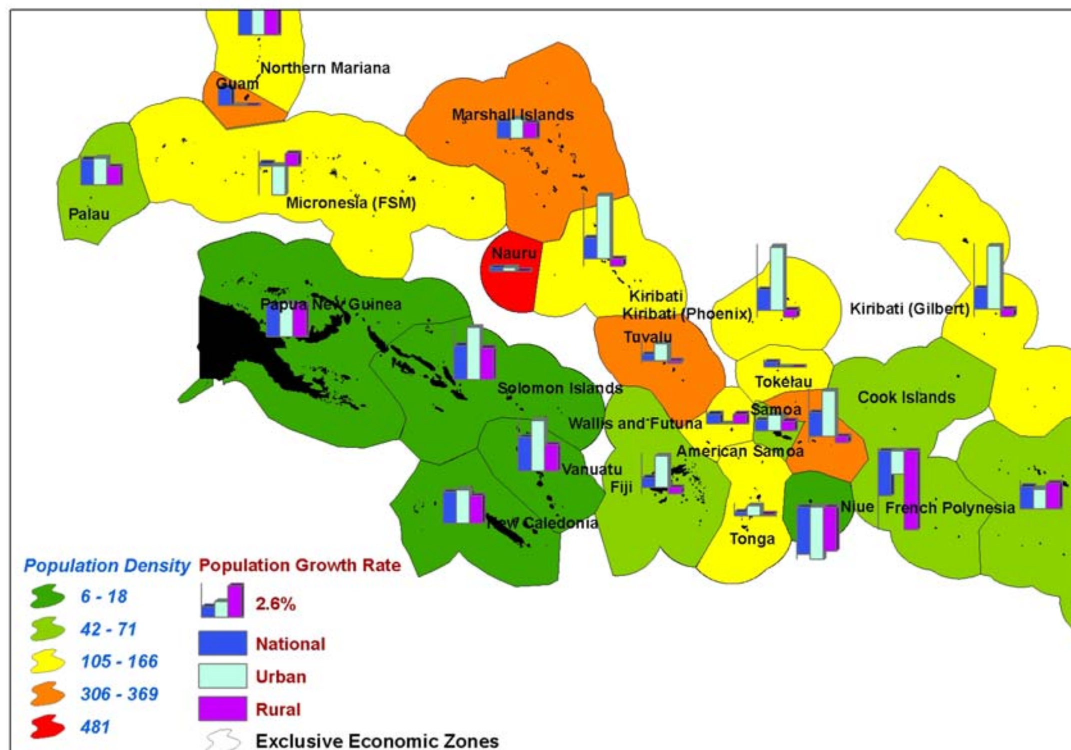
Source: Author's calculations from data described in text.
Standard errors are based on 100 bootstrapped replications.

Both types of treatment effects reported in Table 6 are small (-0.004) and statistically insignificant. In other words, using this flexible propensity score method, there is no firm evidence that the Pacific Island countries grew more slowly over 1987-2003 than did an appropriate group of comparator countries.

Regional GIS Mapping Comparisons

After this consideration of spatio-economic interactions, we move to the GIS visualizations of key variables: in the first case population densities by growth rates further subdivided by urban/rural residence.

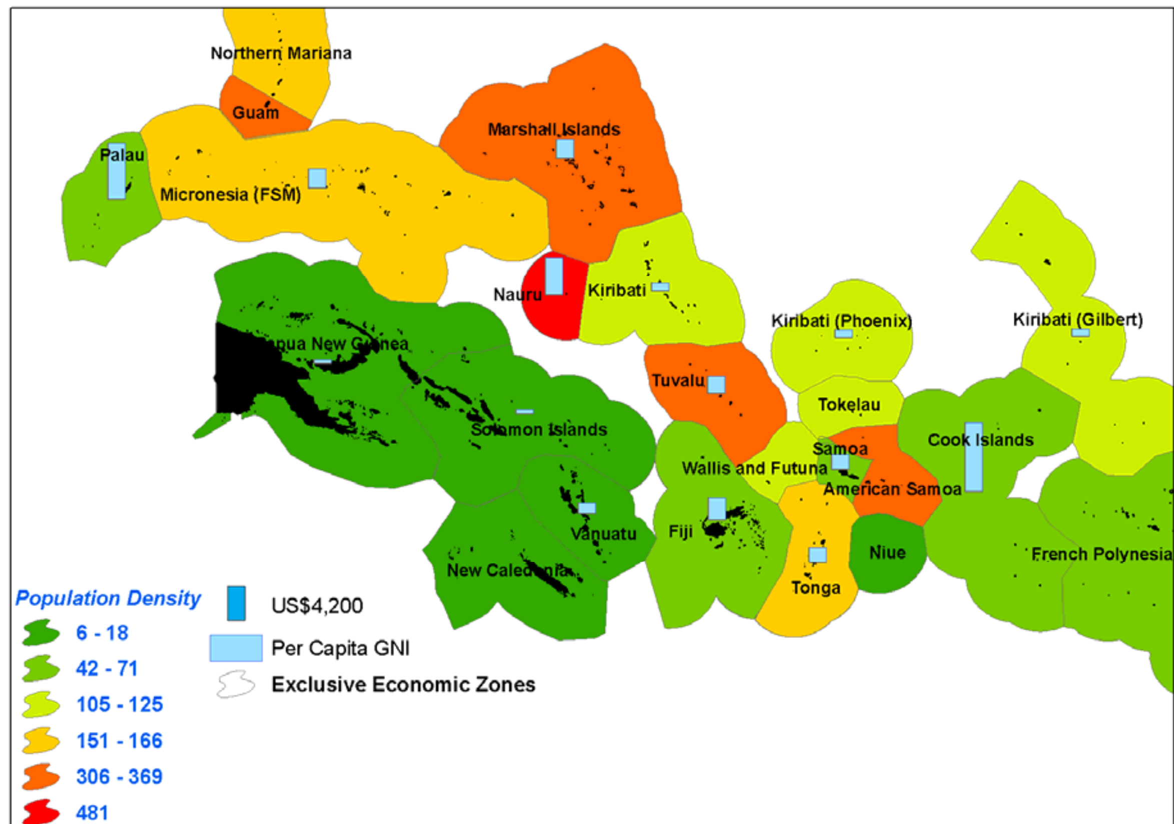
Map 4: Population Density - Population Growth Rates – Urban/Rural



As shown above by the regression results, and also demonstrated here using GIS, population density is an important factor affecting access to resources and their sustainable management. In general the large islands have the lowest density and historically small coral atolls have often been densely populated. At present overseas migration for employment, education, and residence is a highly sought right that for some Pacific nations is either a part of their relationships with former or current colonizers, or negotiated through bilateral agreements. Nauru, a very small island historically densely populated with foreign workers as well, has the highest population density.[9] The next four most highly densely populated island nations are Tuvalu, the Marshall Islands, American Samoa and Guam.

The urban/rural distribution gives further indications: Guam and American Samoa are predominantly urban, and in the case of Guam also includes a large and variable immigrant worker population as well as long established stateside American residents and military. Tuvalu and the Marshall islands, with larger rural populations, demonstrates in the first case a nation lacking access to overseas migration, except for small annual quotas now negotiated with New Zealand. The Marshall Islands density is an issue to monitor as its compact-related migration to Honolulu and mainland US destinations is now increasing rapidly after a slow start. This map thus demonstrates a critical issue: to what extent do Pacific nations have access to working and living overseas.

MAP 5: Population Density by GNI pc



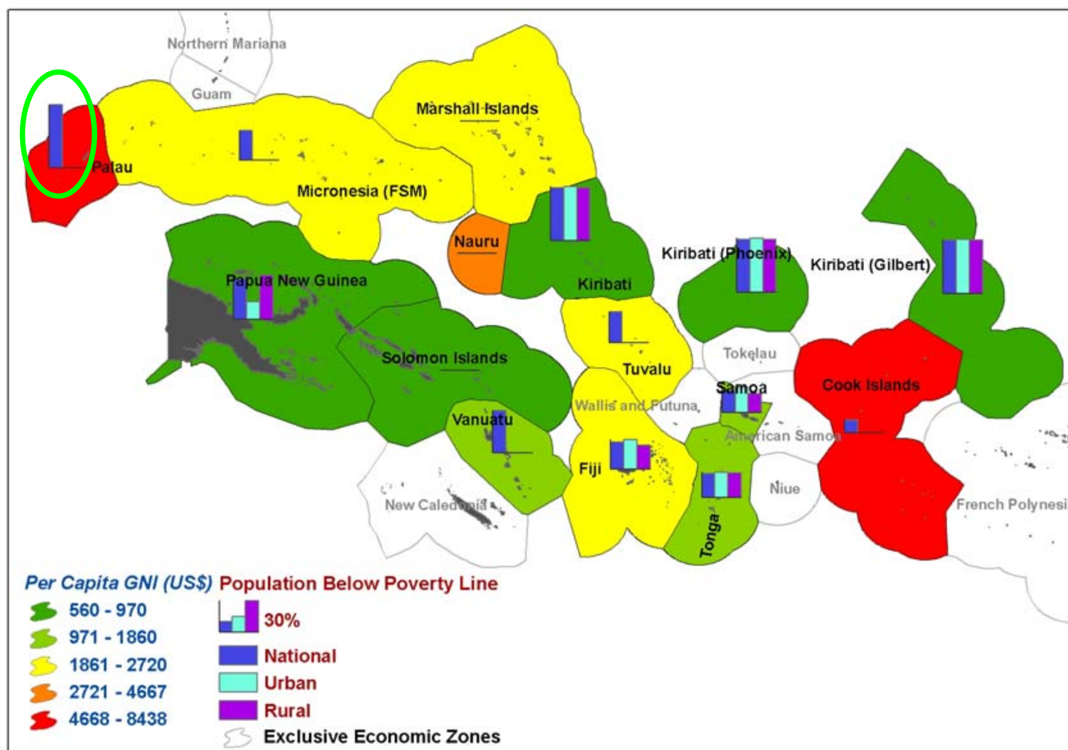
---

[9] The population estimates are for 2004 for all countries and are based on their most recent census. For Nauru the actual count in the 2002 census was 10,065 and the SPC estimate for 2004 was 10,100.

Map 5 indicates that generally low population density is correlated with low per capita Gross National Income. An important exception is Palau, which enjoys one of the highest per capita GNI, even with a low density of population. Possible reasons for the higher income level in Palau were discussed above, with the exception to the general pattern possibly because Palau also benefits from its proximity to Asia and especially the tourism market from Japan and Taiwan.

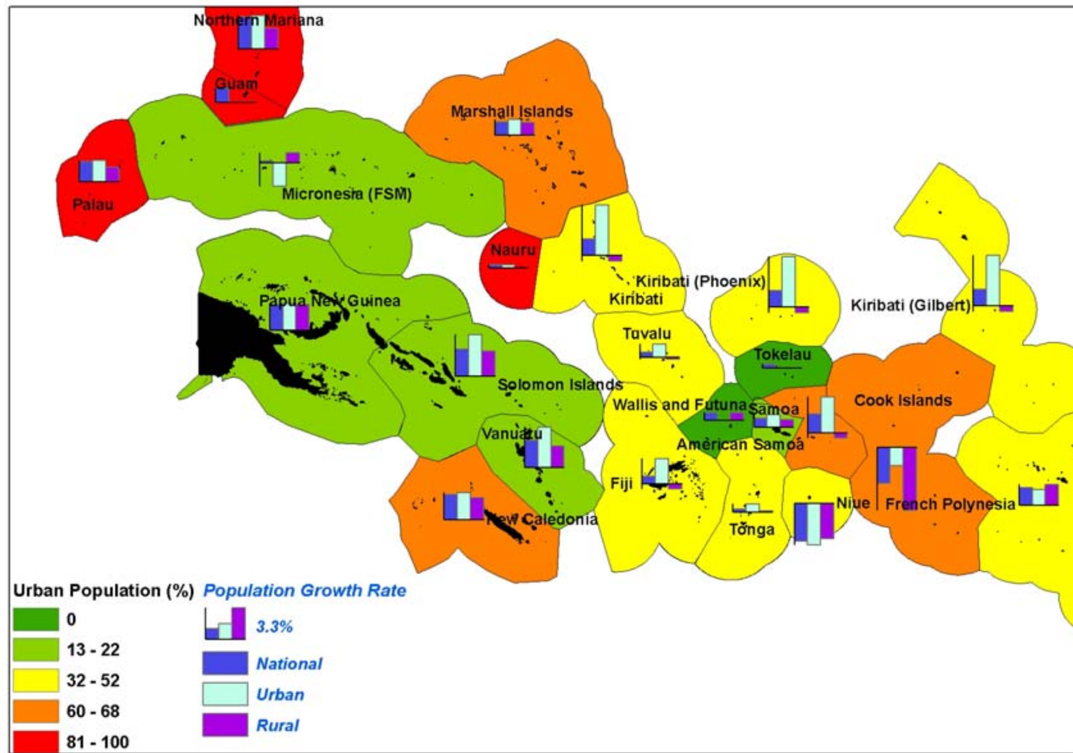
A key focus of donor strategies is to reduce poverty. In this regard, Map 6 demonstrates some of the political issues of data and comparable definitions. Recall that in Map 1, Palau and the Cook Islands are the highest ranking Pacific nations in terms of GDP per capita. Yet at the same time, Palau is shown as having one of the highest rates of population below the poverty line. This potential anomaly is circled on the map to highlight attention to it. Does this contrast between high average income levels and high reported poverty indicate extreme inequalities within this small nation? Not really, and instead the contrast highlights problems with the data available for many of these cross-country comparisons. In this case, the Asian Development Bank (ADB) data set on poverty uses estimates for Palau based upon US poverty thresholds. These refer to a far higher standard of living than the poverty lines used for other countries in the Pacific and so undermine the comparability of this key indicator.

MAP 6: Population Below Poverty Line with pc GNI base



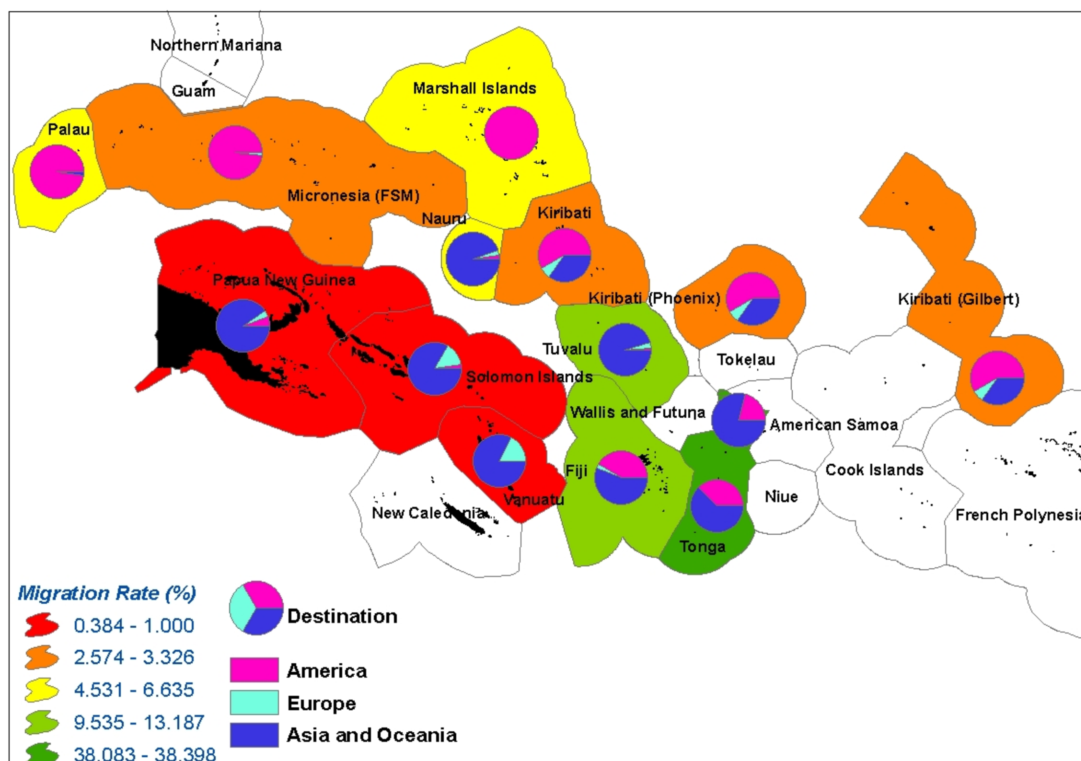
Another key variable within the Pacific is the degree of urbanization (Map 7). The lowest urbanization rates are generally in Melanesia with the highest rates in Micronesia, although there are exceptions to this pattern. The population growth rates that overlay the maps of urbanization rates also demonstrate the on-going movement of especially Eastern Polynesians overseas. The countries with either declining or static total populations are also amongst the most urbanized.

MAP 7: Share of country Population in urban areas and pop growth rates



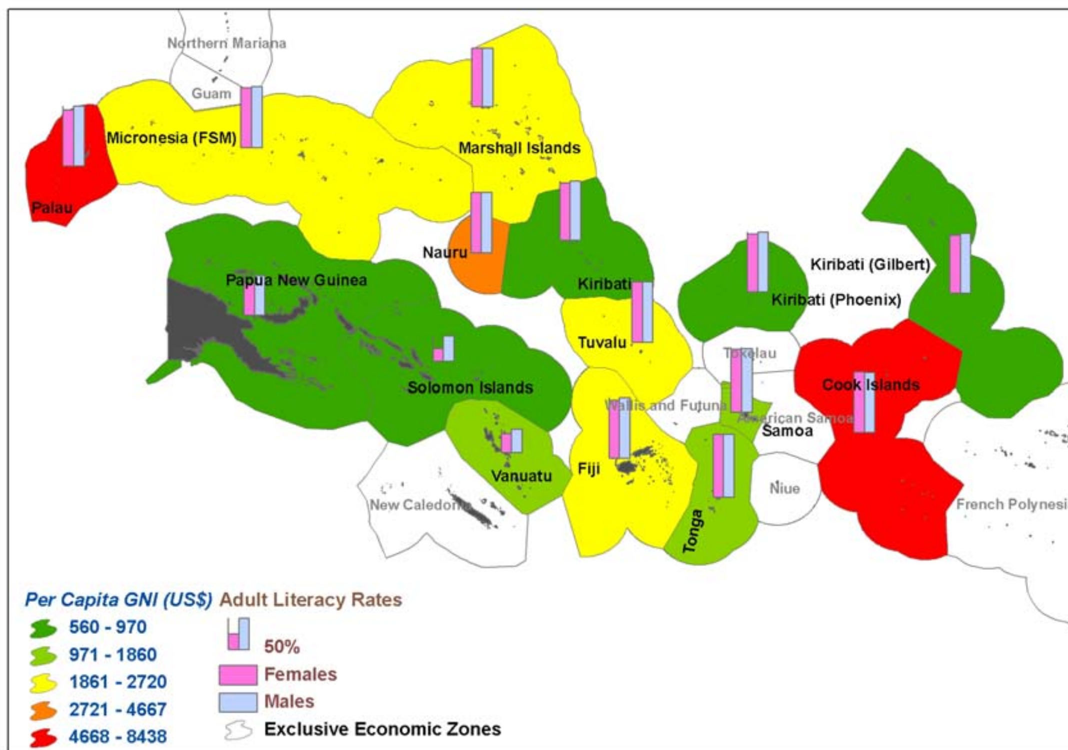
Interestingly, emigration options do not follow pathways only to the former colonizer (Map 8). As expected, outmigration from Palau, the Federated States of Micronesia and the Marshall Islands is nearly exclusively to the United States. However over half of the outmigrants from Kiribati also migrate to America. It is also striking that a high percentage of the small numbers of Solomon Islanders who emigrate go to Europe, nearly equal to that percentage for Vanuatu.

MAP 8: Base: Migration Rate = total emigrants over total population
Charts: share of total emigrants in these three regions



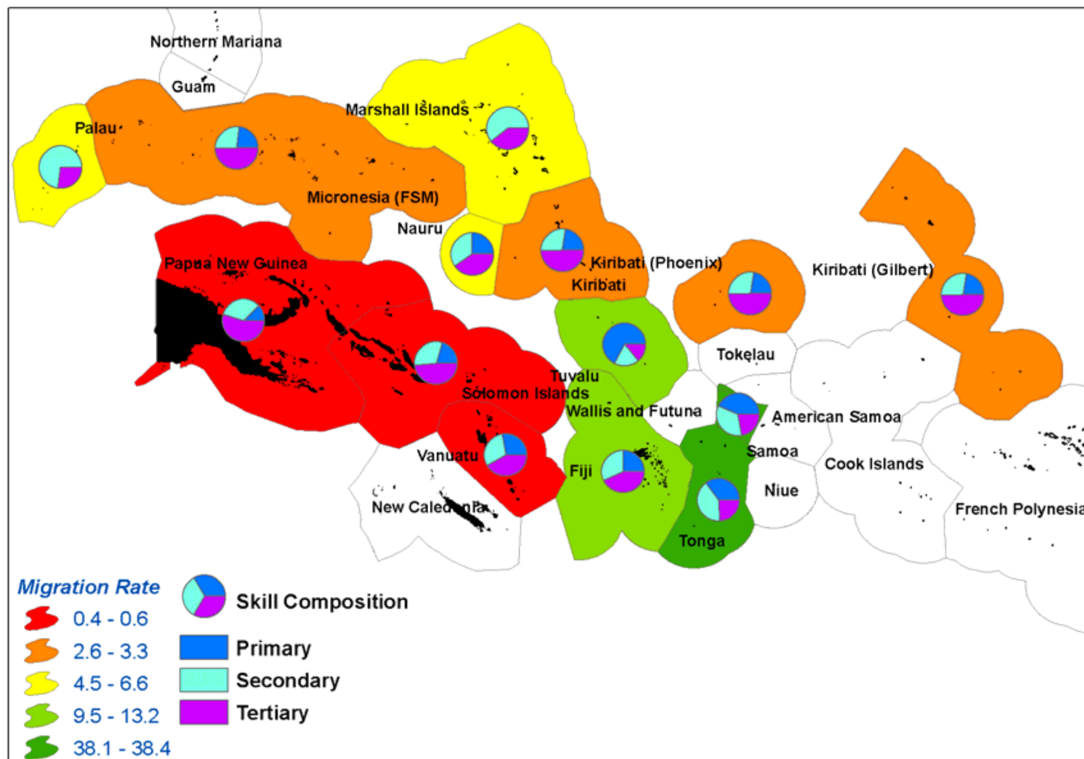
Average education levels are the most important correlate of economic growth across countries according to recent research (Lleras-Money 2005). We therefore attempted to provide a GIS map of educational level, both by island nation-state and islanders residing abroad. However identifying "immigrants" is complicated in the case of dependent [and freely associated] states such as the Cook Islands who have unrestricted rights to live in their associated nation (Docquier and Malfouk 2006: 160). Recent data sets on international skilled migration (Docquier and Malfouk 2004, 2006) have attempted to include the Pacific in international comparative statistics of educational attainment, especially in the context of migration and brain drain. However these used only the data for the largest of Pacific island nations (Papua New Guinea and Fiji) and apply derived ratios from these two countries to all the rest of the Pacific. So while it appears that there are data, these are based upon assumptions that are unlikely to hold, and comparisons within the Pacific are impossible.

MAP 9: Adult Literacy Rate on per capita GNI base



Instead, data on adult literacy rates are used, which show the lowest literacy rates in the countries with the lowest per capita income levels (although Kiribati is an exception to the trend). Generally with the exception of PNG, the Solomon Islands and Vanuatu the gender gap in literacy levels appears to be small (Map 9).

MAP 10: Charts: share of total emigrants with these levels of educational attainment



The other feature of both education and literacy levels, and population mobility, is concerns about potential 'brain drain' of talent people from Pacific Island countries. In this regard, there is clear evidence that emigration is most skill intensive (in terms of being dominated by tertiary educated people) from the countries with the most limited emigration options (Map 10). Thus, over one-half of emigrants from Papua New Guinea are tertiary educated (and almost one-half for the Solomon Islands and Vanuatu) and these three countries have the lowest overall emigration rates. In contrast, the countries with the highest emigration rates (Samoa and Tonga) have less than one-quarter of their emigrants as tertiary educated. Thus, paradoxically, restrictions on mobility, which bind most heavily on Melanesia (except for Fiji) might also contribute to the largest losses through 'brain drain'.

Another interesting contrast is with GNI (not shown on this map). Higher average income levels (and perhaps cultural preferences, such as differences within Yap State) may affect the ability of a country to retain its tertiary educated population. For example, although Palau has a higher emigration rate than the Federated States of Micronesia and Kiribati, the percentage of FSM or I-Kiribati outmigrants with tertiary education is nearly double that of Palau. With more jobs available in Palau and likely higher pay resulting from the higher GNI, Palau has been able to attract some of its educated former out-migrants to return.