

# DEFINING THE CATEGORY OF 'SMALL' STATES

TOM CROWARDS\*  
*Caribbean Development Bank, Barbados*

---

**Abstract:** There is no widely accepted definition of a small state. Most previous definitions have been based upon arbitrarily chosen cut-off values of selected criteria. The present study attempts to categorize the size of 190 states according to population, land area and total income. An initial categorization is based upon observation of each series to identify discontinuities in the distributions. Cluster analysis is then employed to identify groups of countries that share similar size-related characteristics. A classification based on non-hierarchical cluster analysis is proposed, generating four clusters from equally spaced initial cluster-centres. On this basis, 79 countries are classified as 'small'. The reasons for deviation from recent categorizations of small countries are explored, the primary cause being the inclusion of some countries with very low levels of income. Copyright © 2002 John Wiley & Sons, Ltd.

---

## 1 INTRODUCTION

There is a considerable literature devoted to defining small size, dating back to the 1950s. However, most attempts at defining small states have been based upon arbitrarily chosen cut-off values of selected criteria. The most commonly applied criterion has been population size, on the basis that this provides an indication of the stock of human capital and a rough approximation of the size of the domestic market. This criterion has been supplemented at times by land area and by total income (measured as gross domestic product (GDP)). No widely accepted definition of small states has yet emerged. In the absence of an accepted definition, many recent studies have referred to previous literature to justify the choice of criteria applied. This previous literature has generally been lacking in quantitative analysis or reasoned arguments for the cut-off levels applied. An exception is the work of Downes (1988; 1991) that applies principal components analysis to the measure of size, and cluster analysis to the classification of nations based on composite measures of size and development.

The question of what classifies as a 'small' state has reemerged for a number of reasons, including:

---

\*Correspondence to: T. Crowards, c/o FCO (St Helena), King Charles Street, London, SW1A 2AH, UK.  
E-mail: crowards@helanta.sh

- increasing attention being paid to small states by international bodies, as witnessed, for instance, by the Commonwealth Secretariat/World Bank Joint Task Force on Small States that convened two international conferences, in 1999 and 2000, and produced a Final Report in 2000 (Commonwealth Secretariat/World Bank, 2000);
- separate treatment of small and large states in the Commonwealth Vulnerability Index (Atkins *et al.*, 2000) that forms part of the Report of the Commonwealth Secretariat/World Bank Joint Task Force on Small States;
- calls in 1999 for small states to be accorded special and differential treatment within the World Trade Organization and recognition of small states as a distinct category in the guidelines prepared for the unsuccessful negotiations in Seattle in December 1999; and
- formation of a Consultative Group on Small Economies as part of the negotiations for the Free Trade Area of the Americas.

Membership of the Association of Small Island States (AOSIS)—which includes a number of small, continental states—can provide some guidance as to which countries consider themselves to be small. Notably, the Small Island Developing States (SIDS) Conference, the resulting Programme of Action, and AOSIS that stemmed from the conference, did not seek to define what constitutes a small island developing state. Member countries of AOSIS exhibit a wide range of size characteristics.<sup>1</sup>

- population (1995) ranges from Niue with 2,000 persons to Singapore with 3.3 million (mn) and Cuba with 10.9 mn;
- land area ranges from Nauru with 20 km<sup>2</sup> to Guyana with 214 970 km<sup>2</sup> and Papua New Guinea with 462 840 km<sup>2</sup>; and
- total GDP (1995) ranges from Tuvalu with US\$8 mn (and probably lower for some countries not reported) to Cyprus with US\$8 788 mn and Singapore with US\$83 700 mn.

Per capita GDP in these countries ranged, in 1995, from Guinea-Bissau with US\$240 to Nauru with US\$25 091 and Singapore with US\$25 158. In the categories of population size, land area and total GDP, at least one member of AOSIS has a value considerably higher than has generally been associated with countries that are 'small'.<sup>2</sup>

The following section seeks to identify clear breaks in the series relating to population, land area and total GDP for all developing countries. This is followed by cluster analysis to identify groups of countries that are similar based on the three parameters. All data derive from UNCTAD (1999) unless stated otherwise.

## 2 OBSERVATIONAL ANALYSIS

### 2.1 Population Size

Population size has frequently been used to measure country size, with the definition of 'small' being based essentially on arbitrary cut-off levels. Some of the cut-off levels that

<sup>1</sup>Data are taken from UNCTAD (1999).

<sup>2</sup>The literature referring to country size is taken to exclude economic studies that refer to specific countries as small on the basis that they are price-takers who are unable to influence world markets. This, of course, could refer to the vast majority of countries. For instance, Gruen and Smith (1994) refer to Australia as, 'a small open economy', while Masih and Masih (1996) refer to Indonesia as, 'a small Asian developing economy'.

have been employed in the past are listed in the Appendix. These have varied, very generally, from around 10 mn or 15 mn in the 1950s and 1960s, to 5 mn in the 1970s and 1980s, and to around 1 mn or 1.5 mn in the 1990s. The decline in cut-off levels over time corresponds with:

- an increase in the number of states, particularly smaller states, such that a higher cut-off level would include the vast majority of countries within the category of 'small' states (although these would still represent only a small percentage of the total world population);
- a growing recognition that the economic characteristics of small size apply more comprehensively to a narrower range of very small countries; and
- increasing size and complexity of individual economies so that the larger of those previously defined as 'small' may be inappropriate in such a category.

A cut-off level of 3 mn people, based on 'a natural break in the population size continuum', is employed by Armstrong *et al.* (1998, p. 641). Such a break can be observed in Figures 1 and 2, which also depict clear breaks in the population size continuum at 12 mn, 6.5 mn, 1 mn and 0.5 mn. The clearest break in the continuum is that which occurs at 12 mn persons. This would appear to fit with a population cut-off size of 10 mn advocated by Kuznets in 1958. However, as noted above, recent literature has tended to associate the characteristic features of small states with countries with considerably lower populations.

A cut-off level of 12 mn would include 140 out of a sample of 190 developing countries and territories (or 74 per cent), while a cut-off level of 6.7 mn would include 61 per cent of such countries. There would be little rationale for considering separate treatment of these countries when they constitute such a large proportion of all countries. Moreover, many of the countries with population size below 6.7 mn, let alone 12 mn, have relatively large, complex and diversified economies.

The break in the population size continuum at around 2.7 mn (at the 43rd percentile of the sample, i.e. including 43 per cent of the countries) corresponds more closely with recent definitions of small countries, although it is above the 1.5 mn employed in recent studies by the Commonwealth Secretariat and the World Bank. Breaks can also be distinguished at around 1.0 mn (32nd percentile) and 0.5 mn (27th percentile), the latter corresponding to a frequently used definition of 'micro' states.

## 2.2 Land Area

Land area can provide an indication of natural resource variety and abundance. An alternative to total land area would be to measure 'usable' land area, that might be proxied by a measure such as 'arable land and land under permanent crops' as documented by the United Nations Food and Agriculture Organization. However, this considers only actual, rather than potential cultivation, and would ignore non-agricultural resources such as forests and mineral reserves.

Clear breaks in the land area continuum, at around 250 000 km<sup>2</sup> (68th percentile), 125 000 km<sup>2</sup> (58th percentile), 40 000 km<sup>2</sup> (41st percentile) and 7 000 km<sup>2</sup> (25th percentile), are illustrated in Figure 3.

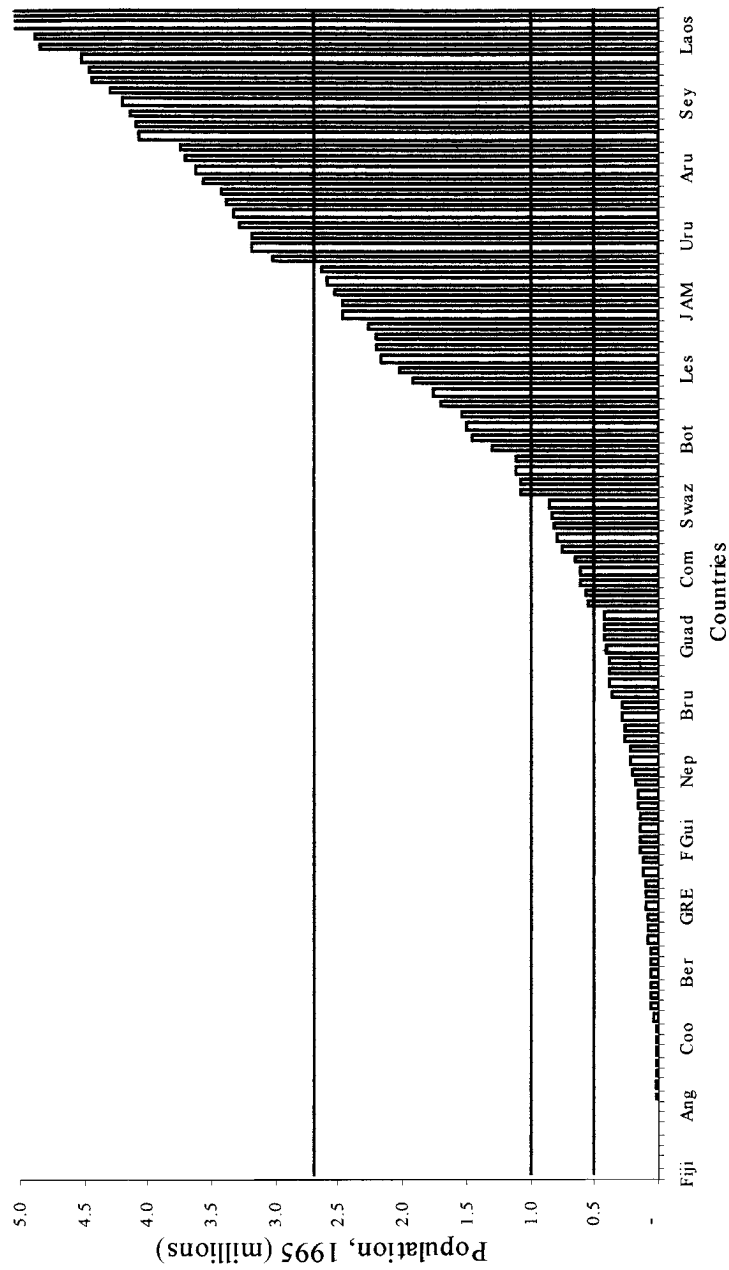


Figure 1. Breaks in the population size continuum below 5 million

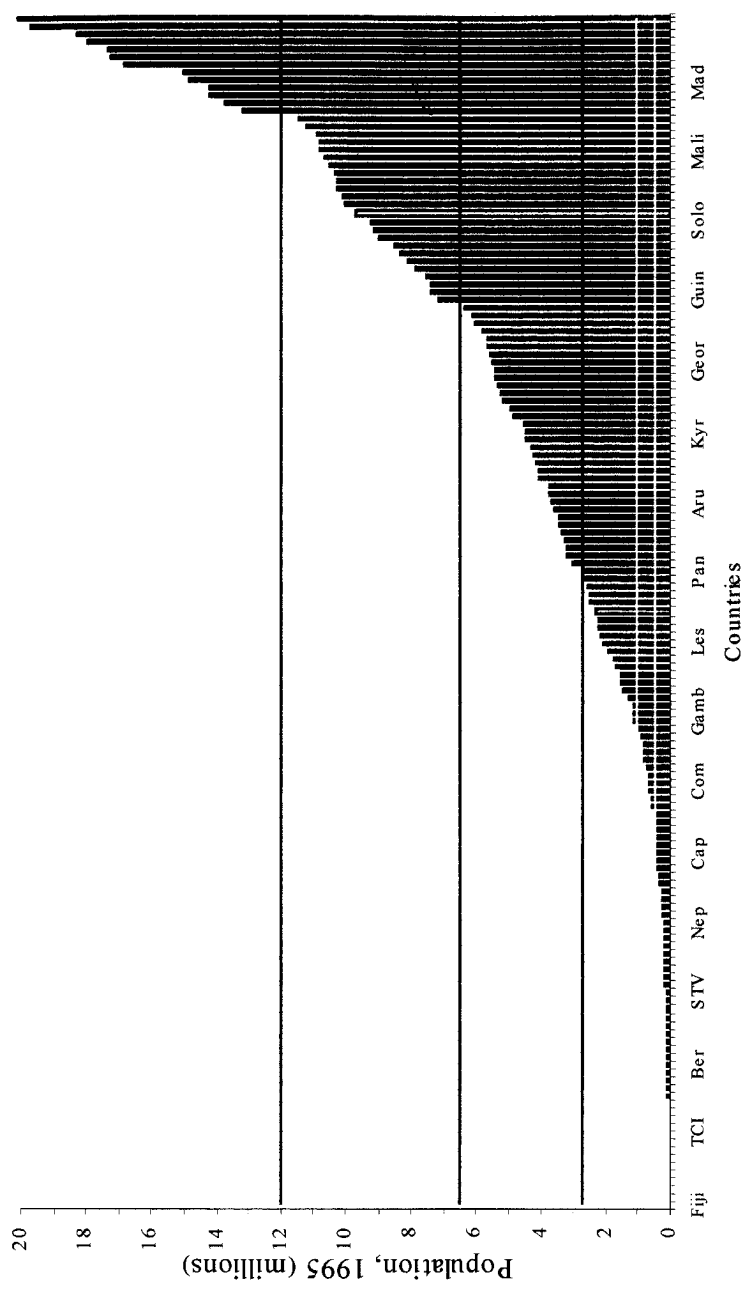


Figure 2. Breaks in the population size continuum below 15 million

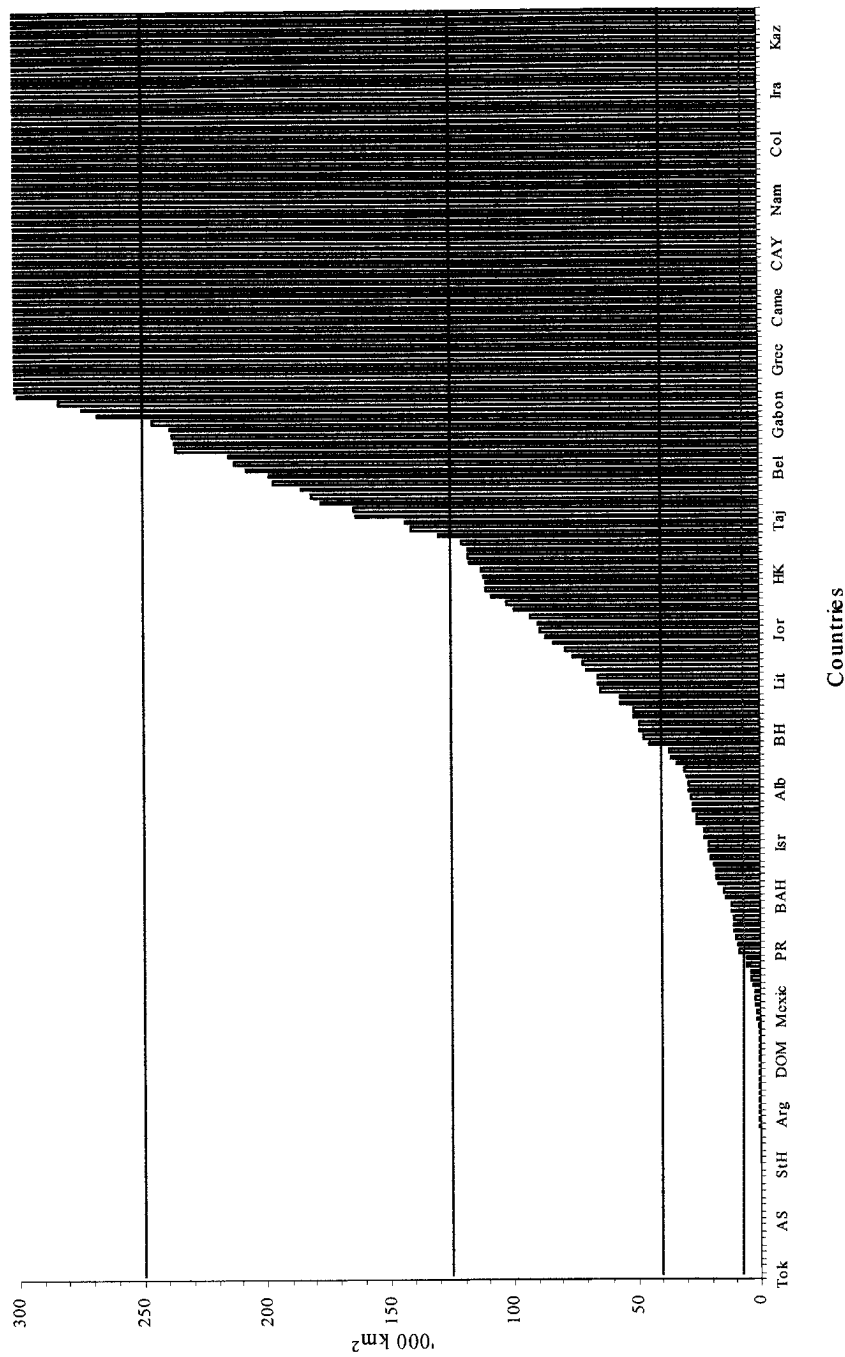


Figure 3. Breaks in the land area continuum below 300,000 km<sup>2</sup>

### 2.3 Income

Total income is used as a measure of the size of an economy. Limited economic size can restrict possibilities for diversification and economies of scale in production. The measure of income employed is GDP, converted to a common currency (US\$) based on market exchange rates. GDP is considered preferable to GNP since it measures economic activity in a country regardless of whether or not income earned remains in the country. Cross-country comparisons may be more accurate based on conversion to 'international dollars' using purchasing power parities (PPP) rather than market exchange rates that can be significantly distorted. However, PPP data are not currently available for a sufficiently large proportion of the world's developing countries. Even for GDP, some data are not available, although most omissions are for very small states whose size-classification is in little doubt.

There are clear breaks in the continuum of total GDP at around US\$19 bn (76th percentile), US\$7 bn (60th percentile), US\$2.5 bn (40th percentile) and US\$0.7 bn (20th percentile), as Figures 4 and 5 illustrate.

### 2.4 Summary of Observed Breaks

The breaks identified in Figures 1 through 5 are summarized in Table 1 which illustrates clear similarities in terms of the percentiles of each series at which the breaks occur. Thus, the first break occurs at around the 25th percentile (containing around 25 per cent of the countries in the sample) for each parameter. A second break in the population series does not correspond to similar breaks in the other two parameters. Thereafter, breaks occur in each of the parameters at around the 40th percentile, the 60th percentile and the 70th percentile.

The group of countries below the first break (around the 25th percentile) corresponds roughly to what have been described elsewhere as 'micro' states. The group of countries below the third break (around the 40th percentile) corresponds roughly to more recent definitions of 'small' states. The countries between the third and the fifth breaks are considered here to be medium-sized states (broken down into medium-small and medium-large), while the remainder of the states (those above the fifth break, or approximately the 70th percentile) are regarded as large states.

Identifying breaks in each of the parameters is not sufficient in itself to form groups of countries according to size, since a country will not necessarily meet the criteria corresponding to a given definition of size in each of the parameters. For instance, a country may be judged to be 'small' based on population size, while being classified as 'large' based on land area. A decision rule has therefore been adopted that defines a country by the smallest size-category that includes at least two of the three parameters for that country. So, for instance, the Bahamas is a 'micro' state based on population size; it is a 'small' state based on land area; and it is a 'medium-small' state based on GDP. According to the decision rule employed, the Bahamas is defined as a 'small' state overall since two of the three parameters fall within this or a smaller size category.<sup>3</sup> The results for the full sample of 190 states are provided in Table 2. On the basis of this rough-and-ready

<sup>3</sup>Greenland is not classified since it is categorized very differently according to land area ('large') and population ('micro'), and data are not available for the income parameter. Other countries for which income data are not available are still classified, since the categories according to population and land area are similar.

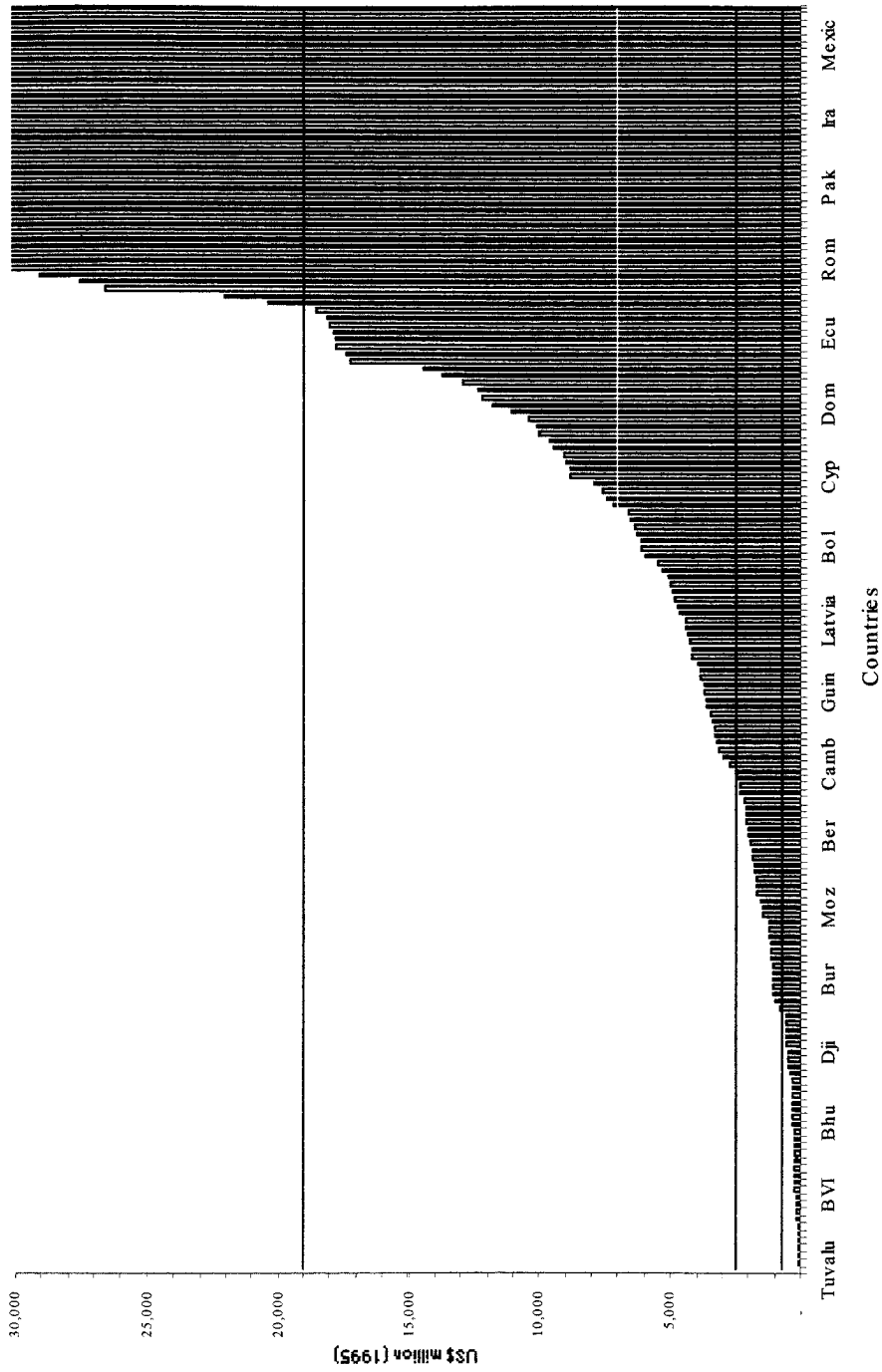


Figure 4. Breaks in the GDP continuum below US\$30 billion



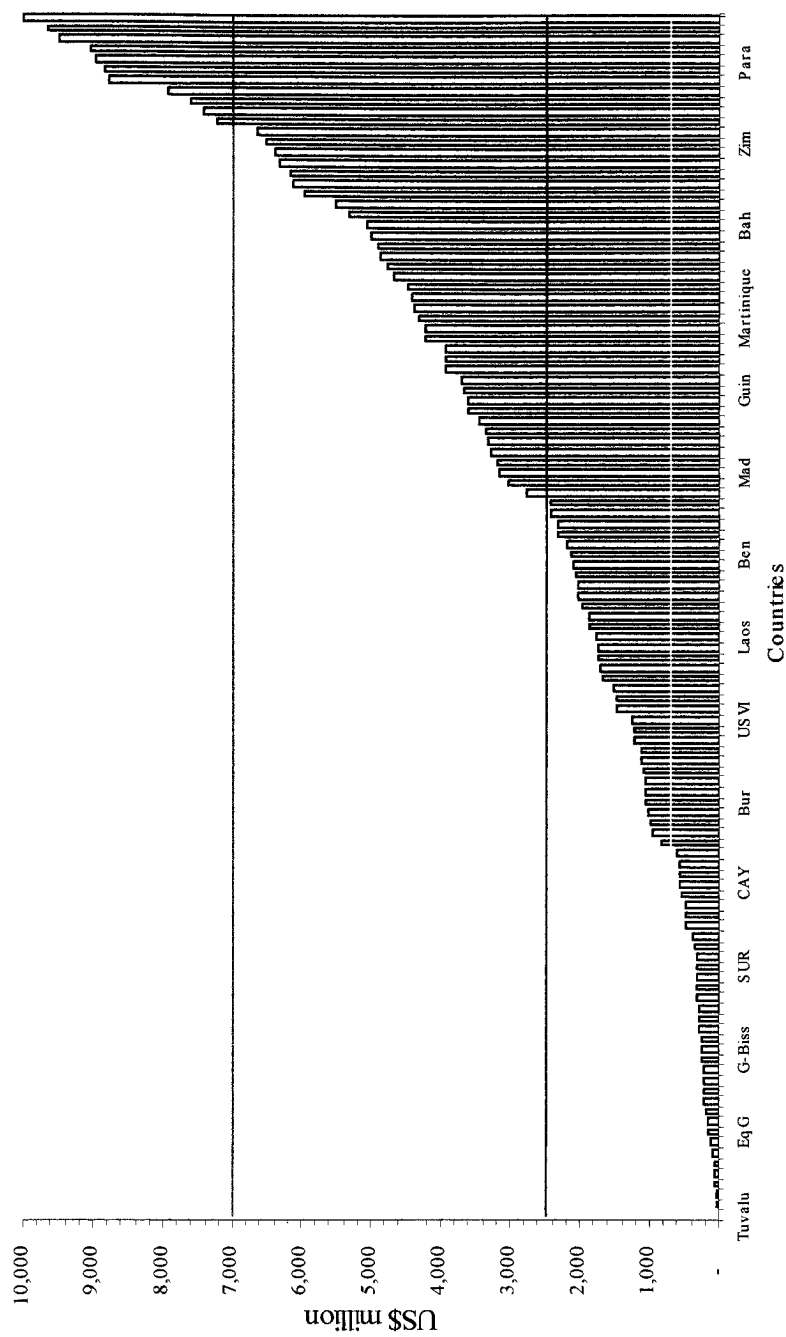


Figure 5. Breaks in the GDP continuum below US\$10 billion

Table 1. Breaks observed in the size continuum for population, land area and income

Break	Population			Land			Income (GDP)		
	Approximate population of country at the break	Sample percentile at the break	Percentage of total developing countries' population	Approximate area of country at the break	Sample percentile at the break	Percentage of total developing countries' land area	Approximate income of country at the break	Sample percentile at the break	Percentage of total developing countries' GDP
1	0.5 mn	27th	0.2%	7,000 km <sup>2</sup>	25th	0.05%	US\$0.7 bn	20th	0.2%
2	1.1 mn	32nd	0.3%						
3	2.7 mn	43rd	1.1%	40,000 km <sup>2</sup>	41st	0.7%	US\$2.5 bn	40th	1.0%
4	6.5 mn	61st	4.3%	125,000 km <sup>2</sup>	58th	3.4%	US\$7.0 bn	60th	3.5%
5	12.0 mn	74th	9.0%	250,000 km <sup>2</sup>	68th	6.9%	US\$19.0 bn	76th	8.9%

Table 2. Country size classification based on observation of breaks in size parameters (an 'X' denotes the size classification of the country based on the decision rule employed)

Country	MICRO pop < area < GDP < 0.5 7.0 0.7		SMALL pop < area < GDP < 2.7 40 2.5		MEDIUM-SMALL pop < area < GDP < 6.7 125 7.0		MEDIUM-LARGE pop < area < GDP < 12 250 19		LARGE pop > area > GDP > 12 250 19	
Albania			*	X	*			*	X	*
Algeria										
Am. Samoa	*	X								
Anguilla	*	X							*	
Angola					*			X		
Antigua & B.	*	X								
Argentina			*	X				*	X	*
Armenia					*					
Aruba	*	X								
Azerbaijan				*		X		*		
Bahamas	*			X						
Bahrain										
Bangladesh					*					*
Barbados	*	X		*				X		
Belize	*		*							
Belarus					X			*	X	*
Benin			*	*						
Bermuda	*	X								
Bhutan					*					
Bolivia				X	*		X	*		
Bosnia H.					*				*	
Botswana			*			X		*	X	*
Brazil								*		
Brunei					*					
Bulgaria	*	X								
Burkina F.			*	*	*		X	X	*	
Burundi			*	X	*					

*Continues*

Table 2. (Continued)

	MICRO pop < area < GDP < 0.5 7.0 0.7		SMALL pop < area < GDP < 2.7 40 2.5		MEDIUM-SMALL pop < area < GDP < 6.7 125 7.0		MEDIUM-LARGE pop < area < GDP < 12 250 19		LARGE pop > area > GDP > 12 250 19	
Country	*	X				*	X	*	X	*
BVI										
Cambodia										
Cameroon										
Cape Verde	*	X		*						*
CAR					X					*
Cayman I.	*	X		*	X					*
Chad									*	X
Chile									*	X
China									*	X
Colombia									*	X
Comoros I.		*							*	X
Congo			*						*	X
Cook I.	*	X		X					*	X
Costa Rica					*	X				
Cote D'Ivoire								*	*	*
Croatia					*	X			*	*
Cuba							X			
Cyprus			*	X						*
Czech R.							X			
Djibouti			*	*		*				*
Dominica		X								
Dominican R.					*		X			
East Timor			*	*			*			*
Ecuador									*	X
Egypt									*	X
El Salvador				*	X				*	*
Eq. Guinea	*		*	*						
Eritrea					X					
Estonia			*		*	X				*
Ethiopia									X	



Table 2. (Continued)

	<b>MICRO</b> pop < area < GDP < 0.5 7.0 0.7	<b>SMALL</b> pop < area < GDP < 2.7 40 2.5	<b>MEDIUM-SMALL</b> pop < area < GDP < 6.7 125 7.0	<b>MEDIUM-LARGE</b> pop < area < GDP < 12 250 19	<b>LARGE</b> pop > area > GDP > 12 250 19
Country					
Kyrgyzstan			X	*	
Laos		*	X	*	
Latvia					
Lebanon		*	X	*	
Lesotho		*			
Libya		X			*
Lithuania			*		
Macau			X		
Macedonia	*			*	
Madagascar		X			
Malawi			X	*	X
Malaysia		*			*
Maldives	*				X
Mali		*		X	*
Malta	*				
Marshall I.	*		*		
Martinique	*		*		
Mauritania	*	*			*
Mauritius	*	X			X
Mexico				*	*
Micronesia	*				
Moldova	*	*	*		
Montserrat	*				
Mongolia		*			*
Morocco					X
Mozambique					X
Myanmar					X
Namibia		*	X	*	X
Nauru	*				*
Nepal			*	X	*



Table 2. (Continued)

Country	MICRO pop < area < GDP < 0.5 7.0 0.7		SMALL pop < area < GDP < 2.7 40 2.5		MEDIUM-SMALL pop < area < GDP < 6.7 125 7.0		MEDIUM-LARGE pop < area < GDP < 12 250 19		LARGE pop > area > GDP > 12 250 19	
Sri Lanka	*	X			*		X		*	
St Helena	*	X								
St Pierre	*	X								
St Lucia	*	X								
St Vincent & G.	*	X								
Sudan	*			*				X	*	
Suriname										
Swaziland				X						
Syria			*				*	X	*	*
Taiwan				*				X		*
Tajikistan										
Tanzania				*		X	*		*	
TCI	*	X						X	*	*
Thailand						X				
Togo	*			*						
Tokelau	*	X								
Tonga	*	X								
Trinidad & T.	*	*								
Tunisia			X		*		*		*	*
Turkey									X	*
Turkmen				*	X				*	*
Tuvalu	*	X	*							*
UAE						X				*
Uganda							X			*
Ukraine							X		X	*
Uruguay	*			*					*	*
USVI	*	X		*						*
Uzbekistan								X	*	*
Vanuatu	*		*					*	*	*
Venezuela									X	*





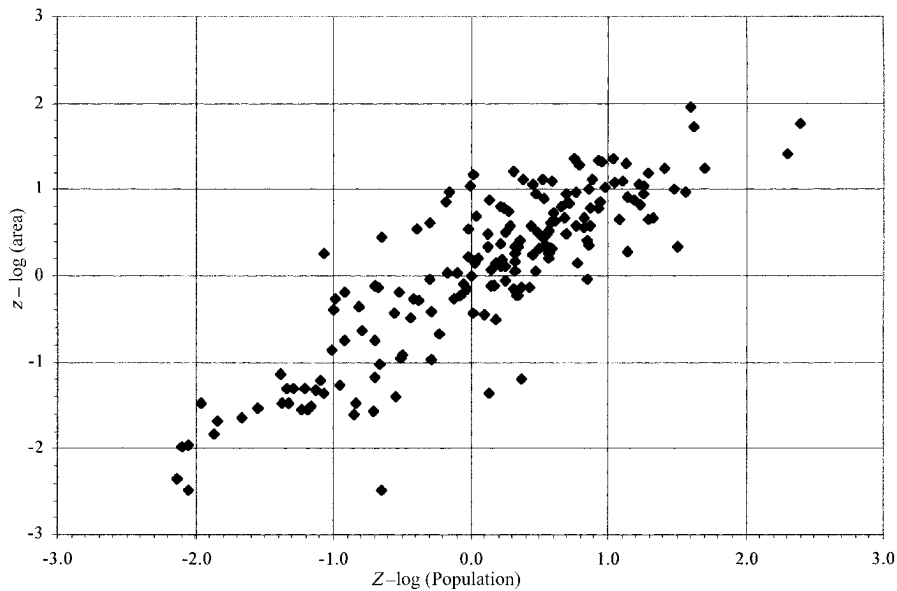


Figure 6. Scatter plot of standardised logarithms of population size and land area

classification technique, 80 out of 189 developing countries, or 42.3 per cent, are classified as ‘small’. Of these, 50 are classified as ‘micro’ states (26.5 per cent of the total).

3 CLUSTER ANALYSIS

Scatter plots comparing two of the parameters at a time (population, land or income), converted to logarithms, are presented in Figures 6, 7 and 8. There is no clear clustering of

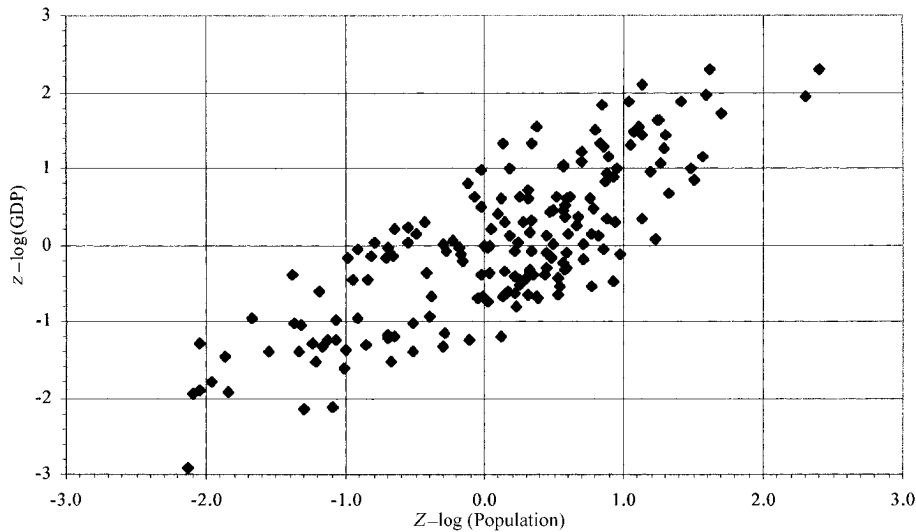


Figure 7. Scatter plot of standardised logarithms of population size and total GDP

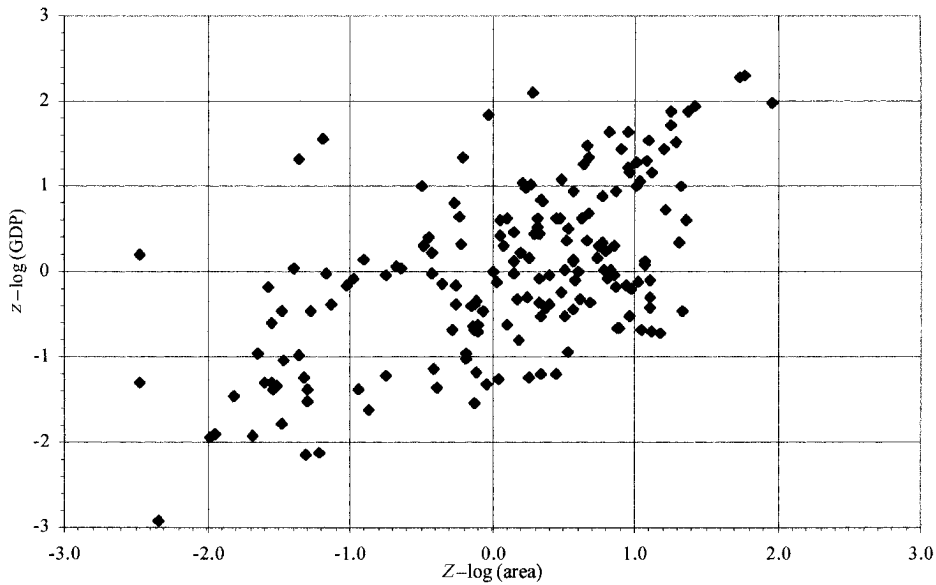


Figure 8. Scatter plot of standardised logarithms of land area and total GDP

countries based on any combination of just two parameters. A technique that enables clusters to be determined beyond just two dimensions, based on a structured analysis of a range of parameters simultaneously, is 'cluster analysis'. This is a statistical technique for identifying relatively homogenous groupings within a set of data, based on distances between data points. Non-hierarchical cluster analysis was applied to data on population size, land area and GDP using the *K*-means cluster analysis performed by the statistical software package SPSS. This groups objects based on their proximity to cluster centres, with the initial centres and the number of clusters being selected in advance. An iterative process then determines the final cluster centres that minimize the Euclidean distance between objects and the centre of each cluster. Datasets and details of the range of alternative cluster analyses performed can be obtained from the author. A more thorough outline of the technical aspects of the analysis, the various results generated, and justification for the final choice of technique is presented in Crowards (2000).

### 3.1 Population and Land Area

Initial analysis focussed on population and land area only since this provides the largest possible sample of 190 countries (GDP data for the income parameter are not available for 14 of these countries). Logarithms were employed to reduce the highly skewed nature of the variables that are made up of many very small and few very large values. The logged variables were then normalised, resulting in each variable having a mean of zero and standard deviation of one. The normalisation procedure converts the variables to a directly comparable scale while maintaining the relative distances between each entry. The normalized, logged variables are labelled as *z-log\_pop* (for population size), *z-log\_area* (for land area) and *z-log\_GDP* (for GDP).

Cluster analysis was performed on  $z\text{-log\_pop}$  and  $z\text{-log\_area}$  based on two pre-specified initial cluster centres at  $(-1.0, -1.0)$  and  $(1.0, 1.0)$  on the basis that these are located very approximately within regions of smaller and larger countries, but are points based on standard integers. These initial clusters, the final clusters generated by the analysis, and the delineation between the two final clusters are illustrated in Figure 9. This shows a clear break between groups of smaller and larger countries, with all the smaller countries (other than Hong Kong and Singapore) corresponding to the groups of small and micro states identified in the observational analysis. On this basis, countries for which GDP data are not available but that fall within the group of smaller countries as defined in this preliminary cluster analysis, will be defined as small.<sup>4</sup>

### 3.2 Population, Land Area and Income

Cluster analysis was then performed on  $z\text{-log\_pop}$ ,  $z\text{-log\_area}$  and  $z\text{-log\_GDP}$ , using standard-integer initial cluster centres for between two and eight clusters. Varying the initial cluster centres has little impact on the final clusters that emerge, but the number of clusters included in the analysis does influence the final results. As Kachigan (1991, p. 267) notes, 'a generally agreed upon approach [to determining the appropriate number of clusters] is to solve for different numbers of clusters (e.g., 2, 3, 4, etc.) and then decide among the alternative solutions based on *a priori*, practical, common sense, or the more technical criteria that abound.'

The *a priori* criterion adopted in this study is that the final clusters should bear some resemblance to the groups of countries identified in the observational analysis based on identified breaks in the size parameters. We might expect some similarity between the results of these two methods, since observed breaks in a series will influence the formation of clusters. We would not expect the results to be identical, however, since cluster analysis combines information on the relative distances for all three parameters, whereas the decision rule for the observational analysis is based on similarities between any two of the parameters regardless of the value of the third. The results of the observational analysis incorporate a number of common sense criteria, such as limiting the number of small states within reasonable bounds, aiming to produce around five distinct groups of countries, and effectively constraining the emphasis on land area given the close correlation between population and GDP. The results are intuitively reasonable, with no inexplicable or anomalous country classifications.

The results that are most consistent between various cluster analyses and with the results of observational analysis are produced by generating two, four, seven or eight clusters.<sup>5</sup> The preferred model is to generate four clusters since this incorporates the results common to the analyses involving two, seven and eight clusters. Given that none of these analyses makes a clear distinction between medium-small and medium-large countries, a four-cluster approach represents the minimum required to match the output of the observational

<sup>4</sup>The two countries for which GDP data are not available that are relatively close to this cut-off line are East Timor and Greenland. The former is a poor country whose level of income is highly unlikely to be large in comparison to other small states. The latter had a population of just 58 000 in 1993, with a very small total income. These are, therefore, also classified as small.

<sup>5</sup>Results deriving from generating three or five clusters are not consistent with *a priori* criteria, since large groups of medium-sized countries are produced without a clear distinction between small and large states. Results from generating six clusters do not fit *a priori* criteria and differ substantially from the results of using other numbers of clusters.



analysis. The equally spaced initial cluster centres employed for normalised logarithms of population, land area and GDP in the four-cluster analysis are (1.0, 1.0, 1.0), (0.5, 0.5, 0.5), (− 0.5, − 0.5, − 0.5) and (− 1.0, − 1.0, − 1.0). An additional category, that of ‘very large’ countries, is derived from an eight-cluster analysis based on an expanded set of equally spaced initial cluster centres.

The results of the cluster analysis are presented in Table 3. The group of small countries is expanded, for those countries for which GDP data are not available, based on the initial cluster analysis of population and area only. Most of these additional countries are likely to be micro states, but the decision rule employed does not allow a distinction to be drawn between ‘small’ and ‘micro’ for countries for which GDP data are unavailable.

Table 3. Results of Cluster Analyses

MICRO	SMALL		MEDIUM	LARGE	VERY LARGE
4 clusters	area and population only	4 clusters	4 clusters	4 clusters	8 clusters
		Albania		Algeria	
.	Am. Samoa	.	.	.	.
M		Anguilla	Angola		
M		Antigua & B.		Argentina	
.	Aruba	Armenia	.	.	.
		.	Azerbaijan		
		Bahamas		Bangladesh	
		Bahrain			
M		Barbados			
		Belize	Belarus		
			Benin		
M		Bermuda			
		Bhutan	Bolivia		
.		.	.	.	.
			Botswana	Brazil	V
		Brunei	Bulgaria		
			Burkina F.		
M		Burundi			
		BVI	Cambodia		
		Cape Verde	Cameroon		
			CAR		
M		Cayman I.	Chad		
				Chile	
				China	V
				Colombia	

*Continues*

Table 3. (Continued)

<b>MICRO</b> 4 clusters	<b>SMALL</b> area and population only	4 clusters	<b>MEDIUM</b> 4 clusters	<b>LARGE</b> 4 clusters	<b>VERY LARGE</b> 8 clusters
M		Comoros I.	Congo		
M		Cook I.	Costa Rica Cote D'Ivoire Croatia Cuba		
		Cyprus	Czech R.		
M		Djibouti Dominica	Dominican R.		
.	East Timor	.	Ecuador	.	.
			El Salvador	Egypt	
		Eq. Guinea Eritrea Estonia	Ethiopia		
.	Falkland I.	F. Guiana F. Polynesia .	.	.	.
		Fiji	Gabon		
		Gambia G-Bissau	Georgia Ghana		
M		Grenada			
.	Greenland	.	.	.	.
.	Guam	Guadeloupe .	.	.	.
		Guyana Haiti	Guatemala Guinea		
			Honduras Hong Kong Hungary	India Indonesia Iran	V V
.		.	.	.	.
		Israel			
		Jamaica	Jordan	Kazakstan	
			Kenya		

*Continues*

Table 3. (Continued)

MICRO 4 clusters	SMALL area and population only	4 clusters	MEDIUM 4 clusters	LARGE 4 clusters	VERY LARGE 8 clusters
M		Kiribati	Korea (DPR) Kuwait Kyrgyzstan Laos Latvia Lebanon	Korea	
		Lesotho	Libya Lithuania		
M		Macau Macedonia	Madagascar Malawi	Malaysia	
M		Maldives	Mali		
M		Malta			
.	Marshall I.	. Martinique	. Mauritania	. Mexico	. V
		Mauritius			
M		Micronesia			
M		Moldova			
		Montserrat			
			Mongolia		
			Mozambique	Morocco	
			Namibia	Myanmar	
M		Nauru	Nepal		
M		N. Antilles New Caledonia	Nicaragua Niger		
.	Niue	.	. Oman	Nigeria . Pakistan	. .
			Panama Papua N. G. Parahuay	Peru Phillipines Poland	
			Puerto Rico		

Continues



Table 3. (Continued)

<b>MICRO</b> 4 clusters	<b>SMALL</b> area and population only	4 clusters	<b>MEDIUM</b> 4 clusters	<b>LARGE</b> 4 clusters	<b>VERY LARGE</b> 8 clusters
		Qatar Reunion		Romania Russia	V
M		Rwanda			
M		Samoa			
		Sao Tome & P.		Saudi Arabia	
M			Senegal		
		Seychell			
		Sierra Leone	Singapore		
M		St Kitts & N.	Slovakia Slovenia		
		Solomon I.	Somalia	South Africa	
.	St Helena	.	Sri Lanka	.	.
.	St Pierre	.	.	.	.
M		St Lucia			
M		St Vincent & G.	Sudan		
		Suriname			
		Swaziland		Syria Taiwan	
			Tajikistan Tanzania		
M		TCI		Thailand	
.	Tokelau	Togo	.	.	.
M		Tonga			
		Trinidad & T.	Tunisia	Turkey	
			Turkmen		
M		Tuvalu	UAE Uganda		
			Uruguay	Ukraine	
M		USVI	Uzbekistan		
		Vanuatu		Venezuela Vietnam	
.	Wallis & F. I.	.	.	.	.

*Continues*

Table 3. (Continued)

MICRO	SMALL	MEDIUM	LARGE	VERY LARGE
4 clusters	area and population only 4 clusters	4 clusters	4 clusters	8 clusters
		Yemen Yugoslavia  Zambia Zimbabwe	Zaire	

Notes to Table 3:  
'.' denotes insufficient data to include in the analysis.  
'M' denotes classified as a micro state.  
'V' denotes classified as a very large state.  
'4 clusters' indicates a classification generated using 4 cluster centres.  
'8 clusters' indicates a classification generated using 8 cluster centres.  
'area and population only' indicates a classification generated using 2 cluster centres without a variable for total GDP.  
Bosnia Herzegovina and Iraq are omitted due to insufficient data.

Out of a sample of 188 countries,<sup>6</sup> 79 (42.0 per cent) are classified as 'small' (of which around half are 'micro'), 75 (39.9 per cent) are classified as 'medium', and 34 (18.1 per cent) are classified as 'large' (of which 6 are 'very large'). These results are illustrated graphically in Figure 10, in a two-dimensional scatter-plot of population (*z-log\_pop*) and land area (*z-log\_area*). The third dimension, GDP, is not represented on either of the axes, but is the primary cause of the considerable loops in some of the lines. A snapshot of just part of this scatter-plot is presented in Figure 11, concentrating on the dividing line between 'small' and 'medium' countries. The influence of a small total GDP, despite relatively large population (suggesting very low levels of GDP per capita) is apparent from the inclusion in the category of 'small' states of countries such as Burundi, Eritrea, Haiti, Rwanda and Sierra Leone. In contrast, the influence of larger total GDP despite small population size (providing high GDP per capita) is apparent from the exclusion of countries such as Kuwait, Slovenia and the United Arab Emirates (UAE) from the category of 'small' states. The dramatic differences in total GDP resulting from contrasting levels of per capita income are illustrated in Table 4. The total GDP of the wealthier three countries in Table 4 is far higher than that of the poorer five countries, averaging US\$28.1 bn as compared with US\$1.1 bn. This is despite having far smaller populations, averaging 1.9 mn as compared with 5.1 mn, and is due to the stark contrast in per capita incomes, averaging US\$14 344 as compared with US\$196. This illustrates the importance of including a measure of total income rather than relying on a measure of population to provide a proxy for economic size.

A concern with employing income as a size parameter is that it may change considerably in the course of just a few years. This is also true, to a lesser extent, for population size. Tests were conducted of the sensitivity of the size categories to changes in population and GDP (and substituting an alternative measure of income, GNP) between 1993 and 1998. The results showed very little change in the classifications, with the only

<sup>6</sup>Out of the original sample of 190 countries, Bosnia-Herzegovina and Iraq do not have available GDP data and their classification is uncertain. All other countries for which GDP data are unavailable fall within the conservatively estimated category of 'small' states based on initial cluster analysis of population and area only.

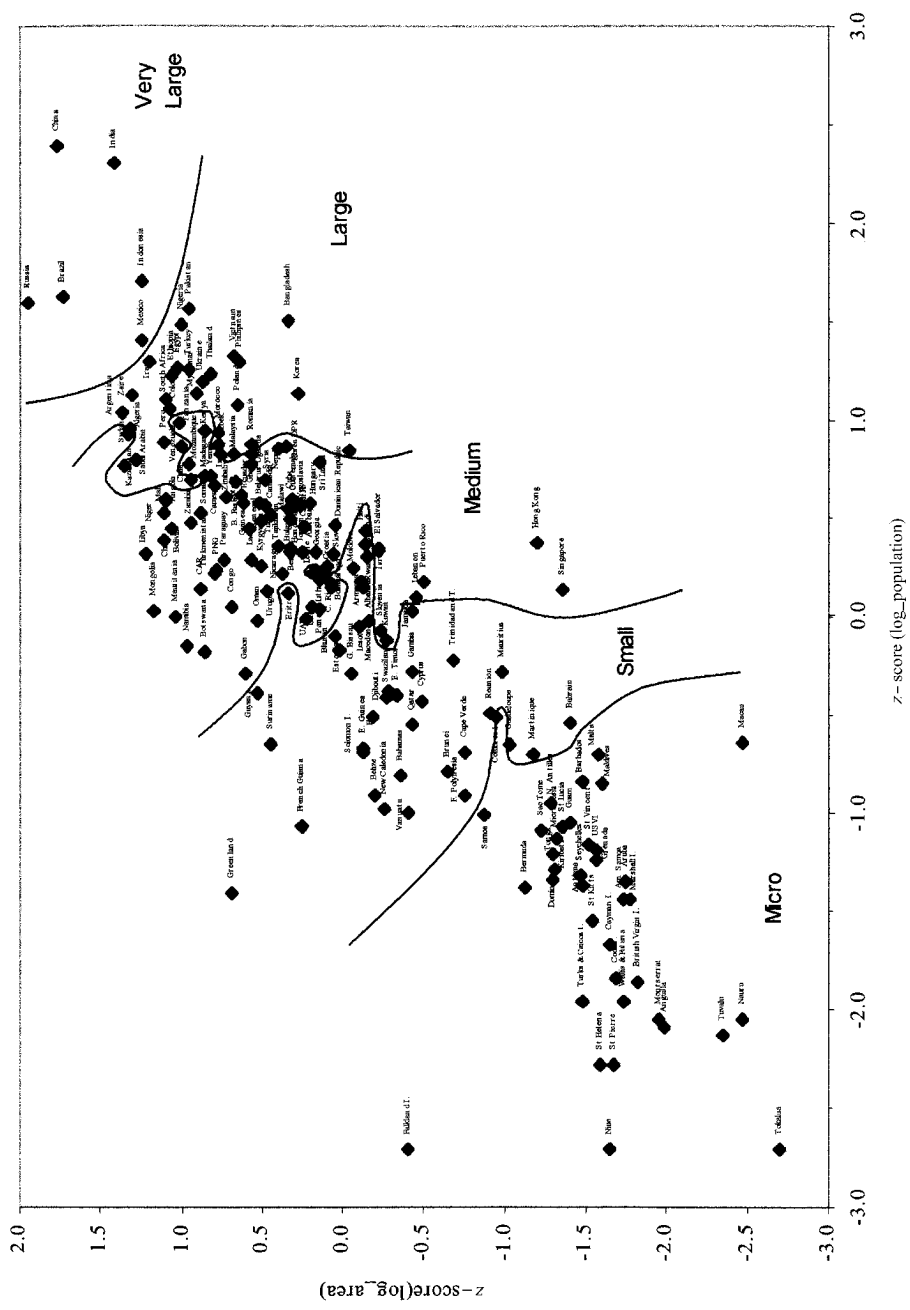


Figure 10. Final clusters based on population, area and GDP parameters

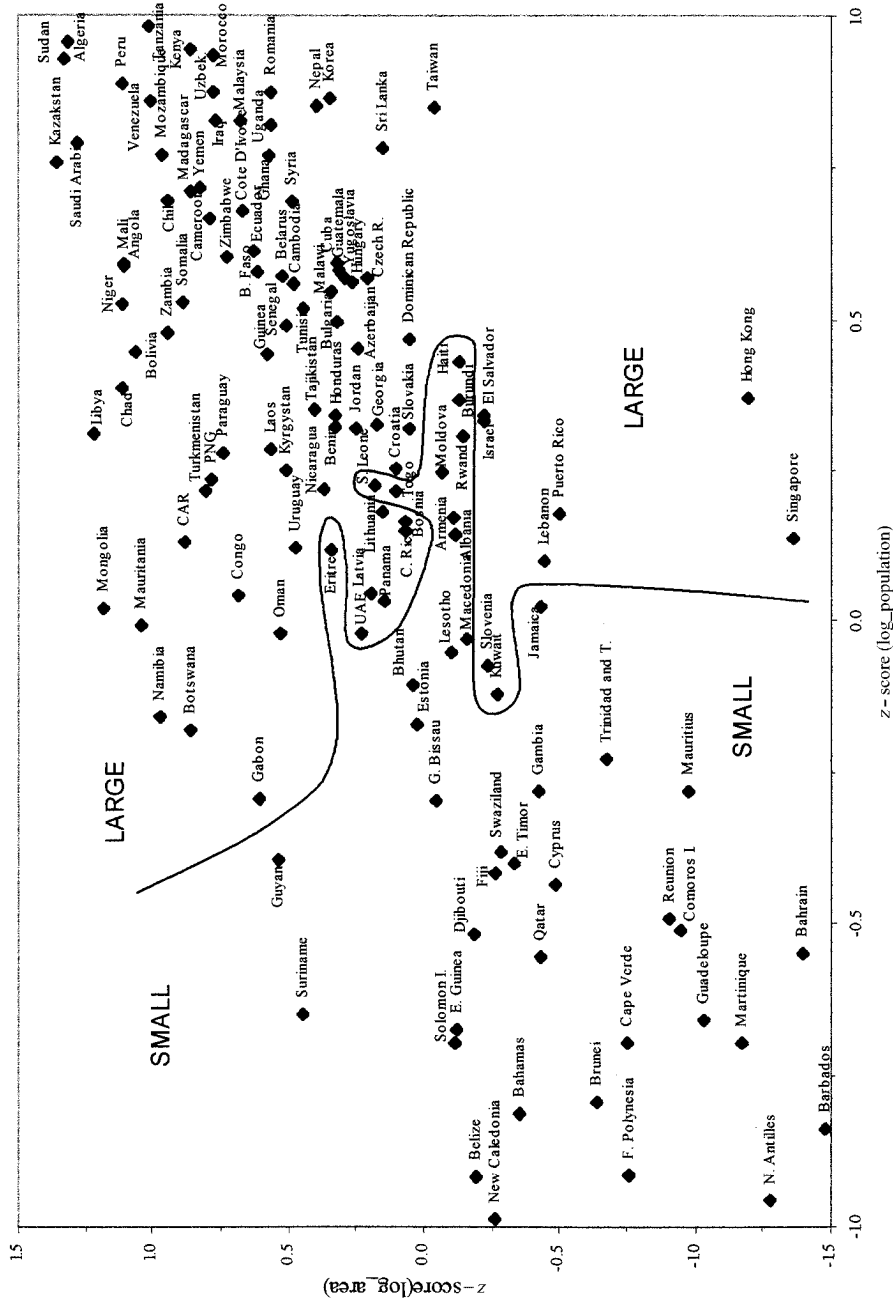


Table 4. Population, total GDP and per capita GDP of selected countries

Country	Population (mn)	Per capita GDP (US\$)	Total GDP (US\$bn)
Burundi	6.1	175	1.1
Eritrea	3.2	107	0.3
Haiti	7.1	286	2.0
Rwanda	5.2	218	1.1
Sierra Leone	4.2	196	0.8
Kuwait	1.7	15 730	26.6
Slovenia	1.9	9 610	18.5
UAE	2.2	17 692	39.1

difference in the distinction between 'small' and 'medium' states being due to very major changes in income. For instance, dramatic increases in GDP between 1993 and 1995 reported for Lebanon and Singapore, of 20 and 50 per cent respectively over the two years, shifted these countries from the category of 'small' to 'medium' states. Otherwise, the results of the cluster analysis were found to be relatively robust to these changes in the parameters. What the sensitivity highlights, however, is that this is not a static classification and that it will need to be updated regularly to ensure that categories remain valid, particularly for those countries that are close to the margin between two categories.

#### 4 COMPARISON WITH OTHER GROUPINGS OF SMALL COUNTRIES

The results of this study lead to an additional 13 countries being classified as 'small' in comparison with a simple cut-off of 1.5 mn population, and these are listed in Table 5. The essentially arbitrary cut-off value of 1.5 mn population is proposed by the Commonwealth Secretariat (1997) and employed by Atkins *et al.* (2000) in deriving the Commonwealth Vulnerability Index, and by the World Bank in their analysis of small states (Easterly and

Table 5. Countries classified as 'small' but with populations greater than 1.5 million

Country	Population (mn, 1995)	Land area (mn km <sup>2</sup> )	Total GDP (US\$bn, 1995)	GDP per capita (\$, 1995)
Albania	3.4	28.8	2.2	645
Armenia	3.6	29.8	1.2	339
Bhutan	1.8	47.0	0.3	172
Burundi	6.1	27.8	1.1	175
Eritrea	3.2	117.6	0.3	107
Estonia	1.5	45.1	3.6	2,433
Haiti	7.1	27.8	2.0	286
Jamaica	2.5	11.0	4.4	1,787
Lesotho	2.0	30.4	1.0	508
Macedonia	2.2	25.7	2.0	918
Rwanda	5.2	26.3	1.1	218
Sierra Leone	4.2	71.7	0.8	196
Togo	4.1	56.8	1.2	297

Table 6. Countries associated with groups of small countries but not classified as 'small'

Country	Population (mn, 1995)	Land area (‘000 km <sup>2</sup> )	Total GDP (US\$bn, 1995)
Bolivia <sup>a</sup>	7.2	1,099	5.4
Cuba <sup>a,c</sup>	10.1	110	?
Dominican Republic <sup>a</sup>	7.7	49	9.5
Guatemala <sup>a</sup>	10.3	109	11.3
Mauritania <sup>b</sup>	2.2	1,026	0.9
Nepal <sup>a</sup>	21.4	141	3.7
Nicaragua <sup>a</sup>	4.3	130	1.8
Papua New Guinea <sup>c</sup>	4.2	463	5.1
Singapore <sup>c</sup>	2.8	0.6	55.1
Sri Lanka <sup>a</sup>	18.1	66	10.5

Notes:

<sup>a</sup>Countries associated with documents relating to small states circulated at the WTO.<sup>b</sup>Countries listed as small in the IMF Framework.<sup>c</sup>Members of AOSIS.

Kraay, 1999). The countries that are categorized as small in this study but not according to the 1.5 mn population criterion have small total incomes deriving from low levels of per capita income. Two countries that would be categorized as 'small' using the 1.5 mn population cut-off but are excluded using cluster analysis are Gabon and Botswana, due to their relatively large total GDP and land area.

The Report of the Commonwealth Secretariat/World Bank Joint Task Force on Small States provides 'Frameworks towards small states' for various international organisations. It is notable that the Frameworks for the International Monetary Fund (IMF) and the World Trade Organization (WTO) each highlight some states considered small that are not included in the Commonwealth Secretariat definition (of less than 1.5 mn population) despite this definition being employed within the Task Force Report. Three of the countries highlighted by the IMF and WTO Frameworks but not meeting the Commonwealth Secretariat criterion of less than 1.5 mn population (Haiti, Jamaica and Lesotho) are classified as small using the methodology applied in this study. However, a further nine are *not* classified as small using either approach. The relevant details for these countries are provided in Table 6, along with a list of AOSIS member states that are not 'small' according to the methodology employed in this study.

Two of the countries listed in Table 6 that have been associated with groups of small states but which are not classified as such in the present study have population sizes far higher than has previously been associated with small states (Nepal and Sri Lanka). Two of the countries have particularly large land areas (Bolivia and Mauritania), and one has a notably high level of total income (Singapore). It is inevitable that any quantitative measure of size will not satisfy all countries, unless it is made so broad that it captures the vast majority of states and is rendered of little practical value.

## 5 CONCLUSION

This paper presents a practical methodology for combining population, land area and income parameters to categorize countries by relative size. Previous studies have tended to use a single parameter—usually population—to measure comparative size, while

acknowledging that other parameters could provide useful additional information. Distinction between categories of countries has, in nearly all cases, been based on arbitrary selection of cut-off lines. The initial observational analysis and subsequent cluster analysis outlined in this study avoid such arbitrary choices. Subjectivity enters the methodology at various points including the choice of parameters, the choice of countries to include in the sample, the choice of cluster analysis technique, the number of clusters to be generated, and the initial cluster centres to be employed. However, each of these subjective choices has been considered in depth and is regarded as justified. The results are broadly consistent across minor alterations in the size of the sample, the parameters employed, the number of clusters generated and the initial clusters selected.

The analysis has illustrated the importance of including a measure of total income; a parameter that is frequently omitted from measures of country size. The study has not considered other parameters that might be considered in categorising small states, such as variables that represent characteristic features of small economies. These might include export product concentration, export market concentration and a reliance on external finance and trade. However, these features are not exclusive to small states, nor do all small states exhibit such features. A useful exercise might be to assess the correlation between such economic variables and the categories of size identified in the study.

What this study does *not* do, is provide a single composite measure of size along which each country's comparative size can be assessed. It generates discrete and mutually exclusive groups of countries, and makes no distinction within these groups as to which countries are larger or smaller. The comparison is simply between each of the five categories of size that are generated. The final analysis results in a category of 'small' states (including 'micro' states) that encompasses 79 out of a sample of 188 developing countries, based on size parameters representing population, land area and income. The group of countries identified as 'small' is of a practical size, is relatively robust to changes in the methodology, and does not run counter to intuition or to *a priori* expectations of what might constitute a set of small states.

## REFERENCES

- Armstrong H, de Kervenoael RJ, Li X, Read R. 1998. A comparison of the economic performance of different micro-states, and between micro-states and larger countries. *World Development* **26**(4): 639–656.
- Atkins JP, Mazzi S, Easter CD. 2000. A Commonwealth Vulnerability Index for developing countries: the position of small states. Commonwealth Economic Paper 40. Commonwealth Secretariat: London.
- Berlage L, Terweduwe D. 1988. The classification of countries by cluster and factor analysis. *World Development* **16**(12): 1527–1545.
- Bourne C. 1991. The changing world environment with special reference to small states. Paper presented at the Eastern Caribbean Central Bank and Commonwealth Secretariat Symposium on Small States, 'Problems and Opportunities in a World of Rapid Change', St. Kitts, 25–27 March 1991.
- Briguglio L. 1995. Small island developing states and their economic vulnerabilities. *World Development* **23**(9): 1615–1632.
- Caldwell JC, Harrison GE, Quiggin P. 1980. The demography of micro-states. *World Development* **8**(12): 953–967.

- Chenery HB, Syrquin M. 1975. *Patterns of Development, 1950–1970*. Oxford University Press: Oxford.
- Collier P, Dollar D. 1999. Aid, risk and the special concerns of small states. Paper presented at the Joint Commonwealth Secretariat/World Bank Task Force Conference on Small States, St. Lucia, 17–19 February 1999.
- Commonwealth Secretariat. 1985. *Vulnerability: Small States in the Global Society*. Commonwealth Secretariat: London.
- Commonwealth Secretariat. 1997. *A Future for Small States: Overcoming Vulnerability*. Commonwealth Secretariat: London.
- Commonwealth Secretariat/World Bank. 2000. Small states: meeting challenges in the global economy. Report of the Commonwealth Secretariat/World Bank Joint Task Force on Small States, March. Commonwealth Secretariat: London; World Bank: Washington, DC.
- Crowards TM. 2000. Defining the category of 'small' states. Staff Working Paper No. 5/00, June. Caribbean Development Bank: Barbados.
- De Vries BA. 1975. 'Development aid to small countries'. In *Development Policy in Small States*, Selwyn P (ed.). Croom Helm: London.
- Demas WG. 1965. *The Economics of Development in Small Countries with Special Reference to the Caribbean*. McGill University Press: Montreal.
- Dommen E, Hein P. 1985. *States, Microstates and Islands*. Croom Helm: London.
- Easterly W, Kraay A. 1999. Small states, small problems? Paper presented at the Joint Commonwealth Secretariat/World Bank Task Force Conference on Small States, St. Lucia, February 17–19 1999.
- Downes AS. 1988. On the statistical measurement of smallness: a principal component measure of country size. *Social and Economic Studies* 37(3): 75–96.
- Downes AS. 1990. A multivariate statistical analysis of country classification: the identification of small developing countries. *Social and Economic Studies* 39(1): 71–88.
- Eckhaus R. 1997. Is it beautiful to be small, or is it a burden? *Journal of Eastern Caribbean Studies* 22(4): 1–30.
- Farrell T. 1991. The concept of small states current problems and future prospects: with special reference to the Caribbean. Mimeo, March, St Kitts and Nevis: Eastern Caribbean Central Bank.
- German Development Institute. 1988. Economic and industrial development options for small Third World countries. Occasional Papers of the German Development Institute, No. 91; German Development Institute: Berlin.
- Galbis V. 1984. Ministate economies. *Finance and Development* June: 36–38.
- Gayle DJ. 1986. *The Small Developing State: Comparing Political Economies in Costa Rica, Singapore and Jamaica*. Gower Press: Aldershot.
- Gillis M, Perkins DH, Roemer M, Snodgrass DR. 1987. *Economics of Development*, 2nd edn. W.W. Norton & Company: New York.
- Gruen D, Smith J. 1994. Excess returns in a small open economy. *Economic Record* 70(211): 381–397.
- Gylfason T. 1999. Exports, inflation and growth. *World Development* 27(6): 1031–1057.
- IMF. 1999. International Financial Statistics Yearbook, Volume LII. International Monetary Fund: Washington, DC.
- Jacobs BL. 1975. Administrative problems of small countries. In *Development Policy in Small States*, Selwyn P (ed.). Croom Helm: London.
- Jalan B. 1982. Classification of economies by size. In *Problems and Policies in Small Economies*, Jalan B (ed.). Croom Helm: London.
- Kachigan S. 1991. *Multivariate Statistical Analysis*.



- Karunasekera J. 1991. Small states: a review of literature and major development problems. Paper presented at the Eastern Caribbean Central Bank and Commonwealth Secretariat Symposium on Small States, 'Problems and Opportunities in a World of Rapid Change', St. Kitts, 25–27 March 1991.
- Khatkhate DR, Short BK. 1980. Monetary and central banking problems of mini states. *World Development* 8(12): 1017–1025.
- Kuznets S. 1958. 'Economic growth in small nations'. In *Economic Consequences of the Size of Nations*, Robinson EAG (ed.). Macmillan Co: London.
- Lloyd PJ, Sundrum RM. 1982. Characteristics of small economies. In *Problems and Policies in Small Economies*, Jalan B (ed.). Croom Helm: London.
- Looney RE. 1989. Macroeconomic consequences of the size of Third World nations: with special reference to the Caribbean. *World Development* 17(1): 69–83.
- Michaely M, Papageorgiou D. 1998. Small economies: trade liberalization, trade preferences, and growth. *Iberoamericana: Nordic Journal of Latin American and Caribbean Studies* XXVIII(1–2): 121–159.
- Milner C, Westaway T. 1993. Country size and the medium-term growth process: some cross-country evidence. *World Development* 21(2): 203–211.
- Masih R, Masih A. 1996. Macroeconomic activity dynamics and Granger causality: new evidence from a small developing economy based on a vector error-correction modelling analysis. *Economic Modelling* 13(3): 407–427.
- Parsan E. 1991. The international transport problems of small states. Paper presented at the Eastern Caribbean Central Bank and Commonwealth Secretariat Symposium on Small States, 'Problems and Opportunities in a World of Rapid Change', St. Kitts, 25–27 March 1991.
- Persaud B. 1986. Small states: economic problems and prospects. *Bulletin of Eastern Caribbean Affairs* 12(5): 1–11.
- Poon A. 1989. Flexible specialization and small size: the case of Caribbean tourism. Paper Presented at the Second Conference of Caribbean Economists, Dover Convention Centre, Bridgetown, Barbados, 28–30 May 1989.
- Reid G. 1986. Development assistance by multilateral financial institutions to their smallest members. Paper presented at the Small States Financial Forum Round Table on Small States and Multilateral Financial Institutions, Washington DC, 27 September 1986.
- Schiavo-Campo S. 1975. Some considerations on development aid to small countries. In *Development Policy in Small States*, Selwyn P (ed.). Croom Helm: London.
- Selwyn P. 1980. Smallness and islandness. *World Development* 8(12): 945–951.
- Shand RT. 1980. Island smallness: some definitions and implications. In *The Island States of the Pacific and Indian Oceans: Anatomy of Development*, Shand RT (ed.). Monograph No. 23, Development Studies Centre, Australian National University.
- Siddiqi Q. 1987. Finance for small states. *Crown Agents Review* 1: 3–5.
- Singh N. 1991. Environmental problems and opportunities in small open economies. Paper presented at the Eastern Caribbean Central Bank and Commonwealth Secretariat Symposium on Small States, 'Problems and Opportunities in a World of Rapid Change', St. Kitts 25–27 March 1991.
- Smith BJ. 1987. 'Some aspects of economic adjustment in small island economies'. In *Economic Adjustment: Policies and Problems*, Holmes F (ed.). International Monetary Fund: Washington, DC.
- Srinivasan TN. 1986. The costs and benefits of being a small, remote, island, landlocked or ministate economy. *World Bank Research Observer* 1(2): 205–218.
- Streeten P. 1993. The special problems of small countries. *World Development* 21(2): 197–202.

- UNCTAD. 1996. *Handbook of International Trade and Development Statistics, 1995*. United Nations Conference on Trade and Development. UNCTAD: Geneva.
- UNCTAD. 1999. *Handbook of International Trade and Development Statistics, 1996–7*. United Nations Conference on Trade and Development. UNCTAD: Geneva.
- UNITAR. 1971. *Status and Problems of Very Small States and Territories*. United Nations Institute for Training and Research: New York.
- World Bank. 2000. *World Development Indicators*. World Bank: Washington, DC.

APPENDIX. A SURVEY OF SOME OF THE DEFINITIONS OF SMALL SIZE USED IN THE LITERATURE, 1957-1999

Study	Year	Population (million persons)	Land area (km <sup>2</sup> )	Income (current US\$)	Other	Notes and authors' quotes
International Economic Association	1957	< 10-15 mn				from Karunasekera, 1991
Kuznets	1958	< 10 mn				from Demas, 1965
Demas	1965	< 5 mn	26-50 '000 usable' land			'this is of course very arbitrary'
UNITAR	1971	✓	✓			from Khatkate and Short, 1980
Chenery & Syrquin	1975	< 15 mn				from Jalan, 1982
De Vries	1975	< 5 mn				'must be arbitrary' 'follows Demas (1965)'
Jacobs	1975	< 5 mn				plus Fiji and Mauritius
Caldwell <i>et al.</i>	1980	< 0.5 mn, 'micro-state'				
Khatkate & Short	1980	< 1 mn				
Shand	1980	0.25-0.6 mn, 'small' 0.025-0.25 mn, 'very small' < 0.025 mn, 'micro-islands'	10-30 '000 km <sup>2</sup> 0.5-10 '000 km <sup>2</sup> < 500 km <sup>2</sup>	\$100 mn \$25-\$100 mn < \$25 mn		
Jalan	1982	< 5 mn	< 65,000 km <sup>2</sup>	\$3,000 mn		based on median country for composite of equal weights
Lloyd & Sundrum	1982	< 5 mn				'population is the most serviceable measure'
Galbis	1984	< 1 mn, 'ministate'				'somewhat arbitrary'

APPENDIX Continued

Study	Year	Population (million persons)	Land area (km <sup>2</sup> )	Income (current US\$)	Other	Notes and authors' quotes
Commonwealth Secretariat	1985	< 1 mn				
Gayle	1986	0.06 mn–8 mn	0.2–285 '000 km <sup>2</sup>		GNP per capita \$1–7'000	'inductive if peremptory approach'
Persaud	1986	< 1 mn				'almost all states within this group tend to experience the special economic problems associated with small size'  '[a] common-sense notion of small.' Based on a review of the literature
Reid	1986	< 5 mn, 'small' < 1.5 mn, 'very small' < 0.3 mn, 'microstates'				
Srinivasan	1986	< 5 mn, 'small' < 1.5 mn, 'very small'				
Gillis <i>et al.</i>	1987	< 25 mn				
Siddiqi	1987	< 1.5 mn				'realistic' 'for most practical purposes'  'somewhat arbitrary' 'by analogy with the literature'
German Develop- ment Institute	1988	1–5 mn or 7.5 mn, 'small' < 1 mn 'micro-states'				
Looney	1989	< 5 mn				a 'useful' indicator
Poon	1989	< 2.27 mn (Jamaica)				'the anomalies . . . are fewer and do
Farrell	1991	5–10 mn 'moderately small'				

		0.5 mn–5 mn, 'small'			less violence to commonsense'
		< 0.5 mn, 'micro-states'			
Karunasekera	1991	< 1 mn			'[based on] recent studies'
Parsan	1991	< 5 mn			'following Jalan (1982)'
Singh	1991	< 1 mn			
Milner and Westaway	1993	< 1 mn or < 6 mn	< 60,000 km <sup>2</sup>	< \$20 mn or < \$50 mn or < \$100 mn	
Streeten	1993	< 10 mn, 'small'			'The best simple measure is population'
		< 5 mn, 'very small'			implied by country groupings
Bruglio	1995	< 1.5 mn			Revision of 1985 report. Plus Jamaica, Papua New Guinea, Lesotho and Namibia
Commonwealth Secretariat	1997	< 1.5 mn			'lacking clear discontinuities'
					'the convention'
Eckhaus	1997	lower 50%, 'small'			'natural break in the population size continuum'
		lower 25%, 'very small'			
		lower 20%, 'microstates'			
Armstrong <i>et al.</i>	1998	< 3 mn			'a large enough number of countries to do robust statistical analysis'
Collier & Dollar	1999	< 5 mn			
Easterly & Kraay	1999	< 1 mn			
Gylfason	1999	< 2 mn			