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Measuring Competitiveness in the World's Smallest Economies: Introducing the SSMECI

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Measuring Competitiveness
in the World's Smallest
Economies: Introducing
the SSMECI

Ganeshan Wignaraja
and David Joiner

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Measuring Competitiveness in the World's Smallest Economies: Introducing the SSMECI

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November 2004

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FOREWORD

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ABSTRACT

Recent attempts to measure competitiveness across countries have typically neglected the world's smallest economies. Hence, a simple composite index, the small state manufactured export competitiveness index or SSMECI, was developed to benchmark industrial competitiveness. The SSMECI represents the first attempt to provide a comprehensive picture of the competitiveness performance of small states. The performance of small states varies across geographical regions, income groups, and country size classes. Europe was the best performing region, with Malta and Estonia occupying the top two positions in the index. Small states in Southern Africa were the next most successful, with Mauritius and the four Southern African states all in the top 11 of the index. Meanwhile, performance in the Pacific and Western Africa was poor. Statistical analysis of the determinants of competitiveness indicate that high-performing small states had better macroeconomic conditions, higher levels of foreign investment, more trade openness, better levels of education, and modern infrastructure. The paper concludes that a coherent, market-oriented competitiveness strategy in small states is vital to success on international markets.

I. INTRODUCTION

The world's smallest economies are increasingly preoccupied with industrial competitiveness in the wake of rapid globalization. There are two aspects to this interest. On one hand, the process of world economic integration is associated with unprecedented adjustment challenges for small states and enterprises within them. Faced with falling trade barriers and aggressive foreign investors, there is deep concern about the prospect of declining domestic enterprises and even industrial marginalization in an open, integrated world economy. On the other hand, small states are keen to reap the positive aspects of globalization—access to new markets, industrial skills, and technologies—for enterprise development. These issues have fuelled studies on appropriate policy responses to globalization in small states (see Commonwealth Secretariat 1997, Wignaraja 1997, Peretz et al. 2001, Jessen and Rodriguez 1999, Gounder and Xayavong 2001, Wint 2003, Holden et al. 2004, Briguglio and Cordina 2004).

This paper seeks to contribute to the process of new policy development in small states by measuring their industrial competitiveness record using a composite index and benchmarking them against each other. Benchmarking exercises of this type allow small states to assess their country's performance in relation to:

- (i) countries at a similar level of development, or of similar characteristics, which they would like to outperform; and
- (ii) countries at a higher level of development, whose performance they wish to emulate, and whose policy strategies they could learn from in order to achieve it.

Section II explores other efforts to benchmark competitiveness and highlights the lack of coverage of small economies in these exercises. Section III tries to remedy this gap by constructing a small states manufactured export competitiveness index (SSMECI) and presenting the results. This is a simple composite index made up of three variables (manufactured exports per capita, growth rate of manufactured exports, and share of manufacturing in gross domestic product or GDP). Section IV undertakes a T-test to shed light on the performance of small states, while Section V concludes.

There are many ways (e.g., GDP and population) to define a small state and each has merits depending on the purpose at hand. Following Commonwealth Secretariat (1997), this study defines a small state as an economy with 1.5 million people or less. Accordingly, 40 economies are considered small states in this study.¹

¹ Included in this group are five somewhat larger states (Botswana, Jamaica, Lesotho, Namibia, and Papua New Guinea), which share many of the physical and economic characteristics of small states in their respective regions. Appendix Table 2 contains a basic profile of the 40 small states.

II. CURRENT BENCHMARKING INITIATIVES AND THEIR APPROPRIATENESS FOR SMALL STATES

The concept of competitiveness is somewhat elusive, particularly at the national level, and has been intensely debated to clarify its meaning and economic relevance. It has often been equated with macroeconomic issues (e.g., changes in exchange rates or wages) or microeconomic issues (e.g., entrepreneurship, economic incentives and bureaucratic regulations on business, and firm-level technological capabilities and institutional support) (see Faggerberg 1988, Porter 1990, Corden 1994, Krugman 1994, Dahlman and Aubert 2001, Lall 2001a, and ADB 2003). An examination of the theoretical debate on competitiveness is beyond the scope of this paper. Suffice it to say that both macroeconomic and microeconomic approaches to competitiveness offer valuable insights, depending on the purpose at hand. There is increasing recognition that building technological capabilities at the firm level is associated with competitiveness performance in a world of rapid globalization and technological progress. Furthermore, that appropriate economic incentives and supportive institutions can help firms to overcome market and systems failures in technological learning. This paper's focus is on the empirical literature on competitiveness particularly on recent exercises to benchmark competitiveness performance across countries using different composite indices.² These include the following:

- (i) World Economic Forum's *Global Competitiveness Report* (WEF 2003);
- (ii) International Institute for Management Development's *World Competitiveness Yearbook* (IMD 2003);
- (iii) United Nations Industrial Development Organisation's *World Industrial Development Report 2002/2003* (UNIDO 2003); and
- (iv) Wignaraja and Taylor (2003).

Table 1 summarizes the key features of these four initiatives.

The work of the WEF and the IMD, both based in Switzerland, has largely dominated the global competitiveness benchmarking industry. Annual rankings of competitiveness in developed and developing countries have been produced for 24 years by the WEF's *Global Competitiveness Report* and for 13 years by the IMD's *World Competitiveness Yearbook*. Both indices focus on the micro level business perspective, and examine the extent to which nations provide an environment in which enterprises can compete. In line with this, rather than focusing on trying to calculate a measure of *actual* competitive performance, both adopt an approach of looking at a wide range of factors that could *affect* national competitiveness. To this end they use a large basket of variables (160 for WEF and 321 for IMD in 2003), which include both "hard" published statistics and "soft" data from surveys of businessmen. The sample size of these surveys is rapidly increasing with 7,741 responses to the WEF "Executive Opinion Survey" in 2003, as opposed to 4,600 in 2001.

Both indices are widely used, gaining widespread media attention. They have also generated a wealth of empirical data. What light then can they shed on the competitiveness of small states? Unfortunately the answer is very little. Despite increasing its coverage from 80 to 102 countries, the WEF index only has eight countries that are among the 40 small states in this study. The situation

² Composite indices of the type used in this paper are only one possible way to capture competitiveness. Other popular methods include labor productivity, unit labor cost, real effective exchange rates, and revealed comparative advantage. See ADB (2003) for a discussion of the different methods.

with the IMD index is even worse, with no small states among the 59 countries included. The precise reasons for this lack of coverage are unknown, and without discussion with the institutions involved, any attempt to determine such reasons remain simple guesses. However, one of the most significant factors is likely to be that the very complexity of both the indices means that the data requirements simply cannot be met in small states. With small populations and often underdeveloped institutions there is simply no capacity or demand to collect the data required.

The specific issues of small states may also mean that the general theory of competitiveness espoused by both the WEF and IMD is perhaps inappropriate for the measurement of competitiveness in the small states context. In small, developing economies, focus on the basic economic fundamentals (e.g., macroeconomic stability, outward-oriented trade policies, high levels of human capital and efficient infrastructure) is perhaps more appropriate than worrying about the 200 subcomplexities found in sophisticated multisectoral economies of the developed world.

TABLE 1
FEATURES OF RECENT COMPETITIVENESS INDICES

PUBLICATION	WORLD ECONOMIC FORUM (2003)	INSTITUTE OF MANAGEMENT DEVELOPMENT (2003)	UNIDO (2002)	WIGNARAJA AND TAYLOR (2003)
Name of Index	Growth Competitiveness Index	World Competitiveness Scoreboard	Competitiveness Industrial Performance Index	Manufactured Export Competitiveness Index
Concept	Business school approach to measuring national level competitiveness, using both performance and explanatory variables	Business school approach to measuring national level competitiveness, using both performance and explanatory variables	Focus on industrial performance and national ability to produce manufactures competitively	Focus on industrial performance and national ability to produce manufactures competitively
Number of Variables	160	321	4	3
Weighting System	Two-tier approach based on a concept of "core" or "noncore" innovator countries; different aggregations and weightings apply to each group in the final index	20 categories each weighted at 5%	4 variables, equally weighted	3 variables weighted at 30, 30, and 40 percent (with technology intensity of exports weighted higher)
Data Source Type	Published Data and Entrepreneur Surveys (7,741 responses)	Published Data and Entrepreneur Surveys (over 4000 responses)	Published Data	Published Data
Country Coverage (including small states)	Covers 102 countries (8 small states)	Covers 59 countries (0 small states)	Covers 87 countries (3 small states)	Covers 80 countries (11 small states)
First Published/ Frequency	Yearly since 1979	Yearly since 1990	2002 and henceforth periodically	2003

Quite apart from the lack of attention given to small states, the WEF and IMD competitiveness indices have attracted criticism on technical grounds. Lall (2001b) provides a comprehensive analysis of the WEF index of 2000 and finds flaws in its definition of competitiveness, model specification, choice of variables, identification of casual relations, and use of data. Lall goes on to offer some insights into the construction of competitiveness indices, and while not writing with small states in mind, his comments are perhaps particularly relevant in the context of small states:

"To be analytically acceptable, however, all such efforts should be more limited in coverage, focusing on particular sectors rather than economies as a whole and using a smaller number of critical variables rather than putting in everything the economics, management, strategy and other disciplines suggest. They should also be more modest in claiming to quantify competitiveness: the phenomenon is too multifaceted and complex to permit easy measurement" (Lall 2001b, 1520).

ADB (2003) points out similar flaws in the WEF competitiveness index. For instance, ADB notes that the weights used to construct the WEF index is arbitrary and the index displays an overly negative view of the role of government. Furthermore, that it relies extensively on qualitative data obtained through questionnaires that are only tenuously related to the notion of competitiveness.

Wignaraja and Taylor (2003) also offer a critique of the theory and methodology used by WEF and the IMD, including a detailed exploration of the IMD index of 2001. In summary they find that the IMD rankings have:

- (i) *Ambiguous theoretical basis.* The theoretical linkages between the input determinants and national competitiveness are weak. The "fundamentals" of the IMD 2001 index (IMD 2001, 43-9), which details the "four fundamental forces of competitiveness", are more of a schema than a theory.
- (ii) *Problems of Index Construction.* The justification for the weightings given to each of the indicators is sometimes weak and often nontransparent. There also seems to be a lack of distinction between variables that indicate competitiveness and those that determine it, with both types used. These lead to problems in interpreting the results and applying lessons to other countries.
- (iii) *Ad hoc Data and Proliferation of Components.* The use of survey data can be problematic in that the perceptions of businessmen in one country cannot be directly compared with the views of businessmen in another country without some kind of moderation. The justification of the recent proliferation of indicators is also weak, with no explanation as to what is being gained by their addition.

Building on this critique, and the argument that such indices need to be less ambitious and analytically simpler, recent work by UNIDO (2002) and Wignaraja and Taylor (2003) have emphasized the industrial competitiveness performance of developing countries.³ This is a departure from the somewhat broader (and more vague) concept of national competitiveness implicit in the WEF and IMD work. The two newer indices were developed from a general developing country perspective,

³ The UNCTAD/WTO International Trade Centre (ITC) also produces a Trade Performance Index, which benchmarks across developing countries at an industry/product level (see ITC 2000). It is not discussed here due to the current paper's focus on national level competitiveness, rather than individual industries/products. However, for policymakers interested in such detail it can be a valuable tool.

rather than being small-states specific, but come closer to the methodology appropriate for the focus of this study, and in the context of data-sparse small states.

The UNIDO Competitive Industrial Performance Index focuses on the national ability to produce manufactures competitively, and is constructed from four basic indicators of industrial performance (see UNIDO 2002):

- (i) manufacturing value added (MVA) per capita
- (ii) manufactured exports per capita
- (iii) share of medium- and high-tech activities in MVA
- (iv) share of medium- and high-tech products in manufactured exports

The UNIDO index provides valuable insights into the industrial record of the developing world. Unfortunately out of 87 countries listed in the index, only three are small states, as defined in this study. Again, the reasons are unclear, but perhaps even such a simplified index still poses data availability problems.

Wignaraja and Taylor (2003) found a similar analytical underpinning to the UNIDO work and construct a Manufactured Export Competitiveness Index (MECI) of 80 developing countries using three variables:

- (i) manufacturing exports per capita (1999)
- (ii) average manufactured export growth per annum (1980-99)
- (iii) technology-intensive exports as percent of total merchandise exports (1998)⁴

Of the 80 countries in the MECI, 11 are small states. The results for these economies are shown in Table 2. The top and bottom three results in the overall MECI are also shown in order to give context to the data and index values for small states.

⁴ Technology-intensive exports include electronics, petrochemicals and chemicals, iron and steel, engineering, plastics, and industrial ceramics.

TABLE 2
SUMMARY OF RESULTS FROM MECI

OVERALL RANK	ECONOMY	MECI INDEX VALUE	MANUFACTURED EXPORTS PER CAPITA, 1999		AVERAGE MANUFACTURED EXPORT GROWTH, 1980-1999		TECHNOLOGY-INTENSIVE EXPORTS, 1998 (PERCENT OF TOTAL MERCHANDISE EXPORTS)	
			RANK	VALUE (CURRENT \$US)	RANK	VALUE (PERCENT)	RANK	VALUE (PERCENT)
1	Singapore	0.93	1	25,039	13	13.4	1	70
2	Malaysia	0.82	5	2,988	3	19.2	4	55
3	Taipei, China	0.79	3	5,477	31	9.4	3	58
15	Trinidad and Tobago	0.52	16	645	37	7.7	14	23
24	Mauritius	0.45	12	984	15	12.8	43	3
26	Cyprus	0.45	15	684	62	3.1	23	17
30	Bahrain	0.42	13	953	19	11.6	65	0
38	Dominica	0.38	21	393	34	9.2	65	0
45	Jamaica	0.35	22	377	64	2.8	43	3
50	St. Kitts and Nevis	0.33	26	300	57	3.8	65	0
55	Grenada	0.31	52	45	42	7.2	65	0
58	Belize	0.29	41	86	69	0.4	49	2
61	Guyana	0.27	53	37	67	0.9	43	3
67	Tonga	0.24	72	6	50	5.9	65	0
78	Congo, DR	0.15	76	1	74	-2.1	58	1
79	Nigeria	0.13	80	1	71	-1.2	58	1
80	Yemen, Rep. of	0.00	78	1	80	-18.0	65	0

Source: Wignaraja and Taylor (2003).

The 11 small states are fairly evenly spread through the middle section of the index, but even the highest performers have MECI values substantially below East Asian tiger economies (such as Malaysia; Singapore; and Taipei, China) at the top of the rankings, putting perspective on the performance of small states. One of the reasons for this is perhaps the universally low level of high-technology exports in the small states (whether due to lack of such productive capacity or lack of data). While the share of high technology exports was an appropriate variable for the study of 80 developing countries, its applicability for work that focuses on small states exclusively is called into question, as it is either not available or not distinctive enough among a small-states sample.

Significant differences in the performance of individual small states are visible. Cyprus, Mauritius, and Trinidad and Tobago stand out among the sample of 11 small states in the MECI rankings. In contrast, smaller Caribbean economies (Belize, Grenada, Guyana, and St. Kitts and Nevis) and Tonga in the Pacific have performed poorly compared to the three leading small states.

III. A SMALL-STATES SPECIFIC COMPETITIVENESS INDEX

Bearing in mind the limited coverage of small states in the mainstream competitiveness literature and the specific issues surrounding measurement of their performance, efforts to benchmark the export performance of small states requires a new small-states specific index. As many of the existing methodologies are inappropriate for small states, the design of such an index and the interpretation of its results need to be handled with care. Building on the empirical work of Wignaraja and Taylor (2003), a simple, transparent SSMECI was developed. The key features of this index are highlighted in Box 1 while the rest of the section presents the results by country and various aggregate categories.

A. Country-level Findings

Country-level rankings of competitiveness generate considerable interest in academic and policy circles. Of particular interest are the top performers. Before considering the composite SSMECI rankings, it is useful to start with a brief look at the component variables. Table 3 shows the top 10 performers for each of the three component variables in the SSMECI. It is noticeable that there is considerable difference in the ranking of the three tables, and that top performers in one component are not necessarily the top in others. However, some countries rank consistently high, for example Estonia, which ranks 3rd, 3rd, and 4th, respectively. The Seychelles also figures in all three lists, albeit at the bottom end. Some countries that figure highly in two of the components, such as Mauritius in per capita manufactured exports and manufacturing value added (MVA) as a percent of GDP, do not figure well in the third (average manufactured export growth) and this ultimately leads to a lower overall ranking in overall SSMECI. At the same time, a particularly high ranking on a single variable can push up a country on the overall SSMECI rankings. Swaziland, which is at the top in terms of share of manufacturing in GDP, is a case in point.⁵

⁵ Swaziland's large share of manufacturing in GDP seems due to the following: (i) 26 garment factories established by Taipei,China investors to take advantage of the Africa Growth and Opportunities Act, which provides ready access to the American market; (ii) one of Coca Cola's five worldwide plants that produces coke concentrate; (iii) various sugar pulp factories; and (iv) other light industries established by South African investors to take advantage of the South African Customs Union market.

Box 1
THE SMALL STATES MANUFACTURED EXPORT COMPETITIVENESS INDEX (SSMECI)

The small states manufactured export competitiveness index (SSMECI) emphasizes the ability to produce manufactures competitively in the world's smallest economies. It has been designed in light of the problems with data availability in some small states and the need to build in realistic data requirements in order to make the country coverage of the index as wide as possible. The SSMECI is composed of just three variables, each of which captures a different aspect of industrial competitiveness and which combine to create a simple but effective snapshot of the economy's overall international competitiveness in this area. The three factors captured are:

- (i) current performance in world export markets scaled by size
- (ii) dynamism of this performance over time, i.e., growth rates
- (iii) size of the manufacturing base in the structure of the wider economy

The first factor captures an economy's actual record of competing in international markets rather than simply alluding to an ability to be competitive. The second captures how dynamic this performance is, and whether the economy's performance is on an upward or downward trend. The third looks at more structural issues, recognizing that in a small state where economies of scale are such an issue, a larger manufacturing base is likely to reflect an advantage in achieving competitiveness. To reflect these three concepts and in light of the data issues, three specific variables were selected for the small states index, namely:

- (i) manufactured export value per capita in 2001 (US\$)
- (ii) average manufactured export growth per annum 1990-2001
- (iii) manufacturing value added as a percent of GDP in 1999

Using these variables, the SSMECI was constructed for 40 small states in the sample set. This sample size is sufficient to permit basic statistical analysis of determinants. Calculations were performed to give each country a value between 0 and 1 for each of the three variables, and these were then weighted to produce a final index figure for each country, which could then be ranked. Higher values in the SSMECI indicate greater levels of competitiveness, thus for example, Malta, with a SSMECI of 0.72 is perceived to be more competitive than Djibouti with a SSMECI of 0.22 in Table 4.

In interpreting the findings, readers should be aware of the sensitivity of results in small states. When the overall production base is so small, the establishment or closure of a single factory can substantially affect the overall figures for that year. The quality/reliability of the data obtained can also often be poor, due to underdeveloped/understaffed statistics institutions in small states. To a degree such factors may have influenced the overall rankings, and led to marginally higher or lower placement than would be expected. This needs to be taken into account when interpreting the results, though it is unlikely to change the basic patterns observed.

Full details of data sources, definitions, and the specific methodology used to construct the SSMECI are given in the Appendix.

TABLE 3
COUNTRY RANKINGS FOR THE THREE SEPARATE VARIABLES

MANUFACTURED EXPORTS PER CAPITA 2001			AVERAGE MANUFACTURED EXPORT GROWTH, 1990-2001			MANUFACTURING VALUE ADDED AS PERCENT OF GDP, 1999		
RANK	COUNTRY	VALUE (CURRENT \$US)	RANK	COUNTRY	VALUE (PERCENT)	RANK	COUNTRY	MVA
1	Malta	4469	1	Brunei	19.50	1	Swaziland	31.69
2	Botswana	2891	2	Maldives	17.07	2	Mauritius	24.56
3	Estonia	2203	3	Estonia	16.86	3	Namibia	15.45
4	Trinidad and Tobago	1666	4	Lesotho	15.70	4	Estonia	15.43
5	Qatar	1331	5	Trinidad & Tobago	13.25	5	Lesotho	15.13
6	Bahrain	1080	6	Bahamas	12.89	6	Belize	14.81
7	Mauritius	940	7	Fiji Islands	12.75	7	Fiji Islands	14.11
8	Brunei	773	8	Grenada	12.48	8	Jamaica	13.93
9	Cyprus	605	9	Seychelles	11.19	9	Seychelles	13.73
10	Seychelles	576	10	Suriname	10.36	10	Malta	12.03

Sources: Data primarily from ITC, using COMTRADE Database; *World Development Indicators* (2001, 2002, 2003); and other regional and national sources. See Appendix for full details of data sources and methodology.

Table 4 shows the full SSMECI ranking for the 40 small states, with the component indices, the ranking in each individual variable, and the underlying data values.

TABLE 4
OVERALL SSMECI RANKING

OVERALL RANK	COUNTRY	SSMECI INDEX VALUE	MANUFACTURED EXPORTS PER CAPITA, 2001 ^a		AVERAGE MANUFACTURED EXPORT GROWTH, 1990-2001 ^b		MANUFACTURING VALUE ADDED AS PERCENT OF GDP, 1999 ^c	
			RANK	VALUE (CURRENT \$US)	RANK	VALUE (PERCENT)	RANK	MVA
1	Malta	0.72	1	4,469	16	5.36	10	12.03
2	Estonia	0.71	3	2,203	3	16.86	4	15.43
3	Swaziland	0.69	17	299	12	7.10	1	31.69
4	Mauritius	0.65	7	940	22	3.14	2	24.56
5	Trinidad and Tobago	0.59	4	1,666	5	13.25	22	7.99
6	Brunei	0.58	8	773	1	19.50	19	8.42
7	Seychelles	0.57	10	576	9	11.19	9	13.73
8	Lesotho	0.56	24	113	4	15.70	5	15.13
9	Botswana	0.55	2	2,891	25	2.25	34	4.97
10	Fiji Islands	0.55	18	266	7	12.75	7	14.11

(continued next page)

TABLE 4 (CONTINUED)

OVERALL RANK	COUNTRY	SSMECI INDEX VALUE	MANUFACTURED EXPORTS PER CAPITA, 2001 ^a		AVERAGE MANUFACTURED EXPORT GROWTH, 1990-2001 ^b		MANUFACTURING VALUE ADDED AS PERCENT OF GDP, 1999 ^c	
			RANK	VALUE (CURRENT \$US)	RANK	VALUE (PERCENT)	RANK	MVA
11	Namibia	0.51	14	398	26	2.15	3	15.45
12	Bahrain	0.51	6	1,080	21	3.25	15	9.88
13	Qatar	0.49	5	1,331	28	1.73	23	7.30
14	Guyana	0.49	19	207	11	10.02	14	10.15
15	Grenada	0.49	16	319	8	12.48	24	7.26
16	Maldives	0.49	23	116	2	17.07	26	6.46
17	St. Kitts and Nevis	0.48	11	514	20	3.82	13	10.33
18	Jamaica	0.48	26	105	18	4.51	8	13.93
19	Bahamas	0.47	12	508	6	12.89	38	3.20
20	Barbados	0.46	13	468	23	2.82	16	9.32
21	Belize	0.46	22	122	30	0.00	6	14.81
22	Bhutan	0.46	28	59	14	6.86	11	11.56
23	Cyprus	0.46	9	605	31	-1.68	12	10.54
24	Dominica	0.45	15	357	19	3.94	17	8.48
25	Suriname	0.43	30	21	10	10.36	21	8.12
26	St. Vincent/Grenadines	0.41	25	111	17	5.16	25	6.54
27	Gabon	0.39	29	48	13	6.89	32	5.16
28	Solomon Islands	0.39	21	148	27	1.89	33	5.12
29	Samoa	0.37	34	9	15	5.53	28	6.02
30	Vanuatu	0.34	33	9	29	0.53	27	6.35
31	Papua New Guinea	0.32	32	10	33	-5.37	20	8.28
32	Tonga	0.31	35	4	24	2.33	36	3.89
33	St. Lucia	0.31	27	83	34	-9.79	29	5.96
34	Cape Verde	0.30	31	21	36	-10.96	18	8.45
35	Antigua and Barbuda	0.27	20	197	37	-13.97	39	2.25
36	São Tomé and Príncipe	0.24	39	0	32	-3.65	35	4.52
37	Djibouti	0.22	37	2	35	-10.90	37	3.60
38	Gambia, The	0.20	36	2	38	-16.74	30	5.60
39	Comoros	0.13	38	1	39	-26.09	31	5.43
40	Kiribati	0.00	40	0	40	-29.07	40	0.99

^a In some cases where data from 2001 was not available, 2000 or 1999 data was used. See Appendix for full details.

^b Where data was not available for 1990 or 2001, the nearest available year was used. Growth rates were calculated using a compound method, adjusting for length of time period as appropriate. See Appendix for full details.

^c Where 1999 data was not available, 1998 or 2000 was used. See Appendix for full details.

Sources: Data primarily from ITC, using COMTRADE Database; *World Development Indicators* (2001, 2002, 2003); and other regional and national sources. See Appendix for full details of data sources and methodology.

As might have been expected, results show that two European countries, Malta and Estonia, occupy the first two places in the ranking, perhaps reflecting both the greater access to market and the positive effect of sustained competitive pressure from their large European neighbors.⁶ The rest of the top 10 is made up of some of the traditional small state powerhouses of the various regions, such as Mauritius from the Indian Ocean, Trinidad and Tobago from the Caribbean, and Fiji Islands from the Pacific.

Of noteworthy interest is the performance of the “BLNS” countries that make up the Southern African Customs Union with South Africa. In the rankings all four score highly, Swaziland is 3rd, Lesotho 8th, Botswana 9th, and Namibia 11th. This high performance may again be due in part to proximity to large markets, and the trade and investment stimulus that an agreement such as the Southern African Customs Union produces for its “satellites.”

Some countries do not perform as well as might be expected. For example, Cyprus, ranked 23, did not perform as well as the other European countries in the sample. While it scored fairly highly in terms of per capita exports and MVA, manufactured exports have actually fallen over the last 10 years, possibly reflecting a fall in comparative competitiveness, and this negative average growth brings down the overall SSMECI ranking score.

B. Findings by Region, Income Group, and Country Size

In an attempt to establish patterns of performance and provide analytical insights, the 40 small states have been grouped into various categories as follows:

- (i) geographical region to facilitate comparisons across regions
- (ii) income per head to permit analysis of different income groups
- (iii) population to enable analysis by country size

In each case, the group values for each of the three variables have been calculated using weighted averages, which have then been indexed, using the same methodology as before. Simple averages are also shown for each grouping, calculated using average index values for each country in the group.

Table 5 aggregates the results according to geography, allowing the regional breakdown of the results to be analyzed.

⁶ Calculations were also done including Costa Rica; Singapore; and Taipei, China, in order to check the robustness of the theory, and to set context to the SSMECI figures. Not surprisingly, these three economies came out at the top of the index.

TABLE 5
SSMECI PERFORMANCE BY REGION

RANK	REGIONAL GROUPING ^a	NO.	WEIGHTED AVERAGE SSMECI ^b	SIMPLE AVERAGE SSMECI	MANUFACTURED EXPORTS PER CAPITA, 2001		AVERAGE MANUFACTURED EXPORT GROWTH, 1990-2001		MANUFACTURING VALUE ADDED AS PERCENT OF GDP, 1999	
					RANK	VALUE (CURRENT \$US)	RANK	VALUE (PERCENT)	RANK	MVA
1	Europe	3	0.79	0.63	1	2,076	3	8.70	2	12.24
2	Africa	12	0.49	0.42	3	602	5	2.74	1	12.86
3	Asia	3	0.45	0.51	5	351	1	16.95	5	8.46
4	Caribbean/ Latin America	13	0.37	0.45	4	481	2	9.84	4	9.04
5	Middle East	2	0.28	0.50	2	1,200	6	2.41	6	8.21
6	Pacific	7	0.14	0.33	6	51	4	5.01	3	9.53

^a Regional groupings according to *World Development Indicators 2002* (World Bank 2002).

^b Group values calculated from weighted components of subindices for members of each region. Where original data for manufactured exports for 1990 and 2001 were not available, data for these years has been extrapolated using average growth rates of that country. SSMECI values were calculated using sample maximum and minimum levels.

Sources: Author's calculations; COMTRADE Database; *World Development Indicators* (2001, 2002, 2003); and other regional and national sources. See also the Appendix for full details of data sources and methodology.

The high performance of the European region is probably to be expected, as discussed above. In comparison, the relatively high performance of the African region is more surprising, and closer inspection shows that there are in fact two tiers of performance within the region. At the top level, the four BLNS countries, Mauritius, and the Seychelles are all in the top 11 of the SSMECI rankings. At the other end, a number of African countries, particularly in Western Africa, occupy the bottom ten positions. Overall, the contributions of the top-tier performers are enough to obtain a high average in comparison to the other regions.

Also of note is the particular poor performance of the Pacific region, which was not strong in any of the three variables, and significantly lower in the SSMECI rankings.⁷ Apart from the Fiji Islands at 10 in the overall SSMECI, the other countries of the Pacific were all in the bottom 15.

⁷ There are about 12 small states in the Pacific by our definition but five could not be included in the final SSMECI due to data constraints. As a result, the sample for the Pacific is not complete and may be biased. However, lack of data is often correlated to poor performance, and it is unlikely that inclusion of these countries, if data were available, would significantly improve overall regional performance. See Holden et al. (2004) for an analysis of constraints facing the private sector in the Pacific. These include a weak macroeconomic environment, poor governance, frequent political instability, excessive state involvement combined with weak regulation, underdeveloped financial markets, and a poor investment policy environment for business.

TABLE 6
SSMECI PERFORMANCE BY INCOME GROUPING

RANK	REGIONAL GROUPING ^a	NO.	WEIGHTED AVERAGE SSMECI ^b	SIMPLE AVERAGE SSMECI	MANUFACTURED EXPORTS PER CAPITA, 2001		AVERAGE MANUFACTURED EXPORT GROWTH, 1990-2001		MANUFACTURING VALUE ADDED AS PERCENT OF GDP, 1999	
					RANK	VALUE (CURRENT \$US)	RANK	VALUE (PERCENT)	RANK	MVA
1	Upper Middle Income	11	0.84	0.52	1	1,520	1	6.23	2	11.06
2	Lower Middle Income	14	0.55	0.40	3	193	2	4.93	1	13.98
3	High Income	8	0.36	0.50	2	1,308	4	3.80	4	8.49
4	Low Income	7	0.13	0.33	4	38	3	4.62	3	9.09

^a Income groupings according to *World Development Indicators 2003* (World Bank 2003).

^b Group values calculated from weighted components of subindices for members of each income group. Where original data for manufactured exports for 1990 and 2001 were not available, data for these years had been extrapolated using average growth rates of that country. SSMECI values were calculated using sample maximum and minimum levels.

Sources: Author's calculations; COMTRADE Database; *World Development Indicators* (2001, 2002, 2003); and other regional and national sources. See also the Appendix for full details of data sources and methodology.

Table 6 shows the performance by income grouping, which reveals some very interesting results. Rather than running from high income down to low income in a linear fashion, the performance of the four groups is more erratic. High-income countries perform only third best out of the four, with the lowest average growth rates in manufacturing exports, and the lowest MVA as a percentage of GDP. They do have the second highest manufactured exports per capita though, which prevents them from being below the low-income countries. This pattern of results could reflect "mature" economies that have developed a manufacturing export base, as shown in the high per capita figures, but have then diversified their economies into other sectors such as services, particularly financial services and high-end tourism. In such a case, the per capita exports in manufacturing would still be relatively high, but growth in manufacturing exports would slow, and value added in manufacturing as a share of total GDP would fall.

TABLE 7
SSMECI PERFORMANCE BY POPULATION SIZE GROUPING

RANK	REGIONAL GROUPING ^a	NO.	WEIGHTED AVERAGE SSMECI ^b	SIMPLE AVERAGE SSMECI	MANUFACTURED EXPORTS PER CAPITA, 2001		AVERAGE MANUFACTURED EXPORT GROWTH, 1990-2001		MANUFACTURING VALUE ADDED AS PERCENT OF GDP, 1999	
					RANK	VALUE (CURRENT \$US)	RANK	VALUE (PERCENT)	RANK	MVA
1	More than 1m	11	1.00 ^c	0.52	1	615	1	5.96	1	12.42
2	250,000 to 1m	16	0.63 ^c	0.45	2	592	2	4.34	2	8.72
3	Less than 250,000	13	0.00 ^c	0.36	3	123	3	0.48	3	8.27

^a Population groups per authors' definition.

^b Group values calculated from weighted components of subindices for members of each population group. Where original data for manufactured exports for 1990 and 2001 were not available, data for these years had been extrapolated using average growth rates of that country. SSMECI values were calculated using sample maximum and minimum levels.

^c The extreme range of the weighted average SSMECI index values obtained (1.00 and 0.00) reflects the strength of the correlation. The group with population of over 1 million, was ranked first in all three variables, thus achieving an index value of 1.00 for all three variables. When weighted, this gives an overall SSMECI of 1.00. For the group with a population under 250,000 the reverse is true, with last place rankings in each variable giving 0.00 index values, and an overall SSMECI of 0.00.

Sources: Author's calculations; COMTRADE Database; *World Development Indicators* (2001, 2002, 2003); and other regional and national sources. See also the Appendix for full details of data sources and methodology.

Table 7 shows the SSMECI performance grouped by population size. This distinction is particularly important to capture the record of tiny, micro states compared to larger small states. In the absence of a universally accepted definition of subcategories by size, the sample was divided into countries with populations under 250,000 (micro states); between 250,000 and 1 million; and over 1 million. The striking finding is that the micro states record a particularly weak competitiveness performance. This suggests that even within the world's smallest economies, country size matters for industrial competitiveness. Perhaps unsurprisingly, the performance of the larger states was better than the smaller two categories, though the magnitude of this is perhaps unexpected. Many factors probably explain the gap in industrial competitiveness performance between larger states and micro states. These include: the larger small states have somewhat bigger markets than smaller ones; have access to a larger pool of technical and managerial skills; are more attractive to inflows of FDI; are better able to finance costly infrastructure project (e.g., setting up a national airline); and, possibly, are less susceptible to natural disasters.

C. Comparison of Results with Other Indices

As stated earlier, one of the reasons for developing the SSMECI is the lack of coverage that existing work gives to small states. The IMD index contains none of the small states in the SSMECI, so comparison of results is not possible. The WEF index however, has eight common countries, and the MECI of Wignaraja and Taylor (2003) has 11 similarities. A comparison of the resulting rankings is given in Table 8.

TABLE 8
COMPARISON OF RESULTS FROM SSMECI, MECI, AND WEF GROWTH COMPETITIVENESS INDEX

COUNTRY	SSMECI RANKING	MECI (WIGNARAJA AND TAYLOR 2003)	WEF GROWTH COMPETITIVENESS RANKING, 2003
Malta	1	...	19
Estonia	2	...	22
Mauritius	4	24	46
Trinidad and Tobago	5	15	49
Botswana	9	...	36
Namibia	11	...	52
Bahrain	12	30	...
Guyana	14	61	...
Grenada	15	55	...
St. Kitts and Nevis	17	50	...
Jamaica	18	45	67
Belize	21	58	...
Cyprus	23	26	...
Dominica	24	38	...
Tonga	32	67	...
Gambia, The	38	...	55

... means not available.

Sources: WEF (2003), authors' calculations.

Only three countries appear in all three indices, and so comparison across all at the same time is difficult. However, if the SSMECI is compared individually against each other, the results, while not identical, show some correlation. Against the WEF, the results are broadly similar, and while Botswana and The Gambia fare slightly better in the WEF rankings than in the SSMECI, the rankings are otherwise fairly similar. The correlation with the MECI is somewhat surprisingly less strong, with a number of countries having significantly different rankings. However, if these outliers, including Cyprus, Dominica, and Guyana are excluded, the overall pattern of correlation is again visible.

IV. EXPLAINING INDUSTRIAL COMPETITIVENESS PERFORMANCE

Ranking intercountry patterns of competitiveness performance is only the first step in analyzing competitiveness. A second and more interesting step is investigating what factors led to high, or low, performance. In other words, what are the determinants of manufacturing export competitiveness and what lessons can be learned for future policy development.

A. T-Test and Variables

The analysis of the determinants of competitiveness in small states has been conducted using a simple statistical test, a two sample t-test of the variable means.⁸ It analyzes whether the two sample means are equal, and thus whether the two groups are distinct in statistical terms. By using the top 20 performers in the SSMECI, and the bottom 20 as our two samples, we can determine whether the mean for a particular determinant is different in the two groups. If, for example, the mean value for a particular determinant (e.g., foreign investment) is higher in the top 20 sample to a level that is statistically significant, this would imply that high levels of foreign investment are associated with high SSMECI performance, which further implies it has an impact on competitiveness.⁹

Tests of this nature were conducted on 25 separate variables, to see which factors were statistically significant. The variables utilized are divided into seven subcategories:

- (i) *Macro Environment.* A stable and predictable macroeconomic environment, characterized by low inflation and interest rates, sustained GDP growth, and high levels of saving and investment, is widely accepted as a fundamental condition for business activity. Five variables are used in this category covering a wide scope of macroeconomic variables.
- (ii) *Country Size.* Recent literature has shown that country size is inversely correlated with susceptibility to economic, political, and environmental risks. Traditional economic theory would also suggest that larger country size may allow greater economies of scale and scope. Population is used as the proxy for country size as this has been shown to have the same result as more complex indices based on variables such as total GNP, population, and total arable land.
- (iii) *Trade and Investment Regime.* An open trade and investment regime exposes the business sector to overseas competition, encourages economies of scale through increased market access, and facilitates technological transfer. Three proxies of openness are used as well as inward foreign direct investment (FDI) stock.
- (iv) *Vulnerability.* "Vulnerability", whether in the form of susceptibility to natural disasters, or over reliance on one commodity may hamper the competitiveness of economies. Six variables are used to test this hypothesis, including both singular and composite measures of vulnerability.
- (v) *Structural.* The overall structure of economic activity may impact competitiveness, with a move away from low value-adding agriculture into manufacturing and services, freeing labor and benefiting the overall competitiveness of the economy. However, conversely at the opposite extreme, a lack of agricultural and mineral activity may prevent exploitation of potential for value-added industries based on natural resources. Two basic measures of economic structure are used.

⁸ Recent attempts at statistical analysis of the factors affecting competitiveness in developing countries include Ul Haque (1995), James and Romijn (1997), Wignaraja and Taylor (2003), and Wint (2003).

⁹ An important qualification about the testing procedure should be noted. The simple t-test shows significantly different means between two samples for individual variables. However, it does not indicate causality, and is thus less powerful than full econometric analysis. That said, it does provide insights into those underlying factors correlated with competitive success in comparisons of strong and weak national performance.

- (vi) *Infrastructure.* Efficient and cost-competitive physical infrastructure allows businesses to compete in the global market without constraint, and for small states, particularly modern ICT infrastructure allows the possibility to escape the “tyranny of distance”, and stay abreast of the latest technological innovation and production techniques. Three variables of modern ICT infrastructure are used.
- (vii) *Human Capital.* A strong base of productive human capital is recognized as the basis for industrial innovation and competitiveness. Education and training provides productive numerate workers with the skills to compete successfully. Four variables are used covering enrolment rates at different stages of education and adult literacy.
- (viii) *“Development.”* While not strictly a “determinant” of competitiveness, a country’s level of development would be expected to be correlated with its level of competitiveness, even if the direction of causality is complicated. As such three variables are used to proxy for overall “development.”

B. The T-Test Results

Table 9 shows the results of the t-tests on the means of the variables for high-performing sample countries (top 20), and the low performers (bottom 20). Data availability determined the sample size for a given t-test. In some cases the sample size would ideally have been higher, but all have enough for statistical relevance and are not low by cross national statistical analysis standards.

The main findings are as follows:

- (i) *Macro Environment.* The higher-performing sample countries had significantly higher average savings ratios, and lower interest rates (both at the 5 percent confidence level). This may suggest that cost and availability of capital is a driver of SSMECI performance. The means of GDP growth of the two samples are statistically different at the 5 percent level (5.6 compared to 3.5 percent between 1990-1999). While the high-performing sample countries do have a lower mean inflation rate, the difference is not statistically significant at the 10 percent level. Nor was the gross capital formation ratio.
- (ii) *Country Size.* Using the full data set, the difference in the means of population size for the two samples was not statistically significant. However, if Papua New Guinea is not included in the sample (at 5.25 million, it is something of an outlier in the group), then the means are highly significant at the 1 percent confidence level. This backs up the theory that size, even within the small states grouping, is a significant factor in SSMECI performance.

TABLE 9
T-TESTS TO EXAMINE SIGNIFICANCE OF DETERMINANTS

DETERMINANTS	HIGH PERFORMERS (TOP 20)		LOW PERFORMERS (BOTTOM 20)		T-STAT	SIGNIFICANT AT 5% (* ALSO AT 1% LEVEL)
	MEAN	OBSERVATIONS	MEAN	OBSERVATIONS		
Macro Fundamentals						
Inflation, average 1996-2000, (percent) ^b	4.4	20	12.0	20	-1.10	
GDP Growth, average 1990-1999 (percent) ^b	5.6	17	3.5	19	1.75	ü
Interest Rate, 1999 (percent) ^{b,c}	13.1	17	16.8	15	-1.75	ü
Gross Domestic Saving as percent of GDP (1999) ^b	20.8	16	12.8	16	2.14	ü
Gross Capital Formation as percent of GDP (1999) ^a	26.4	16	25.9	16	0.15	
Country Size						
Population (2001) ^a	886,869	20	666,785	20	0.73	
Population (excluding PNG) ^a	886,869	20	425,429	19	2.49	ü *
Trade and Investment Regime						
FDI Inward Stock percent of GDP (2000) ^d	75.4	18	42.8	18	1.86	ü
Imports as percent of GDP (1999) ^b	62.5	20	66.1	20	-0.31	
Exports as percent of GDP (1999) ^b	51.4	19	30.9	20	2.10	ü
Imports/Exports as percent of GDP (1999) ^b	111.3	20	97.0	20	0.92	
Vulnerability						
Vulnerability to Natural Disasters ^e	127	17	170	20	-0.72	
Composite Vulnerability Index ^e	7.55	17	7.41	20	0.21	
Export Dependence ^e	64.66	17	43.49	20	2.66	ü *
UNCTAD Diversification Index (2000) ^f	0.77	15	0.69	13	1.97	ü
UNCTAD Concentration Index (2000) ^f	0.46	16	0.51	14	-0.76	
No. of Commodities Exported (2000) ^f	81.9	16	25.3	14	3.62	ü *
Structural						
Agriculture Value Added, 1999 (percent GDP) ^b	7.9	18	18.4	19	-3.28	ü *
Services Value Added, 1999 (% GDP) ^b	59.4	18	58.9	18	0.09	
Infrastructure						
Telephones/Mobiles per 1,000 population (2000) ^a	379	20	220	17	1.90	ü
Internet Users (2001) ^a	46,000	20	33,974	19	0.50	
Personal Computers per 1000 population (2001) ^a	87.2	17	79.4	16	0.33	
Human Capital						
Adult Literacy as percent of population, 1999 ^a	88.6	18	71.5	13	3.07	ü *
Secondary Enrolment, 2000 ^a	66.2	13	57.8	11	0.90	
Tertiary Enrolment, 2000 ^a	14.9	13	11.5	10	0.62	
Development						
GDP per Capita, 2001 (Current US\$) ^a	6,833	20	2,531	20	2.62	ü *
GDP per Capita, 2001 (PPP US\$) ^g	10,203	20	5,145	18	3.07	ü *
HDI Index Value, 2003 ^g	0.76	20	0.67	18	2.34	ü

Sources:

^a World Development Indicators (World Bank 2003)

^b Small States, Economic Review & Basic Statistics (Commonwealth Secretariat 2002)

^c IMF, various country reports

^d UNCTAD, World Investment Report 2002

^e Atkins, Mazzi, and Easter (2001)

^f Handbook of Statistics (UNCTAD 2002)

^g Human Development Report (UNDP 2003)

- (iii) *Trade and Investment Regime.* The high-performing sample countries have significantly greater means for FDI stock (at the 5 percent confidence level), which would confirm the suggestion that FDI is a driver of competitiveness, through generation of export production and technological transfer. Unsurprisingly, openness as measured by the exports/GDP ratio was significant, but imports/GDP and the combination of exports and imports to GDP were not significant. On one hand this is surprising but perhaps reflects that all small states are by nature fairly reliant on imports, perhaps even more so if lacking competitiveness.
- (iv) *Vulnerability.* Some measures of vulnerability showed high levels of significance, particularly those relating to the structure and diversity of production. Dependence on exports, and the number of commodities exported were both significant at the 1 percent level, while the UNCTAD diversification measure was significant at the 5 percent level. Perhaps surprisingly, the recent attempts to produce vulnerability indices were not significant, with neither the Natural Disasters vulnerability index, nor the composite vulnerability index producing statistically significantly different means across the samples.
- (v) *Structural.* The structural variable showed that high-performing SSMECI countries had a significantly lower mean for the share of agricultural value added in GDP than the lower-performing group (at the 1 percent confidence level). Given the nature of the index this is perhaps not surprising and represents the traditional shift from agricultural production to manufacturing and industry. The share of services value added in GDP was not significant at the 10 percent level.
- (vi) *Infrastructure.* In the area of modern infrastructure the difference in means for telephone connections (fixed lines and mobile) was significant at the 5 percent level, suggesting that communication and information flow is a factor in competitiveness. The number of Internet connections and PCs was not significant however, and this may be because it is too early for such new technology to be feeding through to the indicators found in the SSMECI.
- (vii) *Human Capital.* The importance of human capital in determining competitiveness may be suggested by the high significance (at the 1 percent confidence level) in the difference in means between samples for levels of adult literacy. For both secondary and tertiary level education enrolment rates, the higher-performing SSMECI countries had greater means than the lower, however this was not statistically significant at the 10 percent level. This lack of significance may have been affected by poor data availability in these data sets.
- (viii) *Development.* As expected the relationship between overall development and performance in the SSMECI was strong. Both measures of GDP per capita had significantly higher means in the top-performing SSMECI countries (at the 1 percent confidence level), while for the Human Development Index the means were significantly different at the 5 percent confidence level.

V. CONCLUSIONS

Exercises to benchmark competitiveness performance across countries, such as that undertaken here, have become increasingly popular in recent years, with the indices of the World Economic Forum and International Institute for Management Development gaining particular popular note. The coverage of such work has recently broadened from including just developed countries to including the developing world as well. To date, however, little attempt has been made to include small states, let alone focus on them particularly. This paper presents a first attempt at such an index, and develops a small state manufactured export competitiveness index (SSMECI) based on three subcomponents, namely manufactured exports per capita, average growth in manufactured exports, and share of manufacturing in GDP.

As ever with work of this kind some results are expected and fit with *a priori* expectations. However, other results take more analysis and explanation. The very size of the countries in question leads to increased data volatility, and this may affect the results, perhaps causing a few anomalies and raised eyebrows. This can never be avoided, but while one or two may have performed above or below expectations, the general pattern of results is sound, and provides insight.

Not surprisingly the European small states (such as Malta and Estonia) perform well, as do other traditional regional small state "powerhouses", such as Fiji Islands, Mauritius, and Trinidad and Tobago. This shows that small states can successfully transit from a state of vulnerability to developing a viable, internationally competitive industrial sector. The high performance of the BLNS countries in the Southern African Customs Union is of note, and perhaps points toward the benefits of integrated trade and investment relationships with larger neighbors. At the other end of the performance spectrum, tiny microstates record a particularly weak competitiveness performance, suggesting that even within the world's smallest economies, country size matters for competitiveness. Factors like the lack of domestic markets, technical manpower, and foreign direct investment may help to explain the poor performance of microstates.

Unfortunately, greater use of econometric techniques was hampered by the lack of data on key variables, and so the ability to analyze the determinants of competitiveness was constrained. However, simple t-test analysis indicates that the determinants of competitiveness include a number of variables, covering both the policy environment and supply side factors. High-performing small states had better macroeconomic conditions, higher levels of FDI, more trade openness, better levels of education, and modern infrastructure. This suggests that the adoption of a coherent market-oriented, competitiveness strategy in small states is vital to success on international markets.¹⁰

Ultimately, even with better data availability that would have enabled more complex econometric analysis to be undertaken, exercises of this type can only begin to shed light on competitive performance and its drivers. The complex nature of factors involved in export competitiveness, and the particular circumstances and constraints of different countries, mean that the lessons a particular policymaker can draw are normally only at the macro level. To truly understand the drivers of competitiveness, there is a need for greater exploration of specific policy environment, and institutional and firm-level competitiveness factors, which requires detailed case studies of individual small states.¹¹

APPENDIX CONSTRUCTION OF THE SSMECI

This appendix covers the technical details of the methodology used to construct the small states manufacturing export competitiveness index (SSMECI), along with notes on data sources and definitions.

Data Definitions and Sources

Definition of "Manufacturing"

The commonly used international definition of manufacturing is used throughout, which is defined using the Standard International Trade Classification (SITC) codes. The manufacturing sector is represented by the addition of the values for SITC code level 5, 6, 7, and 8, minus the value of code level 68.

The use of such a definition has both benefits and costs, but in light of the data constraints of small states, was the only realistic option. In order to put together data for as many countries as possible, a variety of sources had to be used (see below). The use of an international definition made this task both more accurate in terms of common definitions across multiple sources, and more realistic as far as availability is concerned.

Ideally, it would have been useful to define manufacturing to include more of the food processing industry, as this is often a large component of small states export production. However, without access to disaggregated data for each country this was not possible, and in the interest of larger samples, a more standardized definition was more appropriate.

Definition of Small States and Countries Used

The standard Commonwealth definition of small states has been used throughout this paper, and is again used here. From this 32 small states are identified that are Commonwealth members. This includes four countries with small-state characteristics despite their larger populations (Lesotho, Namibia, Papua New Guinea, and Swaziland). To increase the sample size slightly further, the IMF definition of small states was also used; this identifies 43 small states, and when combined with the Commonwealth list, produces a sample of 47 countries. Data constraints meant, however, that a final sample of 40 was available for this study.

Data Sources

As mentioned above, given the difficulties of obtaining data in many small states, a number of sources were used. For the first two variables, the main source was the International Trade Centre, with data extracted from the COMTRADE database. This was supplemented using data from UNCTAD *Handbook of Statistics*, ITC's *PC-TAS*, and the World Bank *World Development Indicators*. National sources were also used where there were gaps in the data, or to verify data. In certain circumstances, gaps in data have been estimated using standard imputation techniques from other data from that country. The specific sources of all data are detailed in Appendix Table 1.

¹⁰ See Wignaraja (1997 and 2003) and Wignaraja et al. (2004) for more details of these and other elements of a coherent competitiveness strategy.

¹¹ For recent examples of detailed competitiveness studies on small states such as Jamaica, Malta, and Mauritius see World Bank (1994), Harris (1997), Lall and Wignaraja (1998), and Malta Ministry of Economic Services (1999). On Singapore, see Singapore Ministry of Trade and Industry (1998).

APPENDIX TABLE 1
SOURCES OF ALL DATA IN SMALL STATES SSMECI

COUNTRY	MANUFACTURED EXPORTS				MANUFACTURED VALUE-ADDED AS A PERCENT OF GDP ^f
	YEAR	SOURCE	YEAR	SOURCE	YEAR
Antigua and Barbuda	1991 ^h	WTO ^a /ITC	1999	ITC	1999
Bahamas	1995	ITC ^b	2001	ITC	1999 ^g
Bahrain	1994	ITC	2001	ITC	1997
Barbados	1990	ITC	2001	ITC	1999
Belize	1992	ITC	2000	ITC	1999
Bhutan	1991	ITC	1999	UNCTAD HOS	1998
Botswana	1991 ^h	ITC/WTO	2001	ITC	1999
Brunei	1990	ITC	1998	ITC	1999 ^g
Cape Verde	1995	ITC	2001	ITC	1999
Comoros	1995	ITC	2000	ITC	1999
Cyprus	1990	ITC	2001	ITC	1999 ^g
Djibouti	1990	ITC	1995 ^h	UNCTAD/WTO	1999 ^g
Dominica	1990	UNCTAD ^c	2001	ITC	1999
Estonia	1995	ITC	2001	ITC	1999
Fiji Islands	1988	ITC	2000	ITC	1999
Gabon	1993	ITC	2000	ITC	1999
Gambia, The	1995	ITC	2000	PCTAS	1999
Grenada	1990	ITC	2001	ITC	1999
Guyana	1991 ^h	FTAA Web ^d	1998	FTAA Web	1999
Jamaica	1990	ITC	2000	ITC	1999
Kiribati	1990	ITC	1999	UNCTAD HOS	1998
Lesotho	1991	NATIONAL ^e	2001	NATIONAL	1999 ^g
Maldives	1995	ITC	2001	UNCTAD HOS	1998
Malta	1990	UNCTAD	2001	ITC	1999 ^g
Mauritius	1990	ITC	2001	UNCTAD HOS	1999
Namibia	1991	WTO/ITC	2001	ITC	1999
Papua New Guinea	1990	ITC	2000	ITC	1999
Qatar	1990	ITC	2001	ITC	1999 ^g
Samoa	1990	ITC	2001 ^h	ITC/WTO	1997
São Tomé and Príncipe	1995 ^h	UNCTAD/WTO	2001 ^h	UNCTAD/WTO	1999
Seychelles	1990	ITC	2001 ^h	WTO-ITC	1999
Solomon Islands	1990	WTO-HDI ^e	2001 ^h	HDI-WTO	1999 ^g
St. Kitts and Nevis	1988	UNCTAD HOS	2001	ITC	1999
St. Lucia	1990	ITC	2001	ITC	1999
St. Vincent/Grenadines	1993	ITC	2000	ITC	1999
Suriname	1990	ITC	2000	UNCTAD	1998
Swaziland	1990	WTO-HDI	2001	ITC	1999
Tonga	1991 ^h	ITC/WTO	2000	UNCTAD HOS	1998
Trinidad and Tobago	1990	ITC	2001	ITC	1999
Vanuatu	1990	ITC	2000	UNCTAD HOS	1999 ^g

(continued)

APPENDIX TABLE 1 (CONTINUED)

- ^a *World Trade Statistics* (World Trade Organisation 2002).
- ^b International Trade Centre using COMTRADE database.
- ^c *Handbook of Statistics* (United Nations Centre for Trade and Development 2003).
- ^d Free Trade Agreement of the Americas (FTAA) website (<http://www.ftaa-alca.org>).
- ^e Data from national sources (e.g., Central Bank or Statistical Office).
- ^f *Human Development Indicators 2001* (United Nations 2001).
- ^g *World Development Indicators 2001* unless otherwise specified.
- ^h Imputed from figure for alternative reference year (1990 or 2001), using total export figures from the WTO and using the assumption that the percent of manufactured exports in total exports stays the same.

Construction of the SSMECI

The SSMECI is a composite index constructed using a methodology similar to that used for the UNDP Human Development Index (HDI).¹²

Indexing the Variables

For each of the three variables an index value was calculated using the following general formula:

$$\text{Index} = \frac{\text{Actual Value} - \text{Minimum Value}}{\text{Maximum Value} - \text{Minimum Value}}$$

A key consideration in such a calculation was determining the minimum and maximum values that were appropriate. In the absence of a theoretical rationale suggesting definite alternatives, the maximum and minimum values in the relevant sample set were used.

For example: Value added from manufacturing (MVA) as a percent of GDP of the Fiji Islands was 14.11 percent in 1999, the sample maximum is 31.69 in Swaziland, and the sample minimum 1 percent in Kiribati. The index for Fiji is therefore:

$$\begin{aligned} \text{M VA Index} &= \frac{14.11 - 1}{31.69 - 1} \\ &= 0.43 \end{aligned}$$

This method was used for the MVA variable and the growth of manufactured exports variable. However, for the manufactured exports per capita variable, the extreme high values of some countries in the sample meant that all, except for three countries, had an index value of below 0.4. This has the effect of introducing a large bias in the overall index in favor of the top three countries. In order to discount these extreme variables, logarithms were used in the calculations. However, this overcompensated for the bias, and even low performers were attaining index values of above 0.8. In order to even out the effect, an average of the two was used, i.e., the average of the two values produced from using logarithms and from not using them.

¹² The HDI is an index produced annually by the United Nations Development Programme (UNDP). It uses a weighted sum of three indices representing life expectancy, educational attainment, and adjusted GDP per capita. For each country, each of the three variables is indexed to a value between 0 and 1, and then the three indices are combined with equal weights to form the HDI. See UNDP (2003).

Rank correlation calculations were used to measure the effect of the use/nonuse of logarithms on the SSMECI order. The rank correlation between the SSMECI based on a logarithmic approach and the "average" method above is 0.985, while the rank correlation between the SSMECI based on a nonlogarithmic approach and the "average" method above is 0.993. Thus while the average method refines the index, its overall impact is relatively limited.

Weighting the Indices

The three variables were weighted 40:30:30 percent, with manufacturing exports per capita gaining the largest 40 percent weight. This approach has been adopted, rather than perhaps the more obvious choice of equal thirds, given the particular interest in current performance, and the need to account for the varying sizes of the countries involved.

As above, the ranking is robust compared to the use of an equal weighting, with a rank correlation of 0.993 between the results of the two methods.

APPENDIX TABLE 2
BASIC PROFILE OF SMALL STATES, MOST RECENT ESTIMATES

COUNTRY	POPULATION (2001)	GDP PER CAPITA (CURRENT US\$ 2001)	GDP PER CAPITA (PPP US\$ 2001)	HDI RANK (2003) ^a	HDI INDEX VALUE (2003)
Antigua and Barbuda	68,490	9,961	10,170	56	0.798
Bahamas	309,840	15,550	16,270	49	0.812
Bahrain	651,000	12,189	16,060	37	0.839
Barbados	268,190	10,281	15,560	27	0.888
Belize	247,110	3,258	5,690	67	0.776
Bhutan	828,040	637	1,833	136	0.511
Botswana	1,695,000	3,066	7,820	125	0.614
Brunei	344,000	14,088	19,210	31	0.872
Cape Verde	446,400	1,264	5,570	103	0.727
Comoros	571,890	386	1,870	134	0.528
Cyprus	760,650	12,004	21,190	25	0.891
Djibouti	644,330	894	2,370	153	0.462
Dominica	71,870	3,607	5,520	68	0.776
Estonia	1,364,000	4,051	10,170	41	0.833
Fiji Islands	817,000	2,062	4,850	81	0.754
Gabon	1,260,790	3,437	5,990	118	0.653
Gambia, The	1,340,770	291	2,050	151	0.463
Grenada	100,410	3,965	6,740	93	0.738
Guyana	766,260	912	4,690	92	0.740
Jamaica	2,590,000	3,005	3,720	78	0.757
Kiribati	92,810	430	–	–	–
Lesotho	2,061,730	386	2,420	137	0.510
Maldives	280,320	2,229	4,798	86	0.751
Malta	395,000	9,150	13,160	33	0.856
Mauritius	1,200,000	3,771	9,860	62	0.779
Namibia	1,792,060	1,730	7,120	124	0.627
Papua New Guinea	5,252,530	552	2,570	132	0.548
Qatar	597,550	27,536	19,844	44	0.826
Samoa	174,000	1,404	6,180	70	0.775
São Tomé & Príncipe	151,100	311	1,317	122	0.639
Seychelles	82,420	6,912	17,030	36	0.840
Solomon Islands	430,760	683	1,910	123	0.632
St. Kitts and Nevis	45,050	7,609	11,300	51	0.808
St. Lucia	156,700	4,222	5,260	71	0.775
St. Vincent/Grenadines	115,880	3,007	5,330	80	0.755
Suriname	419,660	1,803	4,599	77	0.762
Swaziland	1,067,940	1,175	4,330	133	0.547
Tonga	100,720	1,371	–	–	–
Trinidad and Tobago	1,309,610	6,983	9,100	54	0.802
Vanuatu	201,190	1,096	3,190	128	0.568

^a Rank out of 175 countries in HDI Sample

Source: UNDP Human Development Report 2003, World Development Indicators 2003

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