

BUDGETARY BENCHMARKS FOR STATISTICS IN SMALL ECONOMIES

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I. INTRODUCTION

One of the objectives of this conference is to promote awareness of the importance of statistics among key budget officials and finance secretaries in the Caribbean countries. The unspoken objective is to make the case for increased funding of statistical activities.

As we at the IMF know from our technical assistance program and our experience in assessing statistical systems through the data ROSC initiative, **the** major constraint to developing and sustaining effective statistical systems typically is the lack of adequate resources (Category 0.2 of the DQAF, “Staff, facilities, computing resources, and financing are commensurate with statistical programs”). Assuming that the statistics “production function” is characterized by (dis)economies of (small) scale, the underfunding problem can be particularly acute for small economies.

While “underfunding” can affect all the agencies that produce macroeconomic statistics—the National Statistical Office (NSO), the central bank (CB), and the Ministry of Finance (MoF)—as a practical matter, we find that central banks usually have the resources required to support their statistical programs at an appropriate level. The resource constraint is most often binding at NSOs and MoFs. These latter institutions normally are funded from central government general revenues as part of the government’s annual operating budget. An increase in funding for statistics implies, *ceteris paribus*, either a net increase in overall government spending or an increase in the share of a fixed budget that is allocated to statistics. In view of the potentially difficult tradeoffs that would need to be made, key budget officials and finance secretaries need an objective basis to support their decisions about funding for statistics.

But what constitutes an “adequate” level of funding? And how do Caribbean countries compare? The objective of this note is to provide some initial observations on a possible benchmark. We first report on resources available to NSOs in Caribbean countries and then compare these resource levels with those available to selected countries of differing population size. The discussion that follows is mostly exploratory and can hardly be taken as definitive—perhaps it might best be described as “impressionistic.” But it points to two conclusions that we suspect might be relatively robust. First, there appears to be some evidence of the existence of economies of scale in the statistics production function, with the *minimum efficient scale* being achieved at a population size of about 4 million and rising

¹ The views expressed herein are those of the authors and should not be attributed to the IMF, its Executive Board, or its management.

from there as population size decreases. The share of the central government budget that is allocated to achieve an effective statistical system in Iceland (population: 300,000) is more than triple that of New Zealand (population: 4.1 million), for example. Second, some statistical systems in the Caribbean countries appear to be underfunded. For the limited set of countries for which we have information, the allocation of budget shares from central governments to statistical activities is close to the level observed in countries at or beyond the minimum efficient size. When combined with the extra costs associated with small size and diseconomies of scale, this possibly suggests a shortfall. The shortfall conclusion tends to be corroborated by other measures of resource availability, such as the ratio of computers to staff and percentage of staff with a university degree.

II. RESOURCE LEVELS IN CARIBBEAN COUNTRIES

We refer to an Organisation of Eastern Caribbean States Discussion Paper and associated survey that report on resource availability in the Caribbean countries in 2005.² There is also a related survey of Eastern Caribbean Currency Union members undertaken by the Eastern Caribbean Central Bank.³ The country coverage of the two surveys overlaps to some degree and, essentially, the content of the second survey is incorporated in the first survey. Generally speaking, these documents provide an excellent source of comparative information on statistical activities in a significant number of Caribbean countries, and may be representative of statistical activity in the region as a whole. Among other things, the surveys were designed “to provide information on staff qualifications and training, available equipment, an inventory of data series collected and published, and an insight into the level of technology in use.”

Overall, these surveys paint a picture of small size and constrained resources.

Table 1 reports detailed staffing levels for 16 countries. Staff size ranges from 6 in the smallest country to 338 in the largest. Of the countries for which detailed figures are available, and excluding the largest country (Jamaica), the remainder share a total of 373 or, on average, 25 staff. While figures vary somewhat from country to country, the statistics function is a female-dominated activity. In total, females account for 71 percent of the workforce; the female representation is broadly the same when broken down into degree and nondegree components. Staff per 1,000 population, which may be used as a measure of the scale of operations, ranges from 0.1–0.5, and averages 0.26.

As to level of expertise, in total, 31 percent of staff possess a university level degree. In each of the degree and nondegree components of the workforce, women account for approximately 70 percent of the total.

²Schase, Vasantha and Sean Curtis Mathurin, “Statistics in Development Planning in the OECS.” The underlying survey is “The Statistical Infrastructure of Caribbean Countries,” UNECLAC, LC/CAR/L.69, December 19, 2005.

³ Research Department, Eastern Caribbean Central Bank, “Summary of the Statistical Capacity Building Survey Conducted in the ECCB Member Countries,” September 2005.

Table 1. Staffing of Statistical Agencies

	AI	AG	AW	BS	BB	BZ	BM	VG	KY	DM	GD	GY	JM	MS	AN	KN	LC	VC	SR	TT	TC	VI	Total	
Degree	3	5	20	42			14		6	4	5		64	3	22	4	8	7				9	6	222
With subject matter training	3	3	12	27			14		6	4	5		63	3	22	4	8	4				4	2	184
Male		1	7	5			9		3		2		15		9	2	5	1				1	1	61
Female	3	2	5	22			5	3	4	3			48	3	13	2	3	3				3	1	123
Without subject matter training		2	8	15									1					3				5	4	38
Male			1	3									1					1				1	1	8
Female		1	5	15														2				4	3	30
Nondegree	3	37	13	47			7		5	9	30		274	3	8	10	34	9						489
With subject matter training	3	37	11	8			4		3	7	4		231	2	8	3	13	4						338
Male		8	5				2			4	2		69		5	1	3	3						102
Female	3	29	6	8			2		3	3	2		162	2	3	2	10	1						236
Without subject matter training			2	39			3		2	2	26		43	1		7	21	5						151
Male				7					1		10		7			2	5	2						34
Female			2	32			3		1	2	16		36	1		5	16	3						117
Total	6	42	33	89	71	28	21	27	11	13	35	121	338	6	30	14	42	16	92	220	9	6		711
With subject matter training	6	40	23	35			18		9	11	9		294	5	30	7	21	8				4	2	522
Male		9	12	5			11		3	4	4		84		14	3	8	4				1	1	163
Female	6	31	11	30			7		6	7	5		210	5	16	4	13	4				3	1	359
Without subject matter training		2	10	54			3		2	2	26		44	1		7	21	8				5	4	189
Male		1	3	7					1		10		8			2	5	3				1	1	42
Female		1	7	47			3		1	2	16		36	1		5	16	5				4	3	147
Percent with degrees	50	12	61	47			67		55	31	14		19	50	73	29	19	44				100	199	31
Percent with subject matter training	100	95	70	39			86		82	85	26		87	83	100	50	50	50				44		
Percent female	100	76	55	87	59	43	48	67	64	69	60	80	73	100	53	64	69	56			55	78		
Staff/1,000 population	.50	.53	.33	.28	.27	.11				.17	.35	.16	.13		.17	.35	.26	.10			.17			

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AI	Anguilla	BM	Bermuda	JM	Jamaica	SR	Suriname
AG	Antigua and Barbuda	VG	British Virgin Islands	MS	Montserrat	TT	Trinidad and Tobago
AW	Aruba	KY	Cayman Islands	AN	Netherlands Antilles	TC	Turks and Caicos Islands
BS	Bahamas	DM	Dominica	KN	St. Kitts/Nevis	VI	US Virgin Islands
BB	Barbados	GD	Grenada	LC	St. Lucia		
BZ	Belize	GY	Guyana	VC	St. Vincent and the Grenadines		

CARICOM: Caribbean Community; **CSO:** Central Statistical Office; **ECCB:** East Caribbean Central Bank; **ECLAC:** Economic Commission for Latin America and the Caribbean; **OECS:** Organisation of Eastern Caribbean States.

Table 2 provides information on the available level of computing and technology resources. One key measure—the ratio of personal computers to staff—shows considerable variation from country to country. For some countries such as Anguilla, Bermuda, Cayman Islands, and the U.S. Virgin Islands, the ratio is in excess of 1.25:1. For most others, the ratio is considerably below 1.0, averaging 0.65:1.

Only limited information is available on budgetary resources. The ECCB survey provides some information on operating budgets for ECCU member countries.⁴ We have scaled these figures by IMF data on central government expenditure and report these in Table 3. The average share is 0.24 percent.

III. RESOURCE LEVELS IN OTHER COUNTRIES

How does one judge the adequacy of these resource levels in the Caribbean countries? Ultimately, the true test can only be through an assessment of such factors as the comprehensiveness, relevance, accuracy and reliability, timeliness, and accessibility of the data that are actually produced and disseminated. The DQAF is an effective—albeit expensive—means of making this assessment. An alternative is to compare resource levels against those observed in other countries.

In order to get a sense of what a “benchmark” might look like, IMF staff asked a small number of selected countries to respond to a subset of the questions that were contained in the earlier UNECLAC survey of Caribbean countries. Surveyed countries ranged in size from Canada (population: approximately 32 million) to Seychelles (population: approximately 80,000). Countries were chosen to reflect those at a high level of statistical development as well as some whose systems are less developed. We also selected countries of different sizes to try to get an impression of whether there might be evidence of economies of scale. Results of this informal survey for 2005 and 2006 are presented in Tables 4 and 5.

We wish to emphasize that no hard and fast conclusions should be drawn from this exercise. For one thing, the sample comprises only eight countries. For another, sample selection bias is a major problem. And, as will be noted below, comparability across countries is difficult to achieve. For example, the size and responsibilities of a government may differ markedly, making problematic the use of central government spending as a variable to scale budgetary expenditures of NSOs.

⁴ *Ibid*, Appendix III, Table 1, page 30.

Table 2. Available Equipment and Equipment Required in Statistics Offices in the Caribbean

Equipment Available	AI	AG	AW	BS	BM	KY	DM	GD	JM	MS	AN	KN	LC	VC	TC	VI	Total
Computers	8	19	28	87	26	14	12	16	139	7	35	14	29	8	10	8	460
Internet connections	6	6	21	21	19	14	5	10	50	7	31	1	28	1	8	8	236
Printers	3	5	3	15	16	4	3	6	16	7	9	4	9	3	9	6	118
Scanning equipment	3	2	3	3	2	2	1	1	2	2		1	1	1	1	1	26
Photocopiers	1	1	1	4	2	1		1	1	1	39		1		1	1	55
Calculators	5	8	28	52	8	14	11	10		1	31	4	17	2		10	201
Computers/Staff	1.33	1.33	0.85	0.98	1.24	1.27	0.92	0.46	0.41	1.17	1.17	1.00	0.69	0.50	1.11	1.33	0.65
Equipment Required																	
Computers	8	33	28	87	26	14	16	16	156	7	39	16	35	13	10	8	512
Internet connections	1	11	21	21	19	14	5	10	50	7	31	1	28	1	8		228
Printers	3	10	3	4	16	4	6	6	16	7	7	6	9	6	10	6	119
Scanning equipment	3	6	3	2	2	2	1	1	4	2	1	1	1	1	1	1	32
Photocopiers	1	2	1		2	1	1	1	1	1	5		1	1	1	1	20
Calculators	5	10	28	52	8	14	11	10		1	20	4	17	2		10	192
Computers/Staff	1.33	0.79	0.85	0.98	1.24	1.27	1.23	0.46	0.46	1.17	1.30	1.14	0.83	0.81	1.11	1.33	0.72
Percent increase in computers		74					33				11	14	21	63			11

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AI	Anguilla	BM	Bermuda	JM	Jamaica	SR	Suriname
AG	Antigua and Barbuda	VG	British Virgin Islands	MS	Montserrat	TT	Trinidad and Tobago
AW	Aruba	KY	Cayman Islands	AN	Netherlands Antilles	TC	Turks and Caicos Islands
BS	Bahamas	DM	Dominica	KN	St. Kitts/Nevis	VI	US Virgin Islands
BB	Barbados	GD	Grenada	LC	St. Lucia		
BZ	Belize	GY	Guyana	VC	St. Vincent and the Grenadines		

CARICOM: Caribbean Community; **CSO**: Central Statistical Office; **ECCB**: East Caribbean Central Bank; **ECLAC**: Economic Commission for Latin America and the Caribbean; **OECS**: Organisation of Eastern Caribbean States.

Table 3. ECCU Countries: Budget Allocation to Statistical Agencies

	Current Expenditure in Percent of Central Government Current Expenditure (2005)
	(In percent)
Average	0.24
Anguilla	0.26
Antigua and Barbuda	0.11
Dominica	...
Grenada	0.26
Montserrat	...
St. Kitts and Nevis	0.02
St. Lucia	0.55
St. Vincent and the Grenadines	...

Source: ECCB and IMF.

Notwithstanding these caveats, it may be possible, nonetheless, to derive a sense of economies of scale, and even to make a stab at identifying the minimum efficient scale—or minimum population—necessary to deliver the lowest cost (for a given level of quality) statistical system. Possible measures could include: NSO current expenditure per 1,000 population; share of government expenditure dedicated to the statistics agency; and staff per thousand of population.

From Tables 4 and 5, there would appear to be some evidence of (dis)economies of (small) scale. This limited dataset suggests that, in best practice terms as reflected by SDDS subscribers and similar countries, the minimum efficient scale might be achieved around a population of 4 million. New Zealand, for example, spends \$11–14 per 1,000 population at that level. For larger populations, Australia (21 million) and Canada (33 million) are spending on the order of \$9–13. Below a population of 4 million, expenditure per 1,000 population seems to rise quite rapidly. Iceland (300,000) spends roughly \$30 per 1,000 population. The same is true for non-SDDS countries: Mauritius (1.3 million) spends \$1.3; Malta (400,000) spends \$8.6; and Seychelles (86,000) spends \$10.2. Generally, non-SDDS countries will have less comprehensive survey and source data programs, less timely dissemination practices, and produce fewer data series, so their costs on average could be expected to be below those of the SDDS countries.

Of course, there are a number of difficulties in interpreting these numbers. Being quoted in U.S. dollars, they do not necessarily reflect purchasing power parity exchange rates and may be distorted by recent changes in exchange rates, and differing levels of expenditure across countries may reflect little more than the differing wage levels in richer and poorer countries. One alternative could be to compare staffing levels in NSOs per thousand of population, since this measure is less likely to be distorted by movements in market exchange rates or differences in national wage levels.

Table 4. Resources and Scale of Operations in National Statistical Agencies
2005
(In thousands (000) of U.S. dollars, where applicable)

	Canada	Australia	Jordan	New Zealand	Mauritius	Malta	Iceland	Seychelles
(Population in 000)	(32,271)	(20,310)	(5,544)	(4,097)	(1,241)	(403)	(296)	(86)
Annual current expenditure budget (ACEB)	335,234	188,949	1,423	45,364	1,735	3,033	8,923	576
Salary	271,288	140,779	1,197	25,129	1,078	2,639	6,645	364
Nonsalary	63,946	48,170	226	20,235	657	394	2,278	212
Annual capital expenditure budget	2,843	21,295	1,611	8,466	225	-	159	72
ACEB per capita (in U.S. dollars)	10.50	9.00	0.24	11.07	1.40	7.50	30.77	7.82
ACEB/central government operating exp. in percent	0.19	0.12	0.15	0.13	0.13	3.11	0.42	0.17
Share of AECB allocated to surveys				37,407		4.41		123
Number of permanent staff	5,501	2,848		771	144	141	81	41
Male	2,626	1,462		377	65	61	35	14
Female	2,875	1,386		394	79	80	46	27
Number of permanent staff with degree	2,567			654	63	49	57	3
Specialized degree (statistics)				50	39	6	57	2
Male				24	24	2	30	1
Female				26	15	4	27	1
Number of permanent staff without degree	2,934			117	81	92	24	38
Number of PCs/laptops in use	7,289	4,305	280	1,460	97		105	45
Number of PCs with Internet access	3,340	4,305	114	1,460	35		105	42
Number of staff with indiv. e-mail address	5,501	2,848	180	1,120	66		81	41
Local area network in use?	yes	yes	yes	yes	yes		yes	yes
Number of staff with access	5,501	2,848	265	1,120	50		81	41
Offsite backup available	no	yes		yes	yes		no	yes
Permanent staff/000 population in percent	.17	.14		.19	.12	.35	.27	.48
Ratio of computers to permanent staff in percent	132.5	151.2		189.4	67.4		129.6	109.8
Ratio of PCs with Internet access to permanent staff in percent	60.7	151.2		189.4	24.3		129.6	102.4
Ratio of per. staff with degree to permanent staff in percent	46.7			84.8	43.8	34.8	70.4	7.3
Ratio of male to permanent staff in percent	47.7	51.3		48.9	45.1	43.3	43.2	34.1
Total number of data series collected	389							8
Total number of data series published	1,200							18

Table 5. Resources and Scale of Operations in National Statistical Agencies
2006
(In thousands (000) of U.S. dollars, where applicable)

(Population in 000)	Canada (32,577)	Australia (20,530)	Jordan (5,729)	New Zealand (4,140)	Mauritius (1,252)	Malta (405)	Iceland (298)	Seychelles (86)
Annual current expenditure budget (ACEB)	409,399	218,210	1,469	57,460	1,637	3,469	8,719	832
Salary	286,535	150,807	1,242	36,756	1,014	3,356	6,572	483
Nonsalary	22,864	67,403	225	20,704	623	113	2,147	349
Annual capital expenditure budget	7,564	29,527	1,487	9,254	227	-	154	25
ACEB per capita (in U.S. dollars)	12.82	11.53	0.25	13.88	1.31	8.57	30.07	10.18
ACEB/central government operating exp. in percent	0.23	0.14	0.15	0.16	0.13	3.14	0.42	0.26
Share of AECB allocated to surveys				41,458	0.26	7.17		170
Number of permanent staff	5,348	3,669	412	886	153	137	84	44
Male	2,543	1,624	319	430	68	58	36	12
Female	2,805	2,045	93	456	85	79	48	32
Number of permanent staff with degree	2,510	1,645	412	717	74	50	61	4
Specialized degree (statistics)		1,645	23	52	44	6	61	3
Male		848	15	25	23	2	30	1
Female		797	8	27	21	4	31	2
Number of permanent staff without degree	2,838	642		169	79	87	23	40
Number of PCs/laptops in use	8,288	5,195	313	1,592	113	170	110	49
Number of PCs with Internet access	3,795	5,195	69	1,592	43	23	110	45
Number of staff with indiv. e-mail address	5,348	3,669	207	1,249	66	130	84	44
Local area network in use?	yes	yes		yes	yes	yes	yes	yes
Number of staff with access	5,348	3,669	296	1,249	60	130	84	44
Offsite backup available	no	yes		yes	yes	yes	yes	yes

		Canada	Australia	Jordan	New Zealand	Mauritius	Malta	Iceland	Seychelles
(Population in 000)		(32,577)	(20,530)	(5,729)	(4,140)	(1,252)	(405)	(298)	(86)
Permanent staff/000 population in percent		.16	.18	.07	.21	.12	.34	.28	.51
Ratio of computers to permanent staff in percent		155.0	141.6	76.0	179.7	73.9	124.1	131.0	111.4
Ratio of PCs with Internet access to per. staff in percent		71.0	141.6	16.7	179.7	28.1	16.8	131.0	102.3
Ratio of per. staff with degree to permanent staff in percent		46.9	44.8	100.0	80.9	48.4	36.5	72.6	9.1
Ratio of male to permanent staff in percent		47.6	44.3	77.4	48.5	44.4	42.3	42.9	27.3
Total number of data series collected		391							8
Total number of data series published		1,200							18
Total number of surveys conducted in 2006									
Monthly		361			11	4	19	20	
Quarterly		32		1	95		9	10	
Annual		265		2	27	1	13	25	
Other frequency		64		2	10	3	2	a few	
Producer prices survey	- frequency	Monthly	Quarterly	Monthly	Quarterly	Monthly	Monthly	Monthly	
	- sample size	3,000		303	3,000	100	80		
Consumer prices survey	- frequency	Monthly	Quarterly	Monthly	Quarterly	Monthly	Monthly	Monthly	Monthly
	- sample size	600	3,000	381	5,600	6,000	8,700	460	30
Labor force survey	- frequency	Monthly	Monthly	Quarterly	Quarterly	Continuous	Quarterly	Continuous	Quinquennial
	- sample size	103,000	38,500	10,000	15,000	11,280	3,200	4,020	5%
Census of population and housing	- frequency	Quinquennial	Quinquennial	10 years	Quinquennial	10 years	10 years	Continuous	10 years
	- sample size	13 million	100% every 6 years		4,143,279	100%	100%		100%
Household income and expenditure survey	- frequency	Annually		Annually	Three-yearly	Quinquennial	Annually	Continuous	Quinquennial
	- sample size	21,000		13,000	4,500	6,720	3,400	1,200	5%
Business/enterprise survey	- frequency	Various	Annually	Annually	Annually	Monthly	Annually	Annually	
	- sample size		16,000	16,000	22,000	90	1,078	600	
Investment survey	- frequency	Quarterly	Quarterly	Ad hoc	Quarterly	Annually	Annually		
	- sample size		960	350	500	300	4,000		

On staffing, the average cost function seems more clearly defined when proxied by staff per 1,000 population, as might be expected. Generally, it shows a range of 0.16–0.21 for Canada, New Zealand, and Australia, rising to 0.28 for Iceland, 0.34 for Malta, and 0.51 for Seychelles. Mauritius appears to be an outlier.

Budget allocations as a share of total central government spending shows a similar picture. For the three largest countries, the expenditure share is contained in a range of 0.1–0.2 percent. This range also encompasses Jordan, Mauritius, and Seychelles, with Iceland and Malta reporting higher ratios. Notwithstanding the acknowledged difficulties in using government spending as a scalar variable, there is a remarkable degree of constancy in this statistic.

Tables 4 and 5 also provide some information on education levels, male/female staffing, and accessibility to computer and internet resources. These show a generally higher proportion of male staff and staff with degree training, and considerably more access to computers and the Internet, than observed among Caribbean countries.

IV. CONCLUSIONS

As noted above, there are many problems in making comparisons and drawing conclusions from impressionistic work such as what we have reported in preceding sections of this note. However, for what they are worth, there appears to be some evidence of economies of scale in production of national statistics. Moreover, some of the measures seem to suggest that resourcing for statistics in Caribbean countries may lag somewhat behind what is observed in other parts of the world, especially when account is taken of the small populations in many Caribbean countries.