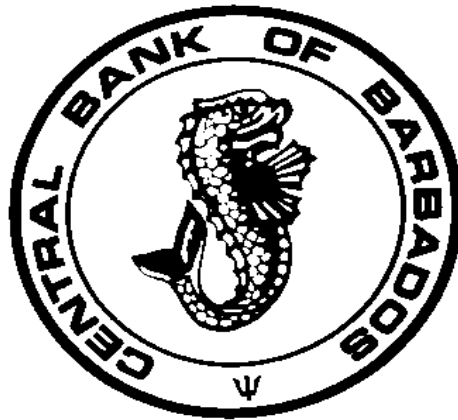


A REVIEW OF THE VAT SYSTEM IN BARBADOS

BY

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Abstract

This is the first study that compares the yield of the value added tax (VAT) in Barbados with that of the regime of consumption taxes which preceded it. It employs various efficiency performance indicators based on the yield of taxes relative to the tax base (GDP and consumption) and the tax rate as well as utilizes the Proportional Adjustment method by Prest (1962) to determine elasticity and buoyancy ratios. The paper finds that (a) the proportion of indirect taxes in total revenue remained unchanged after the introduction of the VAT; (b) the yield of the VAT relative to the rate of tax, was no higher than for the consumption tax in the period prior to its introduction; (c) the costs of administering the VAT and customs duties were about the same, relative to their yields, before and after the introduction of the VAT; and (d) the consumption taxes that preceded the VAT were more buoyant in response to changes in income, and more elastic, than was the VAT.

October 2012

Introduction

Barbados is among many countries that have adopted the value-added tax (VAT) system in a quest for high yields, without sacrificing simplicity and efficiency. The VAT is levied on the market value added of a good or service at each stage of the manufacture or distribution process. It credits taxes paid by enterprises on the inputs to their production process, against the taxes they pay on their own sales.

In Barbados, the VAT was introduced on January 1, 1997 at a standard rate of 15%, replacing an indirect tax structure that consisted of a multi-tiered system of eleven indirect taxes: a consumption tax, an import surcharge, a hotel and restaurant sales tax, a travel ticket tax, an entertainment tax, a tax on quarriable minerals, a surcharge on overseas telephone calls, a surcharge on residential rents, a service tax on pleasure cruises, a stamp duty on imports and an airline business tax.

This study examines the performance of the VAT system in relation to the taxes it replaced, as well as the responsiveness of indirect taxes to income and consumption over the period 1980 to 2011. The analysis uses various performance indicators based on the yield of taxes relative to the tax base and the tax rate to test efficiency. These include: the productivity ratio, the gross compliance ratio, and the consumption ratio or “c-efficiency” ratio. The administrative efficiency of the major taxes as well as the buoyancies and elasticities of tax responses to income changes are examined. To our knowledge, this is the first study that compares the performance of Barbados’ VAT system with that of the regime of consumption taxes which preceded it.

The structure of the paper is as follows. Section 2 gives a brief overview of the indirect tax structure in Barbados while section 3 and section 4 examines the aspects of productivity and efficiency and analyses buoyancies and elasticities, respectively. Section 5 concludes.

2. Stylized Facts - Indirect Tax Structure in Barbados

2.1 Valued Added Tax (VAT)

The VAT was introduced with a threshold of \$60,000 of annual income, below which small businesses were not required to charge the VAT. The VAT rate was set at a 15% basic rate on goods and services, with a concessional rate of 7.5% on accommodation in hotels, guest houses and inns, and a number of zero-rated and exempted items. The seller of a good or service taxed at a zero-rate pays no tax on his/her sales, but is permitted to recover tax paid to suppliers, whereas businesses that are exempted from VAT are not allowed to reclaim the related input tax. Zero-rated items include crude oil, duty free goods, and goods used in commercial fishing while exempted commodities comprise financial services, public transportation, medical and educational services.

The VAT rates remained unchanged until December 2010, when the standard VAT rate was raised to 17.5%, the concessional rate was increased to 8.75% and the VAT threshold was revised to \$80,000.

2.2 Indirect Tax: Before and After VAT

Prior to the introduction of the VAT, consumption duties accounted for about 39% of indirect tax revenues, on average. Import duties and stamp duties were the other major categories, comprising approximately 26% and 14% of indirect taxes, respectively. After 1997, VAT receipts contributed 56% of indirect tax revenue, with import duties and excises accounting for 15.8% and 1.5%, respectively (see Figures 1 and 2).

Figure 1: Indirect Taxes by Source (BDS\$M)

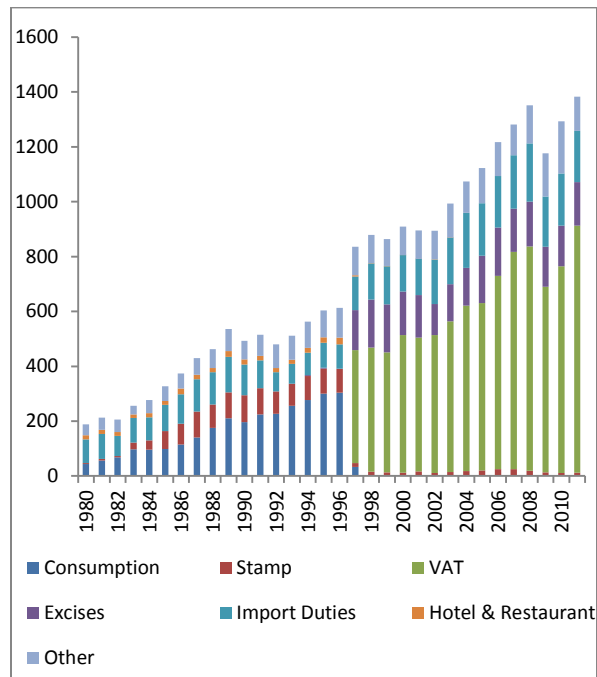
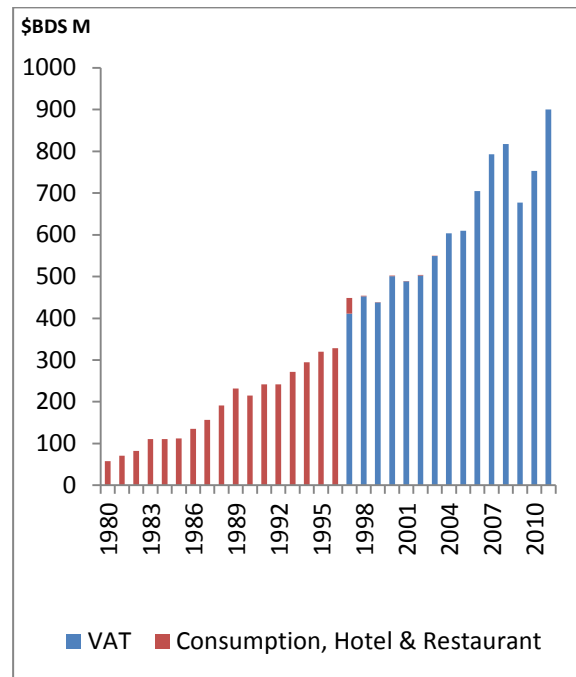


Figure 2: VAT, Consumption and Hotel and Restaurant Receipts (BDS\$M)



Source: Central Bank of Barbados

Over the period 1980 to 2011 tax receipts grew on average by 7%. Figures 3 and 4 show direct and indirect tax revenues as a share of GDP and total tax revenues. In the early 1980s, direct and indirect taxes contributed similar amounts to national income. From 1983, however, the share of indirect taxes expanded as a result of personal income tax reform, involving increased tax thresholds and reduced personal tax rates. With the introduction of the VAT in 1997, the ratio of indirect taxes to total GDP rose, but only temporarily. Overall, direct taxes as a percentage of GDP have remained relatively unchanged since 1980 - 10% to 11%, but indirect taxes to GDP have grown from 12.9% in the 1980s, to 13.5% and 14.6% in the 1990s and 2000s, respectively.

Figure 3: Tax Revenues to GDP (%)

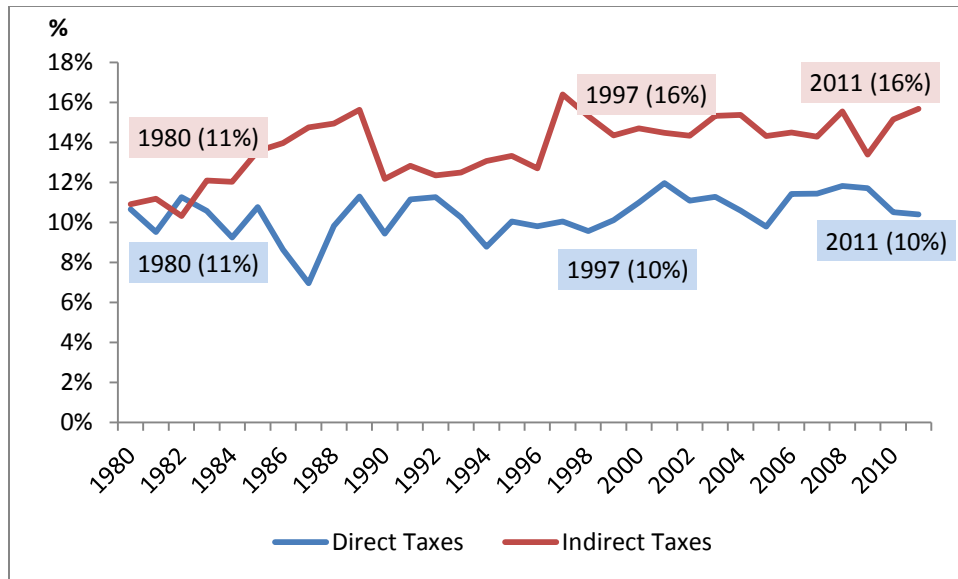


Figure 4: Indirect and Direct Taxes as a Percent of Tax Revenue

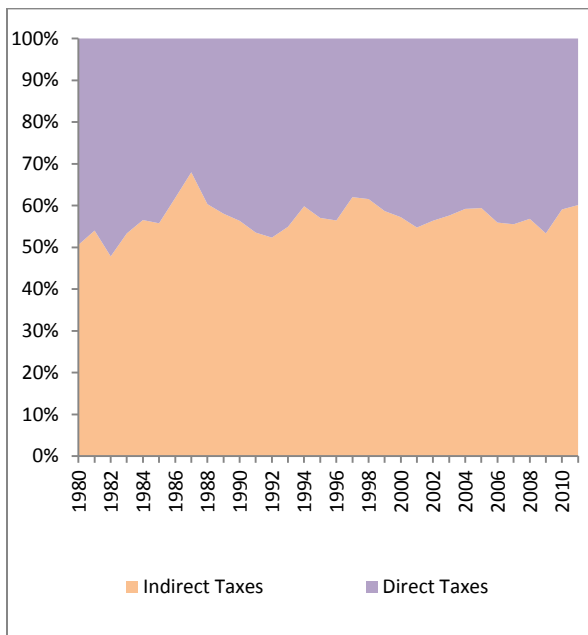
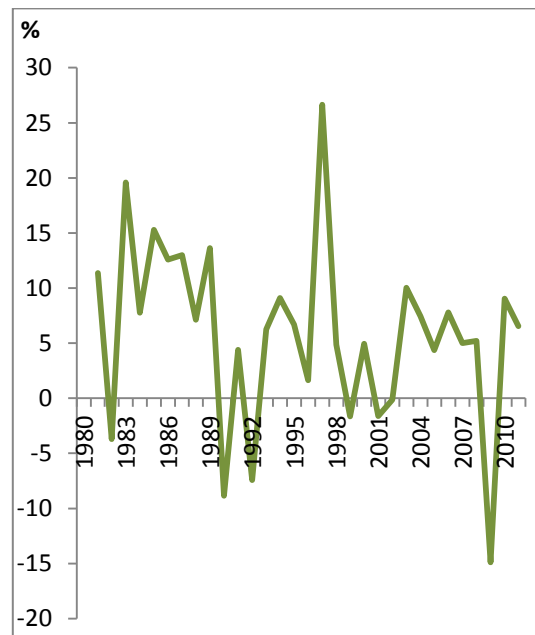


Figure 5: Percentage Change in Indirect Tax Revenue



Source: Central Bank of Barbados

3. Productivity and Efficiency

The revenues from the VAT relative to total consumption fluctuated between 8.5% and 11.2% for the period 1997 to 2011, and averaged approximately 9.5% (see Table 1 in Appendix I). Figure 6 suggests a weak relationship between the direction and magnitude of changes in total consumption and movements in VAT receipts. A correlation coefficient of 0.22 was estimated.

Figure 6: Growth in Consumption Tax and VAT Receipts versus Growth in Total Consumption

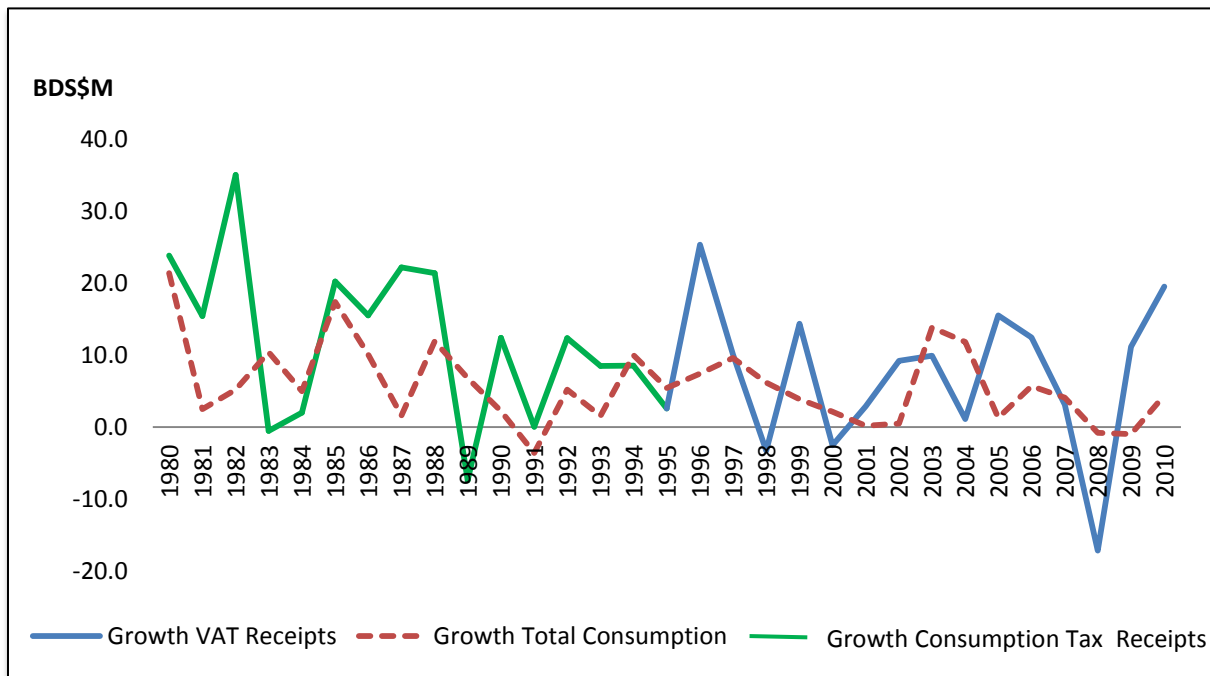


Table 1, in Appendix I, shows the yield of the VAT relative to the principal taxes it replaced, the consumption and hotel and restaurant sales taxes. The ratio of the VAT to total tax revenue was 32.5%, compared to 28% for the consumption taxes and the hotel and restaurant tax. The ratios to GDP were 8.4% for VAT, and 6.4% for the taxes it preceded.

3.1 Methodology

Three revenue performance indicators are used to compare the efficiency of the VAT with that of the taxes it replaced. The indicators are calculated as the tax yield as a proportion of the tax base, divided by the tax rate, differing according to the base employed. The VAT productivity (VATPROD) measure utilises a GDP base, while the VAT gross compliance ratio (VATCR) and VAT c-efficiency (VATCE) indicators use private and total consumption, respectively. A higher ratio suggests a more efficient tax structure.

Analysis

All three measures showed an increase after the introduction of the VAT. The average productivity, C-efficiency, and compliance ratios for consumption tax, and hotel and restaurant tax between 1980 and 1996 were 0.46, 0.52, and 0.61, respectively, compared to similar ratios of 0.55, 0.63, and 0.77 for the VAT during the period 1997 and 2011 (see Appendix: Table 1). Figure 7 reveals that the performance indicators rose slightly with the implementation of the VAT, recovering in an erratic way after 2000. For the consumption tax, all of the performance ratios displayed an increasing trend between 1980 and 1994, but fell off during the period 1995 to 1997. The rise in revenues in the early 1990s is partially attributed to the expansion in the basic tax rate of consumption from 9% to 12% in 1991.

Table 2: Comparative Analysis of VAT Performances (Averages)

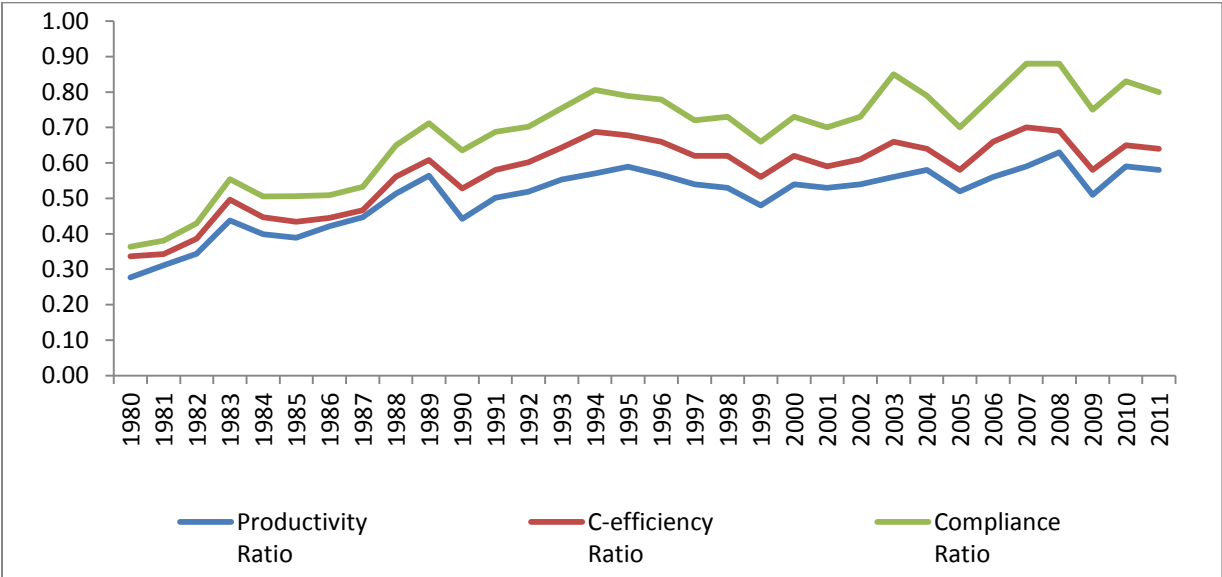
COUNTRY	VAT RATE	Performance Indicators		
		VATPROD	VATCE	VAT/GDP (%)
Barbados	15% (1997), 17.5% (2011)	0.55	0.63	8.4
Jamaica	10% (1991), 15% (1996); 16.5% (2005)	0.61	0.93	9.2
Trinidad & Tobago	15% (1990)	0.28	0.52	6.0
Costa Rica	10% (1975)	0.35	0.53	4.6
Canada	7% (1991)	0.38	0.67	2.7

Notes:

1. Year of tax rate change is in parenthesis.
2. Indicators for Trinidad & Tobago were taken from Cotton (2006).
3. Indicators for Jamaica, Costa Rica and Canada were taken from Edmiston and Bird (2004).

Table 2 shows that Barbados' VAT performance compares favourably to other Latin American and Caribbean countries such as Costa Rica, and Trinidad and Tobago, but is below Jamaica. Nonetheless, Barbados' revenue performance indicators are on par with that developed countries such as the European Union and the Americas (Ebril et al. 2002).

Figure 7: Revenue Performance Indicators for Consumption Tax and VAT

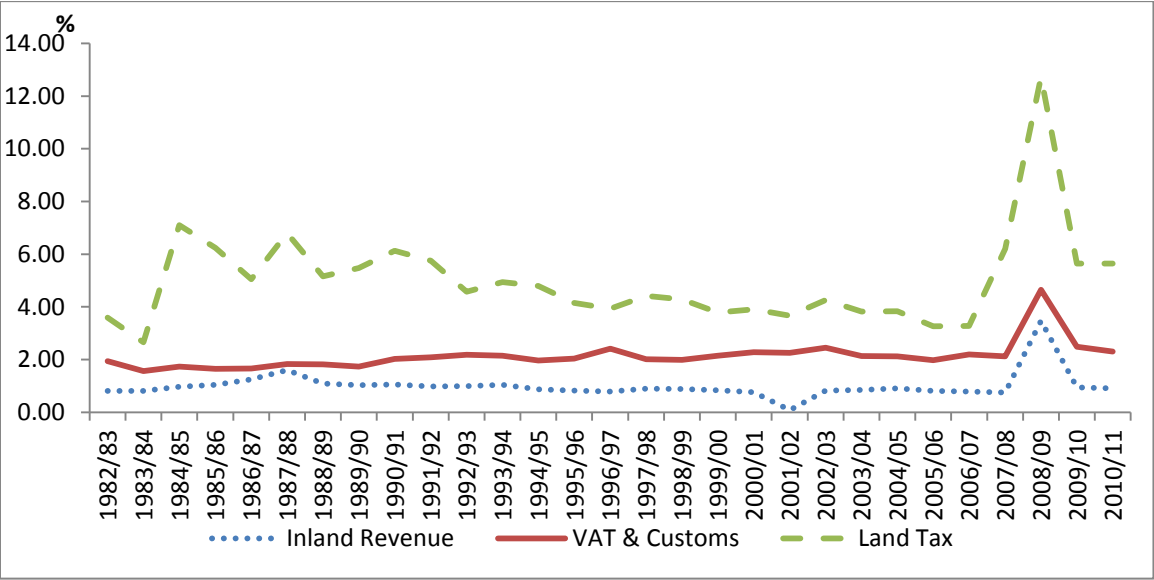


3.2 The Efficiency of Tax Administration

In this section, the cost of collection ratio - the annual cost of administration incurred by a revenue body, as a percentage of the total revenue over the course of a fiscal year - is used to judge the efficiency of the major revenue collecting agencies in Barbados during the two periods FY1982/83 to FY1996/97 and FY1997/98 to FY2010/11. The three main revenue collecting entities in Barbados are the Customs and Excise Department, Inland Revenue Department and the Land Tax Department. The Customs and Excise Department which previously gathered consumption duties, now primarily compiles VAT receipts, import duties and excise taxes, while the Inland Revenue Department collects taxes on incomes, and the Land Tax Department is responsible for property taxes.

The administrative cost of the Customs and Excise Department averaged 1.9 percent of collections during the period FY1982/83 to FY1996/97, and grew to approximately 2.4 percent over the period FY1997/98 to FY2010/11 following the establishment of the VAT Division. The collection costs incurred by the Inland Revenue Department have remained relatively unchanged at 1 percent and that by the Land Tax Department averaged 5 percent (see Figure 8).¹

Figure 8: Administrative Cost to Revenue Yield Ratio of Departments



Source: Authors' calculation

4. Buoyancies and Elasticities

In this section the responsiveness of the VAT to changes in income are analysed, using buoyancies and elasticities. Buoyancy is defined as the reaction of tax revenue to changes in national income or expenditure, without removing the effects of changes in tax rates, the tax base or other movements in the structure of the tax. On the other hand, the elasticity measure removes the influences of discretionary tax measures and alterations in the tax structure, to give

¹ The substantial rise in the cost of collection ratio in FY2008/09 of all departments was related to a one-off retroactive payment of wages and salaries of civil servants.

an indicator of the responsiveness of the tax in the absence of such changes (Sahota, 1961). Elasticities and buoyancies are calculated from $R = bY^c$, where R is annual tax revenue, Y is annual nominal GDP at factor cost and c is the elasticity or buoyancy coefficient.²

4.1 Methodology for Removing Discretionary Changes in the Revenue Series

The discretionary changes are collected from the Annual Budgetary Proposals, Skeete et al. (2003) and the authors' own calculations. The Proportional Adjustment method by Prest (1962) is used to deduct the discretionary tax movements (see Appendices II and III). First, a preliminary series of adjusted tax yields is prepared by subtracting from the actual yield for each year the estimated amount attributed to discretionary tax changes in that year. This adjusted series is then further refined by applying the Prest formula to form a "final series" that excludes the continuing impact of each discretionary movement on future years.

Prest's procedure adjusts the tax yield of any year to the hypothetical yield for that year if a base-year tax structure had prevailed, by multiplying by a sequence of multiplicative factors, each reflecting the proportion of the total yield for that year that would have accrued automatically in the absence of any discretionary changes. The factor for each year is found by dividing the actual tax yield (net of discretionary effects of that year) by the total tax yield.

4.2. Results

Table 3 shows that the buoyancy of the VAT was lower than that of consumption tax. The buoyancy of consumption taxes during the period 1980 to 1996 was approximately 1.50 percent, declining to 1.19 percent in the post-VAT era of 1997 to 2011. The elasticity of the VAT was also lesser, at 1.26% compared to the pre-VAT figure of 1.67%. The elasticities and buoyancies of all indirect taxes have been lower since the introduction of the VAT. Williams (2001), Skeete et al (2003) and Howard (1992, 2001) also found the elasticity of indirect taxes to be relatively low.

² If discretionary tax changes are removed from the tax revenue series then c is the elasticity coefficient, otherwise it is the buoyancy coefficient.

Table 3: Buoyancy and Elasticity for Consumption Tax, VAT, and Total Indirect Taxes

	1980-1996		1997-2011		1980-2011
	Consumption	Total Indirect Taxes	VAT	Total Indirect Taxes	Total Indirect Taxes
Buoyancy	1.50	1.13	1.19	0.89	1.14
Elasticity	1.67	1.19	1.26	0.83	1.21

5. Conclusion

The introduction of the VAT did not materially alter the tax structure, and the proportions of direct and indirect taxes in the total remained unchanged over the period 1980-2011, on average. Within the category of indirect taxes the three largest items accounted for over 80 percent of collections, both before and after VAT. The burden of indirect tax increased with the imposition of the VAT, from an average of 6.4% of GDP to an average of 8.4%. There was some gain in the revenue yield, relative to the tax rate, with the establishment of the VAT, indicated by the three revenue performance measures used. The administrative costs of collecting the VAT were higher relative to the revenue received, than for the taxes replaced. The indirect tax system has also been less elastic and less buoyant in response to changes in income, since the VAT was created, compared with estimates for the pre-VAT period.

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Appendix I

Table 1: Consumption and Hotel & Restaurant Taxes, and VAT Performance Indicators in Barbados

	Year	Tax Receipts	% TTR	% GDP	% TCONS	Productivity Ratio	C-efficiency Ratio	Compliance Ratio
Consumption and Hotel and Restaurant Tax	1980	57.4	15.4	3.3	4.0	0.28	0.34	0.36
	1981	71.1	18.0	3.7	4.1	0.31	0.34	0.38
	1982	82.1	19.1	4.1	4.6	0.34	0.39	0.43
	1983	110.9	23.2	5.2	6.0	0.44	0.50	0.55
	1984	110.3	22.5	4.8	5.4	0.40	0.45	0.51
	1985	112.5	19.2	4.7	5.2	0.39	0.43	0.51
	1986	135.3	22.4	5.1	5.3	0.42	0.44	0.51
	1987	156.3	24.7	5.4	5.6	0.45	0.47	0.53
	1988	191.0	24.9	6.2	6.7	0.51	0.56	0.65
	1989	231.9	25.1	6.8	7.3	0.56	0.61	0.71
	1990	214.8	24.6	5.3	6.3	0.44	0.53	0.64
	1991	241.5	25.1	6.0	7.0	0.50	0.58	0.69
	1992	241.6	26.4	6.2	7.2	0.52	0.60	0.70
	1993	271.5	29.2	6.6	7.7	0.55	0.64	0.75
	1994	294.6	31.3	6.8	8.2	0.57	0.69	0.81
	1995	319.7	30.2	7.1	8.1	0.59	0.68	0.79
	1996	328.0	30.2	6.8	7.9	0.57	0.66	0.78
VAT	1997	411.2	30.5	8.1	9.2	0.54	0.62	0.72
	1998	452.8	31.7	7.9	9.3	0.53	0.62	0.73
	1999	438.0	29.7	7.3	8.5	0.48	0.56	0.66
	2000	501.0	31.5	8.1	9.3	0.54	0.62	0.73
	2001	488.4	29.9	7.9	8.9	0.53	0.59	0.70
	2002	502.5	31.7	8.1	9.1	0.54	0.61	0.73
	2003	548.8	31.8	8.5	9.9	0.56	0.66	0.85
	2004	603.2	33.3	8.6	9.6	0.58	0.64	0.79
	2005	609.9	32.3	7.8	8.7	0.52	0.58	0.70
	2006	704.6	32.4	8.4	9.9	0.56	0.66	0.79
	2007	792.5	34.4	8.8	10.5	0.59	0.70	0.88
	2008	817.5	34.4	9.4	10.4	0.63	0.69	0.88
	2009	677.3	30.7	7.7	8.7	0.51	0.58	0.75
	2010	753.0	34.4	8.8	9.7	0.59	0.65	0.83
	2011	900.3	39.1	10.2	11.2	0.58	0.64	0.80

Source: Based on authors' calculation

Notes: A basic rate of 12% was used in calculating the revenue performance ratios for the Consumption and Hotel & Restaurant taxes. VAT rates of 15% and 17.5% were used in calculating the revenue performance indicators for periods 1997 to 2010 and 2011, respectively

Appendix II

The Proportional Adjustment Method- (Prest 1962)

The formula is developed as follows:

where

T_i : the actual revenue for the i th year

D_i : net discretionary change for the i th year

T_{ij} : tax revenue in the j th year adjusted to the tax structure that existed in year i .

If $i = 1$ is the reference year, the series $T_{11}, T_{12}, T_{13}, \dots, T_{1n}$ represents what the tax receipts would have been if the tax structure had remained as in year 1 with all discretionary changes removed from the years following year 1. This series is used to obtain the elasticity calculations. The mathematical derivation of the series is as follows:

$$T_{11} = T_1$$

$$T_{12} = T_2 - D_2$$

$$T_{13} = T_{23} * \frac{T_{12}}{T_2}$$

$$T_{14} = T_{34} * \frac{T_{13}}{T_3}$$

$$T_{1j} = T_{j-1,j} * \frac{T_{1,j-1}}{T_{j-1}}$$

Appendix III

Table 4: VAT Adjustments (1997-2011)

Year	Effective Date	Tax Adjustment	Gain^(e) (BDS\$M)	Cost^(e) (BDS\$M)
1997	January 1	VAT introduced at a rate of 15% with a special rate of 7.5% for hotel accommodation.	50	
	October 1	A zero rated VAT on a basket of food items, and educational or scientific literature recorded on either electronic or printed medium. VAT exemption on construction services for residential houses.		45
2004	April 1	VAT exemptions on computers, peripherals and computer accessories.		1.5
2008		VAT refund on building materials used in the provision of low-income houses with a value of up to \$150,000 for first time home owners who reside in their homes.		7.2
2009		The threshold in respect of the refund of VAT on building materials for first time home owners increased from BDS\$150,000 to BDS\$200,000.		2.4
2010	December 1	VAT rate increased from 15% to 17.5%. VAT registration increased from BDS\$60,000 to BDS\$80,000	124	
2011		An amendment to the VAT Act to allow hotels offering time share properties to claim a refund of input tax in respect of goods purchased locally.		1.5

Source: Various Financial Statement and Budgetary Proposals of the Government of Barbados

Note: ^(e): Estimate

Table 5: Other Significant Indirect Tax Adjustments (2000-2011)

Year	Effective Date	Tax Adjustment	Gain^(e) (BDS\$M)	Loss^(e) (BDS\$M)
2000	November 1	Excise tax on gasoline and diesel reduced by 12 cents and 7 cents per litre, respectively. The retail prices of gasoline and diesel rose to \$1.66 and \$1.29 per litre, respectively.		2
		Stamp duty reduced for qualifying companies involved in international financing of high value equipment such as aircraft, ships and trains.		1.5
2001	August 13	The retail prices for gasoline and diesel reduced to \$1.45 (from \$1.66) and \$1.18 (from \$1.29) per litre , respectively.	1.5	
	October 1	Tax on lotteries increased from 11.5% to 12.5% to facilitate partial funding of a Sports and Arts Endowment Development Fund.	1.5	
2006		The 3% cess tax on extra regional imports, introduced in September 2005, was increased to 6% but removed from food items zero rated under the VAT Act as well as baby napkins, specialty foods for diabetics and specialty healthcare articles from the elderly. The cess remained in effect for 18 months.		3.1
	April 1	The 60% surcharge will no longer apply to imported garment items for which there is no local production.		1
	April 1	A flat rate of excise tax of 20% as opposed to 46.9% on hybrid vehicles and those powered by solar energy, LPG, and compressed.		1
	April 1	Separate excise tax rate for diesel vehicles		1
		Reduction in road tax from \$1200 to \$600		2
2007	July 1	Environmental levy to increase from 1% to 2%.	10	
		The Customs duty is to be amended to allow import duty and excise tax concessions in respect of vehicles, parts & safety equipment for motor sports competitions		6
	May 1	The rate of excise tax payable on public transport type vehicles falling under Tariff Head 87.02 was 40% regardless of the vehicle's chargeable value. (Previously the excise tax rate was 62% on vehicles with a chargeable value of \$45,000 or less and 80% for those with a value of over \$45,000)		3
2008	August 1	The environmental levy exempted from a specified basket of goods.		3

		Import duties exempted from renewable energy equipment.		1
	July 7	The excise tax payable on alcoholic beverages and manufactured tobacco increased by 50% and 100%, respectively.	1.5	
		The existing levy on used cars and new cars has been equalized to have a common rate. The existing rate of \$4000 for used cars and \$300 for new cars has been adjusted and the new rate is \$1,500 for new and used cars.	1.5	
		The ad valorem rates of the environmental levy were raised from 1.5% and 2% to 2% and 3%, respectively on all local products and imports. However, manufacturers are entitled to a rebate of the levy on all exported goods.	3.5	
		Annual license fees for insurance companies increased from \$5,000 to \$20,000.	4.8	
	August 1	An increase in various highways fees.	46	
		Motor Cycles fee increased from \$120 to \$180 and \$150 to \$225 for without sidecar and with sidecar, respectively.	0.6	
	September 1	Increase in wholesale and retail liquor license fees.	1	
		Increased Town and country planning fees.	0.5	
2009	January 1	Financial fees for financial institutions increased.	4.9	
	July 1	Rebate payable to dealers on new vehicles increased from 15% to 20% based on tariff heading of vehicle.		3
		Gun licenses increased from \$75 to \$500 for 1 st time registration and \$200 for annual renewal.	0.5	
2010	December 1	Increase in excise tax by 50% to \$0.5358 per litre.	22.7	
	December 1	Abolition of the environmental levy on imports.		42
	November 1	Retail liquor licence fees for small shopkeepers reduced from \$1000 to \$500.		0.9
2011	April 1	Fees for mini-buses and route taxis are to be reduced from \$7,250 and \$4,500 to \$3,625 and \$2,250, respectively. Driver's license for PSV drivers will reduce from \$230 per annum to \$80 per annum, in line with Transport Board drivers.		1.4

Source: Various Financial Statement and Budgetary Proposals of the Government of Barbados

Notes: 1. See Skeete et al. (2003) for adjustments in indirect taxes for the period 1977/1978 to 1999/2000

2. ^(e): Estimate