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Estimating the Size of the Informal Economy in Caribbean States

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Abstract

This paper's primary goal is to determine the size of the informal sector in the heterogeneous Caribbean countries. The informal economic activities of a country have several implications for their sustainable economic management. First, they have implications for tax revenue and determining what the optimal tax burden should be. Second, unrecorded activities distort national income accounts and any policies that derive from these statistics. The results of the study are based on two methodologies: the electricity consumption method and the currency demand method. In making a final evaluation, the study also considers results and information obtained in other studies. The findings suggest that the size of the informal sector is 20–30 percent in The Bahamas, 30–40 percent in Barbados, 29–33 percent in Guyana, 35–44 percent in Jamaica, 35–45 percent in Suriname, and 26–33 percent in Trinidad and Tobago.

JEL Codes: E26, E41, E27
Keywords: Shadow economy, informal economy, MIMIC, currency demand approach, macroelectric approach

Executive Summary

In any modern country, the extent of unreported and unrecorded economic activity is cause for concern. Information about the size and character of informal sector activity is critical for effective and efficient decision making about how best to allocate a country's resources. Unfortunately, gathering information about unofficial activities is challenging because, in many instances, participants in the informal economy do not wish to be identified. This problem is further compounded by the fact that there are several different approaches to defining the informal economy and estimating its size, causes, and impact. Recent evidence, however, suggests that, notwithstanding these differences across the world, informal or unofficial activity is on the rise.

This study's primary goal is to apply commonly used methods to determine the size of the informal sector in the heterogeneous Caribbean countries of The Bahamas, Barbados, Guyana, Jamaica, Suriname, and Trinidad and Tobago. The extent of hidden or unrecorded economic activity has several implications for the sustainable economic management of these countries. First, it has implications for tax revenue and determining what the optimal tax burden should be. Informal activities are almost by definition hidden from tax authorities and represent potential revenue gain. However, the size of the informal economy is in part determined by the tax and regulatory burden imposed by the government. An understanding of these relationships will undoubtedly improve policy. Second, unrecorded activity distorts national income accounts and any policies that derive from these statistics.

The results of the study are based on two methodologies: the electricity consumption method and the currency demand method. The study also considers results and information obtained in other studies in making a final evaluation. The findings suggest that the size of the informal sector is 20–30 percent in The Bahamas, 30–40 percent in Barbados, 29–33 percent in Guyana, 35–44 percent in Jamaica, 35–45 percent in Suriname, and 26–33 percent in Trinidad and Tobago.

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1. Introduction

The extent of unreported and unrecorded economic activity is cause for concern in any modern economy. This is because the extent to which individuals and firms engage in activities that are hidden from authorities is symptomatic of serious incentive problems such as large tax, bureaucratic, and regulatory burdens. In addition, activities in the informal sector can negatively impact the efficiency and functioning of the formal sector. For any policy to be truly evidence based, it must consider its impact on all markets, including those that largely contain unregistered actors. Thus, obtaining accurate measures of the allocation of a country's resources in the shadow[1] economy is important for effective economic policy decisions (Schneider, Buehn, and Montenegro, 2010).

There are many definitions of the informal economy. Generally, it is defined as market-based production and exchange that escapes official detection, deliberately or otherwise. As a result, informal economic activities are not recorded in gross domestic product (GDP). There are many factors that might determine the size and character of the informal economy, chief among them the tax and regulatory burden they create. High taxes on business or labour reduce the incentives to operate in the formal economy because the returns on effort or for enterprise become relatively lower in the formal sector. The regulatory burden operates in a similar way by increasing the economic costs of formal sector participation. Along this line, business cycles can impact the size of the informal economy. In times of high growth and prosperity, opportunities in the formal sector for work and business abound, whereas in recessionary times, high levels of unemployment can induce individuals to supplement their incomes in the informal economy. The implications of these relationships can often be observed in labour market and monetary indicators. One of the methodological approaches employed in this study relies on the theoretical proposition that maintains that individuals and firms in the informal economy do not wish to be traced, and therefore they conduct most of their transactions in cash. Finally, expansion of the informal economy can lead to reduced tax revenues for government, which can then reduce the quantity and quality of government services and public infrastructure. The quality of government services and public infrastructure impacts the decision of an agent as to whether to participate in the formal or informal sector.

[1] This study will use the terms shadow economy, unofficial economy, and informal economy interchangeably.

The objective of this study is to estimate the size of the informal economy in the following Caribbean countries: The Bahamas, Barbados, Guyana, Jamaica, Suriname, and Trinidad and Tobago. These countries are all small, with populations ranging in size from 285,000 in Barbados to 2.72 million in Jamaica. However, they have quite diverse economic structures and orientation. Barbados and The Bahamas, on the one hand, are high-income, service-based economies, whereas Guyana and Suriname are middle-income countries whose economies are dominated by agriculture and mining. Jamaica and Trinidad and Tobago are middle- and high-income countries, respectively, and they have highly mixed economies focused on agriculture, mining, manufacturing, tourism, and financial services. Because of this, we can a priori expect heterogeneity in the estimated sizes of informal or unofficial activity.

The study is organised as follows: Section 2 will provide a range of definitions for the informal economy and explore some of the issues associated with its measurement. Section 3 will review and summarise estimates of the informal economy across the world to provide context with which to evaluate Caribbean estimates. Section 3 will also review previous estimates derived for the Caribbean. Section 4 presents a review of methods used to estimate the degree of informal activity. Section 5 describes the data and Section 6 discusses the results. Section 7 concludes the study.

2. Definition and Measurement

The “unofficial or shadow economy” constitutes activity that is not reported to the state statistical office (Johnson, Kaufmann, and Shleifer, 1997). This definition echoes that of Smith, who defines the informal economy as: “market-based production of goods and services, whether legal or illegal, that escapes detection in the official estimates of the GDP” (Smith, 1994: 18).

This definition is commonly found and has been widely applied in the literature (Feige; 1989, 1994; Frey and Pommerehne, 1984; Lubell, 1991; Schneider, 1994). There are several ways to define and measure the informal economy, and these definitions vary greatly. Part of the reason for this varied approach to defining the informal sector is the nature of the informal sector itself. It continually metamorphoses as various aspects of the formal or official economy change, for example, as taxes or punitive sanctions from tax authorities change, or even when general moral attitudes change (Mogensen et al.,1995).

Notwithstanding this difficulty in precisely defining the informal economy, Schneider and Enste (2000) state that a consensus definition of the legal and illegal

shadow economy would include all economic activity that would generally be taxable if it were reported to the tax authorities. Table 1 shows that the informal economy includes unreported income from both legal and illegal productive activities. This study, through its use of different methodologies, adopts an eclectic approach that embraces different dimensions of informality, but primarily uses one grounded in the view that the informal sector is that which is hidden from the view of authorities and manifests in the form of cash transactions (currency demand approach) or electricity consumption (macroelectric approach).

Table 1: Taxonomy of Underground Economic Activities

A TAXONOMY OF UNDERGROUND ECONOMIC ACTIVITIES				
	Monetary transactions		Non-monetary transactions	
Illegal activities	Trade in stolen goods; drug dealing and manufacturing; prostitution; gambling; smuggling and fraud.		Barter: drugs, stolen goods, smuggling, etc. Produce or growing drugs for own use. Theft for own use.	
	Tax Evasion	Tax Avoidance	Tax Evasion	Tax Avoidance
Legal activities	Unreported income from self-employment; Wages, salaries and assets from unreported work related to legal services and goods	Employee discounts, fringe benefits	Barter of legal services and goods	All do-it-yourself work and neighbour help

Sources: Mirus and Smith (1997); Schneider and Enste (2000) with additional remarks.

3. The Size of the Shadow Economy

There are numerous estimates of the size of the informal sector for different time periods and across several different types of countries, computed with many different methodological approaches. Friedman, Johnson, and Kaufmann (2000) summarize many of the key findings in the empirical literature, and their table is replicated and presented here as Table 2. What is immediately obvious and not at all surprising from Table 2 is that developing countries tend to have large unofficial or shadow economies, whereas for developed nations, the size of the unofficial economy is typically small. Estimates for countries such as Egypt, Nigeria, and Thailand show an informal economy that is

approximately 75 percent of the size of officially recorded GDP (or the formal economy). In many South American countries, the size of the unofficial economy varies from a quarter to a third of officially recorded GDP. Transition economies such as Georgia and Ukraine have informal sectors that range in size from 28 to 43 percent of GDP (Schneider and Enste, 2000). The more developed Organization for Economic Cooperation and Development (OECD) countries, however, range from 8 to 23 percent of GDP. Figure 1 in the Appendix shows that Central and South America, West and Central Africa, Russia, Central Asia, and Eastern Europe, as well as Southeast Asia, have the highest recorded levels of informal activity. Developed countries in the global north, on the other hand, have lower levels of informal activity.

Where might the Caribbean be found on this spectrum? We consider six Caribbean countries that are quite diverse. For example, The Bahamas and Barbados are high-income service economies heavily focused on tourism and financial service provision. Guyana and Suriname are middle-income agricultural and mining economies. One might a priori reasonably expect, based on global trends, that the size of the informal economy in the latter two countries is considerably larger than it is in the first two economies. Kamau and Lin (2015) employ a currency demand approach to estimating the size of the informal economy in Suriname and find that the size of the informal economy is large and highly time-variable. Since the 1980s, the informal sector size has averaged in excess of 50 percent of GDP and occasionally in the midst of political and macroeconomic uncertainty exceeded 200 percent of GDP.

The Inter-American Development Bank (IDB) (2006) conducted a study of the informal sector in Jamaica. Using an electricity demand approach, it found that the size of the informal sector grew from 12.9 percent in 1991 to between 40.9 (conservatively estimated) and 45.5 percent of economic activity in 2000 using more standard assumptions. According to this study, Jamaica's informal sector averaged 27 percent of total economic activity over the period 1991–2000. Using other methods—such as the currency demand approach and the method of additions—the IDB (2006) estimated that the informal sector's share of official GDP fluctuated at around 43 percent between 2000 and 2001.

Table 2: Estimates of the Share of the Unofficial Economy

Country name	Initials	Estimates of unofficial economy			Source of estimates		Notes
		Base estimate (share 1)	Alternative estimate (share 2)	Difference between estimates	Share1	Share2	
Argentina	ARG	21.8	21.8	Same estimate	MIMIC 1990 – 1993	MIMIC 1990 -1993	Only one estimate available
Australia	AUS	15.3	15.3	Same estimate	Electricity 1989 – 1990	Electricity 1989 –1990	Alternative currency demand: 13%
Austria	AUT	5.9	15.0	–9.1	Currency demand 1990 – 1993	Electricity 1989 –1990	Alternative currency demand: 5 – 9%
Azerbaijan	AZE	60.6	33.8	26.8	Electricity 1995	Electricity 1990 – 1993	
Belgium	BEL	15.3	22.0	-6.8	Currency demand 1990 – 1993	Electricity 1990 – 1993	Alternative currency demand: 19 – 22%
Bulgaria	BGR	36.2	26.3	9.9	Electricity 1995	Electricity 1990 – 1993	
Belarus	BLR	19.3	14.0	5.3	Electricity 1995	Electricity 1990 – 1993	
Bolivia	BOL	65.6	65.6	Same estimate	MIMIC 1990 –1993	MIMIC 1990 –1993	Only one estimate available
Brazil	BRA	37.8	29.0	8.8	MIMIC 1990 – 1993	Electricity 1989 –1990	
Botswana	BWA	27.0	27.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 –1990	Only one estimate available
Canada	CAN	10.0	13.5	-3.5	Currency demand 1990 – 1993	Currency demand 1989 – 1990	Currency demand: 11 – 15%
Swiss	CHE	6.9	10.2	-3.3	Currency demand 1990 – 1993	Electricity 1989 –1990	Currency demand: 6 – 8%
Chile	CHL	18.2	37.0	-18.8	MIMIC 1990 – 1993	Electricity 1989 –1990	
Colombia	COL	35.1	25.0	10.1	MIMIC 1990 – 1993	Electricity 1989 –1990	
Costa Rica	CRI	23.3	34.0	-10.7	MIMIC 1990 – 1993	Electricity 1989 –1990	
Czech	CZE	11.3	13.4	-2.1	Electricity 1995	MIMIC 1990 – 1993	
Germany	DEU	10.4	15.2	-4.8	Currency demand 1990 – 1993	Electricity 1989 –1990	Currency demand: 11 – 15%
Denmark	DNK	9.4	17.8	-8.4	Currency demand 1990 – 1993	Electricity 1989 –1990	Currency demand: 10 – 18%
Ecuador	ECU	31.2	31.2	Same estimate	MIMIC 1990 – 1993	MIMIC 1990 – 1993	Only one estimate available
Egypt	EGY	68.0	68.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 –1990	Only one estimate available
Spain	ESP	16.1	23.9	-7.9	Currency demand 1990 – 1993	Electricity 1989 –1990	
Estonia	EST	11.8	23.9	-12.1	Electricity 1995	Electricity 1989 –1990	
Finland	FIN	13.3	13.3	Same estimate	Electricity 1989 – 1990	Electricity 1989 –1990	Only one estimate available
France	FRA	10.4	13.8	-3.4	Currency demand 1990 – 1993	Currency demand 1989 – 1990	Cur. Demand: 9 – 15% Elect. 1989 – 1990: 12.5%
Britain	GBR	7.2	13.6	-6.5	Currency demand 1990 – 1993	Electricity 1989 – 1990	Currency demand: 9 – 13%

Country name	Initials	Estimates of unofficial economy			Source of estimates		Notes
		Base estimate (share 1)	Alternative estimate (share 2)	Difference between estimates	Share1	Share2	
Georgia	GEO	62.6	43.6	19.0	Electricity 1995	Electricity 1990 – 1993	
Greece	GRC	27.2	21.2	6.0	Currency demand 1990 – 1993	Electricity 1989 – 1990	
Guatemala	GTM	50.4	61.0	-10.6	MIMIC 1990 – 1993	Electricity 1989 – 1990	
Hong Kong	HKG	13.0	13.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Honduras	HND	46.7	46.7	Same estimate	MIMIC 1990 – 1993	MIMIC 1990 – 1993	Only one estimate available
Croatia	HRV	23.5	23.5	Same estimate	Discrepancy GDP calculations	Discrepancy GDP calculations	Only one estimate available
Hungary	HUN	29.0	30.7	-1.7	Electricity 1995	Electricity 1990 – 1993	
Ireland	IRL	7.8	20.7	-12.9	Currency demand 1990 – 1993	Electricity 1989 – 1990	Currency demand: 11 – 16%
Israel	ISR	29.0	29.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Italy	ITA	20.4	24.0	-3.6	Currency demand 1990 – 1993	Currency demand 1989 – 1990	Electricity 1989 – 1990: 19.6
Japan	JPN	8.5	13.7	-5.2	Currency demand 1990 – 1993	Electricity 1989 – 1990	Alternative currency demand: 10.6%
Kazak	KAZ	34.3	22.2	12.1	Electricity 1995	Electricity 1990 – 1993	
Korea	KOR	38.0	38.0	Same estimate	Electricity 1990 – 1993	Electricity 1990 – 1993	Only one estimate available
Lithuania	LTU	21.6	26.0	-4.4	Electricity 1995	Electricity 1990 – 1993	
Latvia	LVA	35.3	24.3	11.0	Electricity 1995	Electricity 1990 – 1993	
Morocco	MAR	39.0	39.0	Same estimate	Electricity 1990 – 1993	Electricity 1990 – 1993	Only one estimate available
Moldova	MDA	35.0	29.1	6.6	Electricity 1995	Electricity 1990 – 1993	
Mexico	MEX	27.0	49.0	-21.9	MIMIC 1990 – 1993	Electricity 1990 – 1993	
Mauritius	MUS	20.0	20.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Malaysia	MYS	39.0	39.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Nigeria	NGA	76.0	76.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Holland	NLD	11.8	13.5	-1.8	Currency demand 1990 – 1993	Electricity 1989 – 1990	
Norway	NOR	5.9	16.7	-10.8	Currency demand 1990 – 1993	Currency demand 1989 – 1990	Cur. Demand: 14 – 19% Elect. 1989 – 1990: 9%
Panama	PAN	62.1	40.0	22.1	MIMIC 1990 – 1993	Electricity 1989 – 1990	
Peru	PER	57.9	44.0	13.9	MIMIC 1990 – 1993	Electricity 1989 – 1990	
Philippines	PHL	50.0	50.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Poland	POL	12.6	20.3	-7.7	Electricity 1995	Electricity 1990 – 1993	
Portugal	PRT	15.6	16.8	-1.2	Currency demand 1990 – 1993	Electricity 1989 – 1990	

Country name	Initials	Estimates of unofficial economy			Source of estimates		Notes
		Base estimate (share 1)	Alternative estimate (share 2)	Difference between estimates	Share1	Share2	
Paraguay	PRY	27.0	27.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Romania	ROM	19.1	16.0	3.1	Electricity 1995	Electricity 1990 – 1993	
Russia	RUS	41.6	27.0	14.6	Electricity 1995	Electricity 1990 – 1993	
Singapore	SGP	13.0	13.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Slovakia	SVK	5.8	14.2	-8.4	Electricity 1995	Electricity 1990 – 1993	
Sweden	SWE	10.6	17.0	-6.4	Currency demand 1990 – 1993	Currency demand 1989 – 1990	Electricity 1989 – 1990: 10.8%
Thailand	THA	71.0	71.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Tunisia	TUN	45.0	45.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Tanzania	TZA	31.5	31.5	Same estimate	Currency demand 1989 – 1990	Currency demand 1989 – 1990	Only one estimate available
Ukraine	UKR	48.9	28.4	20.5	Electricity 1995	Electricity 1990 – 1993	
Uruguay	URY	35.2	35.2	Same estimate	MIMIC 1990 – 1993	MIMIC 1990 – 1993	Only one estimate available
USA	USA	13.9	10.5	3.4	Currency demand 1990 – 1993	Electricity 1989 – 1990	Currency demand: 6 – 10%
Uzbekistan	UZB	6.5	10.3	-3.8	Electricity 1995	Electricity 1990 – 1993	
Venezuela	VEN	30.8	30.0	0.8	MIMIC 1990 – 1993	Electricity 1989 – 1990	
Sri Lanka		40.0	40.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available
Cyrus		21.0	21.0	Same estimate	Electricity 1989 – 1990	Electricity 1989 – 1990	Only one estimate available

Source: Friedman, Johnson, and Kaufmann (2000).

Table 3 presents estimates of the size of the informal economy for seven Caribbean countries from 1999 to 2007 obtained from Schneider, Buehn, and Montenegro (2010). Generally, higher levels of informal activity are associated with lower income levels. Haiti has the highest level of informal activity and the lowest per capita income in the Caribbean region. The Bahamas, on the other hand, has a very high level of income and lower levels of informal activity. Income is not the only factor: Suriname has a higher level of informal activity vis-à-vis Guyana and Jamaica, even though it has a higher per capita income. In Jamaica and Trinidad and Tobago, a positive trend can be observed which is consistent with the global findings of Schneider, Buehn, and Montenegro (2010). The other countries show no increasing or decreasing trends in the size of the informal economy. These estimates will be used as benchmarks for the derived estimates of this study.

Table 3: Estimates of the Share of the Unofficial Economy in the Caribbean

	Years									
Country	1999	2000	2001	2002	2003	2004	2005	2006	2007	Country average
Bahamas, The	26.1	26.2	26	26	25.5	25.1	25.8	26.2	26.2	25.9
Barbados	33.8	35.3	37.7	37.9	38.3	38.4	38.1	37.8	38.0	37.3
Belize	42.4	43.8	44.3	44.2	45.2	45.5	45.4	45.9	45.6	44.7
Guyana	33.8	33.6	33.8	33.5	33.3	33.8	33	33.4	33.3	33.5
Haiti	56.0	55.4	54.7	54.3	54.4	53.4	53.7	53.8	53.7	54.4
Jamaica	36.4	36.4	36.6	36.6	38.6	39.1	38.9	40.2	40.5	38.1
Suriname	39.9	39.8	40.3	40.8	41.5	42.9	43.3	43.9	44.7	41.9
Suriname (*)	77.0	32.0	63.0	30.0	31.0	21.0	29.0	32.0	24.0	37.7
Trinidad and Tobago	34.1	34.4	34.5	34.4	35.4	35.7	35.9	36.8	37.3	35.4

Source: Schneider, Buehn, and Montenegro (2010); *Kamau & Lin (2015), Greenidge, Holder, and Mayers (2009).

4. Methodological Approaches to Estimating the Shadow Economy

There are several approaches to estimating the size of the informal economy, which have been extensively documented.[2] Two broad approaches are the direct approach and the indirect approach. Direct approaches to estimating the informal sector are microeconomic approaches that employ survey data based on voluntary responses or that use tax auditing and compliance data. As with most micro methodologies, the advantages lie in the richness of the data and the detailed inferences one can make about the structure of the shadow economy. Isachsen, Klovland and Strom (1982) and Isachsen and Strom (1980) used voluntary sample survey methods to estimate the size of the shadow economy for Norway. Mogensen et al. (1995) used the direct approach to estimate the size of the shadow economy in Denmark and found that it ranged from 2.7 percent of GDP in 1989 to 3.1 percent in 1994.

Other direct approaches involve exploiting the differences between income declared for tax purposes and that measured by selective checks (Schneider and Enste, 2000). This particular approach measures the size of the shadow economy by calculating the extent of tax evasion.[3] Both the volunteer sample surveys and the tax compliance direct approaches suffer from selection biases. In the volunteer sample surveys, individuals and firms are usually reluctant to declare their fraudulent behaviour, thus inducing biases that reduce confidence in the estimates arising from this approach. With tax compliance methods based on tax audits, the tax audit selection procedures are likely to induce selection biases both because tax authorities have limited ability to achieve full discovery of fraud and because the operating sample would arise as a result of the characteristics of submitted tax returns, which is by definition non-random and subject to bias.

Indirect approaches are primarily macroeconomic approaches to estimating the size of the shadow economy. The most fundamental macroeconomic approach is to examine the discrepancy between national expenditure and income statistics. Ideally, in national income accounting, the income measure of GDP is expected to equal the expenditure measure of GDP. Any difference is attributed to the informal sector (or unreported income). Several studies have employed this method (e.g., Thomas, 1992; Yoo and Hyun, 1998). Unfortunately, significant discrepancies can occur as a result of

[2] See Schneider and Enste (2000) for a detailed review of widely used methods to measure the size and growth of the shadow economy.
[3] See Dallago (1990) and Thomas (1992) for a detailed discussion.

statistical measurement errors and omissions, which have nothing to do with informal activity. Moreover, in many countries—particularly small developing countries such as those in the Caribbean—a dual approach to computing national income accounts is not employed. Often the income and expenditure approaches are combined on the basis of computational ease for particular sectors, rendering this approach infeasible. The three most commonly used methods are indirect approaches and are outlined below.

4.1. The Multiple Indicators Multiple Causes (MIMIC) Method

This method assumes that the size of the informal economy can be modelled as a latent variable that has observable causes and effects. For example, a growing shadow economy might be induced by an increasing tax and regulatory burden and might cause an increase in the demand for cash or electricity (Andrews, Sanchez, and Johansson, 2011). Estimates are derived from a simultaneous equation system with a set of equations modelling the effects as a function of the latent variable, and another set modelling the latent variable as a function of the causal variables. A measure of the size of the informal economy is obtained from the fitted values of this latent variable (Andrews, Sanchez, and Johansson, 2011).

4.2. Currency Demand Approach

The critical assumption of the currency demand approach is that cash transactions account for the majority of informal sector transactions. If this is the case, a change in the size of the informal economy (or demand for money) is caused by a change in the tax and regulatory burden. First, a money demand function of the following form proposed by Tanzi (1983) is estimated:

$$\ln(C/M_2)_t = \beta_0 + \beta_1 \ln(1+TW)_t + \beta_2 \ln(WS/Y)_t + \beta_3 \ln(R)_t + \beta_4 \ln(Y/N) + u_t$$

The dependent variable is the ratio of cash holdings to current and deposit accounts (C/M_2), and the independent variables are the standard variables that determine demand for liquidity and some measures of the tax and regulatory burden (interest rate R, real per capita income Y/N, tax rates –TW, ratio of wages and salaries to national income WS/Y).

The excess return or unexplained variation in the dependent variable is attributed to the rising (or falling) tax burden as well as other factors that induce individuals and firms

to enter the informal sector. A comparison can then be made between currency states of low and high tax and regulatory burdens. If income velocity for currency is the same in the informal sector as it is in the formal sector, the size of the shadow economy can be computed and subsequently compared to the official economy.

This approach is perhaps the most commonly used method, especially in developing countries or other limited data environments. Most variables used are easily found and reasonably well measured across a wide range of countries. However, limitations abound. First, not all informal transactions are cash transactions. A significant enough volume of transactions might be accounted for by barter (see Table 1). Second, the tax burden is not the only cause of informal sector participation. There are several others, such as regulation or changes in attitudes and mores toward paying taxes. The third limitation is the contrary evidence that the velocity of money is the same in the official and unofficial economy (Hill and Kabir, 1996; Klovland, 1984). Finally, the currency demand approach assumes there is no shadow economy in the base year, which clearly is highly restrictive and biases the estimates of the size of the informal economy downward.

4.3. Electricity Consumption/Macroelectric Approach

Energy consumption and economic activity have been observed to be highly correlated. If electricity consumption can be used as an approximation for total economic activity, formal and informal, the difference in the growth of official GDP and predicted GDP (from electricity consumption) can be used to estimate the size of the informal economy (see Kaufmann and Kaliberda, 1996; Lackó, 1998; Schneider and Enste, 2000). This approach is also popular in limited data environments because it is not intensive in data. There are three major limitations to this approach. First, not all shadow economic activities require considerable energy consumption (for example, personal services). Second, technological progress in energy production and consumption mean that there is a greater degree of efficiency in both formal and informal economies, and this could distort estimates of the informal sector size. Finally, elasticities of electricity/GDP may differ considerably across countries and across time. This study will attempt to mitigate this limitation by using actual estimated elasticities of electricity/GDP for the countries in the sample.

5. Data

The study area comprises the following Caribbean countries: The Bahamas, Barbados, Guyana, Jamaica, Suriname, and Trinidad and Tobago. National income accounting, tax revenue, and electricity consumption data are obtained from the World Bank World Development Indicators (WDI). Monetary data were obtained from each country's central bank statistical databases. The sample period is from 1990 to the most recent available year for each country and respective analysis (macroelectric and currency demand), and ranges from 2012 to 2014.

6. Results

6.1. Macroelectric Approach Results

The results for the macroelectric approach to estimating informal sector size are reported in Tables 4–9. These tables show estimates of the informal sector using both the assumption of unitary elasticity, which stipulates that on average electricity consumption and total economic activity grow at the same rate and actual estimated elasticities for the respective countries. This approach differs from other studies in the literature that tend to use an approach based on a scenario of proposed conservative, unitary, and liberal elasticities chosen by the researcher. This was most notably employed in Kaufmann and Kaliberda (1996). In addition, for the purposes of current and future comparisons of these results with those of other studies on the region, this study considers two alternative base years: 1999 and 2007. One of the challenges of this approach is that the results are sensitive to the starting value or the initial estimate of the informal sector size. In most cases, the initial values are obtained from Schneider and Enste (2000), who employed a currency demand approach to estimating informal sector size for Caribbean countries. Appendix tables present the data used and show the computations of all indices used to compute the informal sector size estimates produced in the tables that follow.

6.1.1. The Bahamas

The findings show that informal sector activity in The Bahamas ranges from 15 to 28.6 percent of GDP using the unitary elasticity assumption and 24.5–27.9 percent of GDP using an estimated elasticity for the Bahamas of 0.61 (see Table 4). These estimates are 22-year period averages and based on initial estimates of 26.1 percent in 1999 and 26.2 in 2007. It is also clear that the informal sector size follows the official sector quite closely, falling precipitously during the great recession and then rising thereafter until the end of

the sample period. In keeping with The Bahamas' status as a high-income country, the findings indicate that The Bahamas' informal sector is under one-third of total economic activity with a very marginal upward trend.

Table 4: The Bahamas' Relative Share of Informal Sector GDP, 1990–2012

Year	Unitary elasticity (Base year: 1999)	Unitary elasticity (Base year: 2007)	Estimated elasticity (Base year: 1999)	Estimated elasticity (Base year: 2007)
1990	…	…	…	…
1991	18.3	2.8	27.7	24.3
1992	23.8	9.3	31.7	28.5
1993	26.4	12.4	33.1	30.0
1994	28.2	14.5	33.3	30.2
1995	23.7	9.2	29.6	26.3
1996	22.5	7.8	27.8	24.5
1997	24.9	10.7	28.7	25.3
1998	28.0	14.4	29.3	26.0
1999	26.3	12.3	26.3	22.9
2000	28.5	14.9	26.5	23.1
2001	29.1	15.6	26.2	22.7
2002	31.2	18.2	26.8	23.4
2003	35.3	23.1	29.9	26.6
2004	34.4	21.9	29.0	25.7
2005	35.6	23.4	28.9	25.6
2006	35.1	22.8	27.9	24.5
2007	38.0	26.2	29.5	26.2
2008	30.2	17.0	25.1	21.6
2009	25.5	11.3	23.4	19.9
2010	26.8	12.9	23.8	20.3
2011	23.9	9.4	21.8	18.1
2012	33.0	20.3	27.3	23.9
Average	28.6	15.0	27.9	24.5

6.1.2. Barbados

The results for Barbados are shown in Table 5. They are based on an initial estimate of 33.77 percent of GDP in 1999 (Greenidge, Holder, and Mayers, 2009) and 38.0 percent of GDP in 2007. The 22-year period averages indicate that the Barbados informal sector ranges from 29.2 to 36.4 percent of GDP using a unitary elasticity

assumption and from 34.1 to 40.7 percent of GDP using an estimated elasticity. The findings indicate a clear upward trend in informal sector activity throughout the sample period.

Table 5: Barbados's Relative Share of Informal Sector GDP, 1990–2015

Year	Unitary elasticity (Base year: 1999)	Unitary elasticity (Base year: 2007)	Estimated elasticity (Base year: 1999)	Estimated elasticity (Base year: 2007)
1990	…	…	…	…
1991	15.0	5.3	32.0	38.8
1992	22.6	13.8	36.7	43.1
1993	21.6	12.6	36.1	42.5
1994	23.9	15.2	36.1	42.5
1995	26.8	18.5	36.2	42.7
1996	28.6	20.5	35.3	41.8
1997	29.6	21.6	33.8	40.5
1998	28.9	20.8	32.1	38.9
1999	33.8	26.2	33.8	40.4
2000	34.8	27.4	32.4	39.2
2001	39.2	32.2	35.1	41.7
2002	41.5	34.9	35.8	42.3
2003	43.1	36.7	35.7	42.1
2004	44.1	37.8	35.5	42.0
2005	45.5	39.3	34.6	41.2
2006	43.8	37.4	31.5	38.4
2007	44.3	38.0	31.1	38.0
2008	45.8	39.7	31.6	38.5
2009	48.5	42.7	34.6	41.2
2010	48.8	43.0	34.6	41.2
2011	45.6	39.4	32.8	39.6
2012	45.7	39.5	32.7	39.5
Average	36.4	29.2	34.1	40.7

6.1.3. Guyana

The 22-period average for Guyana reported in Table 6 shows that Guyana's informal sector ranges from 28.6 to 32.1 percent of total economic activity using the unitary elasticity assumption, and 32.7 to 33.1 percent of total economic activity using an estimated elasticity. In addition, its informal sector activity has been trending slightly upward over the last two decades.

Table 6: Guyana's Relative Share of Informal Sector GDP, 1990–2013

Year	Unitary elasticity (Base year: 1999)	Unitary elasticity (Base year: 2007)	Estimated elasticity (Base year: 1999)	Estimated elasticity (Base year: 2007)
1990	…	…	…	…
1991	27.5	23.8	37.3	37.7
1992	20.0	15.8	31.2	31.7
1993	14.4	10.0	26.2	26.7
1994	27.7	23.9	33.2	33.6
1995	24.1	20.2	29.9	30.3
1996	32.1	28.7	33.9	34.4
1997	27.9	24.2	29.8	30.3
1998	34.9	31.5	35.0	35.4
1999	33.4	30.0	33.4	33.8
2000	34.3	30.9	34.3	34.7
2001	33.5	30.1	33.3	33.8
2002	32.4	28.9	32.3	32.7
2003	28.1	24.4	29.6	30.0
2004	31.8	28.3	31.5	32.0
2005	35.1	31.8	34.3	34.7
2006	34.2	30.8	32.6	33.1
2007	37.2	34.0	33.6	34.0
2008	37.1	33.8	33.1	33.5
2009	37.4	34.2	32.7	33.1
2010	41.6	38.6	35.1	35.6
2011	40.8	37.7	33.4	33.9
2012	41.3	38.3	32.9	33.4
2013	41.0	37.9	31.7	32.1
Average	32.1	28.6	32.7	33.1

6.1.4. Jamaica

Jamaica's results are shown in Table 7. They yield period average estimates of the informal sector between 18.6 and 34.9 percent of total economic activity using the unitary elasticity assumption, and 38.6 and 44 percent of total economic activity using an estimated elasticity. These results vary considerably. Due to dramatic changes in electricity consumption that are not likely due to changes in economic activity of any kind, they yield negative numbers from 2008 to 2012. This is obviously not a feasible solution; thus, the informal sector figures in columns 3 and 4 of Table 7 are likely more accurate, showing no clearly discernible trend in informal sector size. Given Jamaica's relative stagnation over the last three decades, this comes as no surprise.

Table 7: Jamaica's Relative Share of Informal Sector GDP, 1990–2012

Year	Unitary elasticity (Base year: 1999)	Unitary elasticity (Base year: 2007)	Estimated elasticity (Base year: 1999)	Estimated elasticity (Base year: 2007)
1990	...	...	...	...
1991	-63.2	-40.2	41.8	42.9
1992	18.1	30.1	45.7	47.1
1993	15.2	28.2	40.9	42.8
1994	22.9	35.2	40.7	43.1
1995	34.8	45.7	40.5	43.3
1996	36.4	47.6	40.7	44.2
1997	38.7	50.0	41.5	45.4
1998	42.3	53.4	43.0	47.4
1999	42.5	53.8	42.5	47.2
2000	42.5	54.1	42.0	47.1
2001	41.8	53.8	41.3	46.8
2002	42.5	54.6	40.3	46.1
2003	42.1	54.4	38.2	44.4
2004	40.8	53.5	37.4	43.8
2005	40.8	53.7	36.9	43.6
2006	38.5	52.1	35.0	42.1
2007	23.4	40.5	32.9	40.5
2008	-26.2	2.4	30.9	39.0
2009	-14.3	11.9	34.3	42.2
2010	-13.0	13.2	35.3	43.2
2011	-15.8	11.4	34.1	42.4
2012	-21.1	7.5	34.2	42.6
Average	18.6	34.9	38.6	44.0

6.1.5. Suriname

Estimates of Suriname's informal sector size range from 32.6 to 45.8 percent with a unitary elasticity assumption, and 28.5 and 45.9 percent using an estimated elasticity. Over the last two decades, informal sector activity appears to be trending downward.

Table 8: Suriname's Relative Share of Informal Sector GDP, 1990–2012

Year	Unitary elasticity (Base year: 1999)	Unitary elasticity (Base year: 2007)	Estimated elasticity (Base year: 1999)	Estimated elasticity (Base year: 2007)
1990	…	…	…	…
1991	51.0	60.6	43.6	57.3
1992	52.6	61.9	44.0	57.6
1993	56.6	65.1	48.2	60.8
1994	55.7	64.4	46.6	59.6
1995	49.8	59.6	45.0	58.4
1996	42.0	53.4	43.1	57.0
1997	39.2	51.1	40.0	54.6
1998	38.2	50.4	39.0	53.9
1999	39.7	51.5	39.7	54.4
2000	37.9	50.1	39.4	54.2
2001	35.5	48.2	36.8	52.1
2002	35.3	48.0	34.5	50.4
2003	32.4	45.7	30.7	47.6
2004	26.7	41.1	24.4	42.8
2005	23.9	38.8	21.0	40.2
2006	23.7	38.7	18.5	38.3
2007	19.2	35.1	14.2	35.1
2008	15.3	31.9	10.6	32.3
2009	12.8	29.9	7.9	30.3
2010	9.5	27.3	3.4	26.9
2011	9.2	27.0	-0.9	23.7
2012	10.6	28.1	-3.2	21.9
Average	32.6	45.8	28.5	45.9

6.1.6. Trinidad and Tobago

Table 9 shows the findings for Trinidad and Tobago. The period average estimates of the informal sector show that it ranges from 31 to 40.8 percent of total economic activity when a unitary elasticity assumption is employed, and 32.9 to 38.2 percent of total economic activity when an estimated elasticity is used.

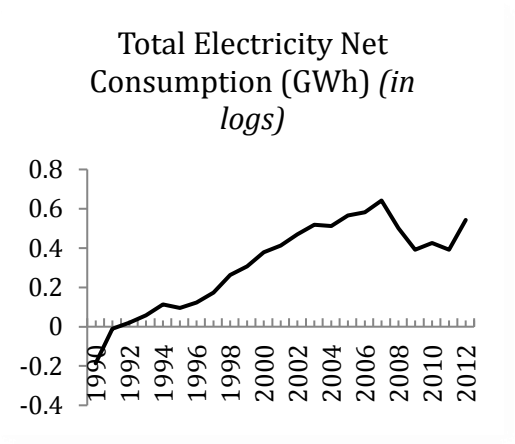
Table 9: Trinidad and Tobago's Relative Share of Informal Sector GDP, 1990–2014

Year	Unitary elasticity (Base year: 1999)	Unitary elasticity (Base year: 2007)	Estimated elasticity (Base year: 1999)	Estimated elasticity (Base year: 2007)
1990	…	…	…	…
1991	31.2	41.0	26.7	32.6
1992	37.4	46.3	34.2	39.4
1993	38.0	46.8	34.7	39.9
1994	37.7	46.5	34.7	40.0
1995	39.9	48.4	37.8	42.8
1996	38.8	47.5	37.2	42.2
1997	41.3	49.6	40.8	45.5
1998	38.7	47.4	38.5	43.4
1999	34.7	43.9	34.7	39.9
2000	33.1	42.6	33.6	38.9
2001	32.4	42.0	33.3	38.6
2002	27.0	37.4	28.0	33.7
2003	28.9	39.0	31.5	37.0
2004	22.4	33.4	25.2	31.2
2005	25.1	35.7	28.9	34.6
2006	18.3	29.8	22.8	29.0
2007	20.2	31.5	25.6	31.5
2008	18.4	30.0	24.0	30.1
2009	22.5	33.5	27.9	33.6
2010	28.9	38.9	34.7	39.9
2011	31.4	41.1	37.5	42.5
2012	33.3	42.8	39.6	44.4
2013	32.5	42.1	38.9	43.8
2014	31.4	41.1	37.8	42.8
Average	31.0	40.8	32.9	38.2

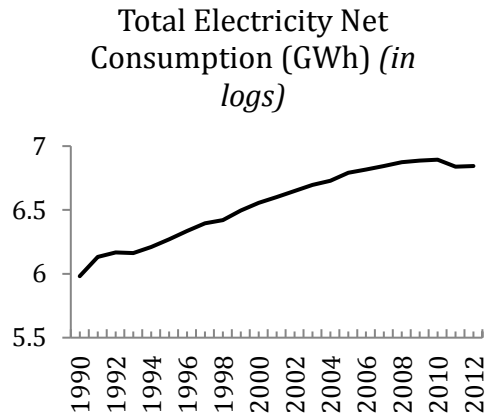
6.2. Diagnostics

Figure 1 shows the evolution of electricity consumption in the six Caribbean countries studied. The estimates of informal sector size are based on the growth of electricity consumption and the assumption that electricity consumption and total economic activity move in tandem. To evaluate the reliability of these results, it makes sense to examine the behaviour of the key determining variable electricity consumption. Barbados, Guyana, and Trinidad and Tobago appear to have smooth electricity consumption profiles with long-run growth rates that appear stable and consistent with the evolution of productive capacity. For most of the electricity consumption series, The Bahamas exhibits the same characteristic, but around the time of the great recession (between 2007 and 2008), The Bahamas experienced dramatic declines in electricity consumption, which only began to recover in 2012. This, however, is not necessarily a cause for concern because it is still consistent with the evolution of productive economic activity. Jamaica and Suriname, on the other hand, have electricity consumption time profiles that raise doubts that the dramatic changes in electricity consumption were in any way related to increases or decreases in total economic activity, which logically raises questions about the derived estimates of the informal sector size. While the direction of movement of electricity consumption in Jamaica and Suriname may not necessarily be a problem and may even roughly accord with general economic activity over the long run, the year-on-year dramatic changes in electricity consumption are too large to be reasonably associated with changes in informal sector participation and activity.

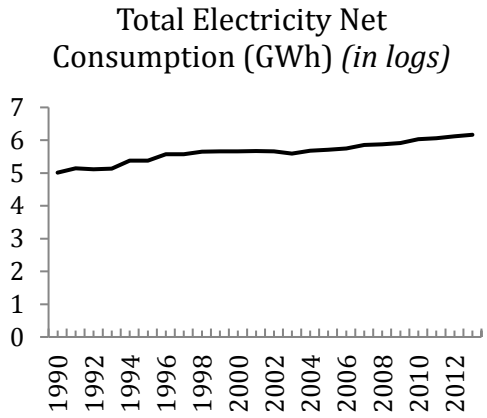
Figure 1: Electricity Consumption Trends



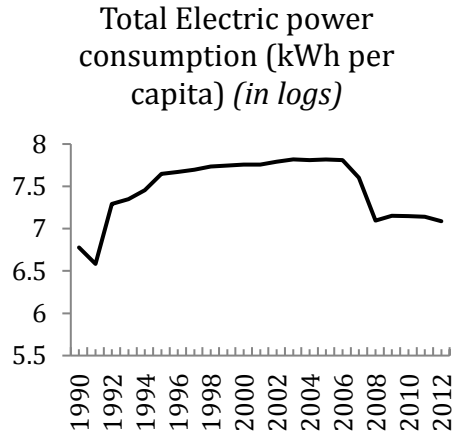
(a) The Bahamas



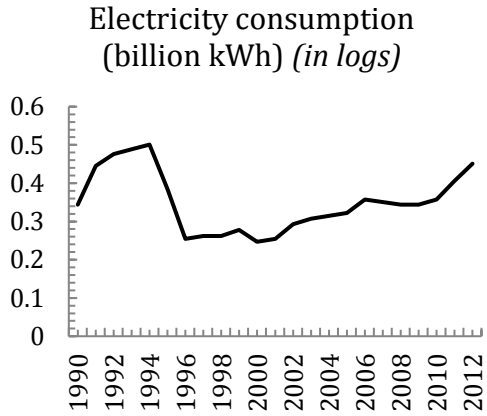
(b) Barbados



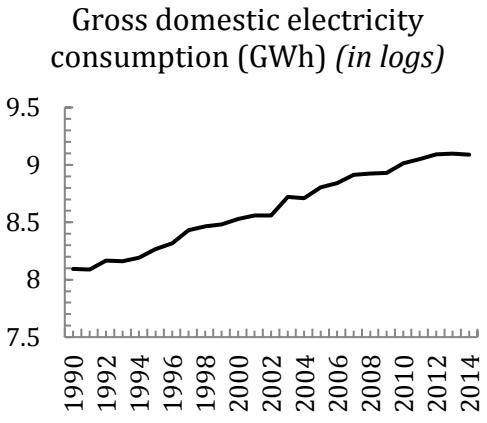
(c) Guyana



(d) Jamaica



(e) Suriname



(f) Trinidad and Tobago

6.3. Currency Demand Approach

Table 10 shows the results obtained from estimating the currency demand equation stated earlier in the study. The limitations of this approach in the Caribbean pertain to limited availability of long annual time series data. Wages and salaries, for example, could not in some cases be consistently obtained for long periods, and, in many cases could not be obtained at all. As a result, this variable is omitted. Detailed tax data is also difficult to obtain. To get an idea of the average tax rate, this study employed total tax revenue as a percentage of GDP. Because we log this variable, we add one to Tax/GDP.

Table 10. Currency Demand Regressions

Dep. variable: Currency Holdings/M2	Bahamas	Barbados	Guyana	Jamaica	Suriname	Trinidad
1+Tax revenue (in % of GDP) *(in logs)*	0.084	0.795	1.10e+01	0.422***	1.155	0.104
	(0.132)	(0.616)	(4.15e-01)	(0.191)	(4.104)	(0.217)
GDP per capita *(in logs)*	1.622***	-1.890***	0.838***	-0.872***	-6.234**	0.205
	(0.274)	(0.627)	(0.221)	(0.370)	(3.164)	(0.308)
Deposit interest rate	0.078*	0.223***	1.67e-01**	-0.018	-3.170	-0.065
	(0.044)	(0.117)	(8.95e-02)	(0.018)	(4.289)	(0.096)
D-W	1.48	0.57	1.61	1.41	1.85	0.43
R-Squared	0.91	0.72	0.72	0.30	0.45	0.35

Note: constant not reported. Standard errors are in parentheses. *** 1% significance, ** 5% significance, * 10% significance.

This study closely follows the methodology of Tanzi (1983). Following Tanzi (1983), upon deriving estimated coefficients for the currency demand regressions, the predicted level of currency holdings for each year in the sample is computed (labelled $\hat{C}$). After this procedure, the predicted level of currency demand is computed assuming that taxes are equal to zero (labelled $\hat{\hat{C}}$). The difference between these predicted currency holdings $\hat{C}$ and $\hat{\hat{C}}$ is an approximation of how much currency holding is tax-induced (Tanzi, 1983). The idea is that when taxes rise, individuals have an incentive to evade taxes and, to do so, they will likely need to raise the level of cash or currency transactions. Tanzi (1983) refers to this difference as "illegal money." "Legal money," on the other hand, is the difference between M1 and illegal money. Following Tanzi (1983), this study divides GDP by legal money to derive an estimate of income velocity of legal money and assumes

that this velocity is identical to that of the income velocity of illegal money. A multiplication of the income velocity of illegal money by illegal money yields an estimate of informal sector economic activity and thus the size of the informal sector relative to GDP. These results are shown in Appendix B, and the results are summarised in the tables that follow.

6.3.1 The Bahamas

The currency demand results for The Bahamas differ markedly from those obtained from the macroelectric approach. Estimated for the period 2000–2013, the period average informal sector size is 3.41 percent of GDP, which is a considerably lower estimate than the 24.5 percent obtained by the macroelectric approach. In both cases, the estimates are stable and mean reverting indicates no major upward or downward trend. Estimating currency demand equations for the Bahamas posed considerable challenges given that this economy has a fixed exchange rate to the U.S. dollar at a one-to-one parity. Because of this and its close proximity to the United States, U.S. dollars and Bahamian dollars are frequently used interchangeably. Data on the extent of this phenomenon are hard to come by, which makes inference using this approach much more challenging. Given the consistency of the reported macroelectric results with those obtained by Schneider, Buehn, and Montenegro (2010), who employ the MIMIC method for The Bahamas, greater emphasis will be placed on these results in the concluding remarks.

Table 11. The Bahamas: Estimates of Informal Economy, Using Average Tax Rate, 1990–2013

Year	Illegal money (1)	Legal money (2)	Income velocity of legal money (3)	Informal economy (4)	Informal economy (in % of GDP) (5)
2000	29.62	769.78	9298.70	275473.38	3.85
2001	28.55	736.75	9970.59	284641.11	3.87
2002	29.75	775.05	9734.28	289621.64	3.84
2003	30.77	871.33	8549.13	263065.93	3.53
2004	36.91	1105.19	6799.61	250963.85	3.34
2005	42.31	1218.79	6375.20	269733.33	3.47
2006	45.99	1258.71	6328.40	291069.15	3.65
2007	46.89	1254.81	6439.88	301983.12	3.74
2008	44.95	1255.85	6284.99	282490.36	3.58
2009	39.15	1249.55	6052.96	236989.85	3.13
2010	39.91	1294.89	5930.88	236681.95	3.08
2011	42.34	1391.26	5553.89	235130.14	3.04
2012	43.75	1519.45	5198.11	227439.63	2.88
2013	43.44	1604.16	4924.70	213952.14	2.71

6.3.2 Barbados

Currency demand estimates for Barbados are for the period 1980–2008. The results show that over this period, the informal sector averaged 32.4 percent of GDP and trended downward until the 2000s, when it dropped below 20 percent of GDP. Although the trending properties differ, the average informal sector size compares favourably to the estimates produced by the macroelectric approach in Table 5.

Table 12. Barbados: Estimates of Informal Economy, Using Average Tax Rate, 1980–2008

Year	Illegal money (1)	Legal money (2)	Income velocity of legal money (3)	Informal economy (4)	Informal economy (in % of GDP) (5)
1980	74753.00	180687.00	4.47	333868.37	41.37
1981	90083.95	179595.05	4.40	396761.52	50.16
1982	110432.49	155666.51	4.84	534191.09	70.94
1983	112014.75	197093.25	3.84	429660.31	56.83
1984	110333.10	191058.90	4.10	452745.97	57.75
1985	114522.14	230685.86	3.43	393182.05	49.64

Year	Illegal money (1)	Legal money (2)	Income velocity of legal money (3)	Informal economy (4)	Informal economy (in % of GDP) (5)
1986	104682.41	298356.59	2.79	292269.24	35.09
1987	117905.31	359766.69	2.37	279878.97	32.77
1988	127333.97	447274.03	1.98	251665.03	28.47
1989	119599.39	395046.61	2.32	277316.75	30.27
1990	143375.16	481362.84	1.84	263897.38	29.79
1991	177748.96	372166.04	2.29	406443.24	47.76
1992	201512.63	409284.37	1.96	395359.93	49.24
1993	196794.18	427753.35	1.89	372192.27	46.01
1994	209113.26	586524.40	1.41	294136.84	35.65
1995	220635.72	678669.69	1.24	273734.45	32.51
1996	238238.15	798507.91	1.10	261358.23	29.84
1997	228695.61	1035079.94	0.89	202606.45	22.09
1998	215459.97	1102096.24	0.86	185920.64	19.55
1999	231482.07	1168186.84	0.82	189039.88	19.82
2000	239828.77	1279944.31	0.78	186812.26	18.74
2001	312932.51	1271902.23	0.76	239392.09	24.60
2002	328537.12	1960132.16	0.50	164425.10	16.76
2003	334488.44	2082347.91	0.48	160951.69	16.06
2004	359932.97	2503249.16	0.41	146086.89	14.38
2005	436597.83	2750863.60	0.38	167759.65	15.87
2006	447982.00	2709012.29	0.41	184715.25	16.54
2007	558367.75	3244489.76	0.35	195502.47	17.21
2008	507870.54	3162475.44	0.36	183236.30	16.06

6.3.3 Guyana

For the period 2005–2013, the average informal sector size in Guyana was estimated at 19 percent of GDP with no evidence of any trend. These estimates are considerably lower than those reported in Table 6.

Table 13. Guyana: Estimates of Informal Economy, Using Average Tax Rate, 2005–2013

Year	Illegal money (1)	Legal money (2)	Income velocity of legal money (3)	Informal economy (4)	Informal economy (in % of GDP) (5)
2005	7E+09	4E+10	7E-06	5E+04	19.04
2006	9E+09	5E+10	6E-06	5E+04	18.18
2007	1E+10	6E+10	5E-06	6E+04	18.46
2008	1E+10	6E+10	5E-06	6E+04	18.31
2009	1E+10	7E+10	5E-06	7E+04	20.39
2010	2E+10	8E+10	4E-06	7E+04	19.50
2011	2E+10	1E+11	4E-06	7E+04	19.36
2012	2E+10	1E+11	3E-06	7E+04	18.06
2013	2E+10	1E+11	3E-06	7E+04	18.40

6.3.4 Jamaica

The findings for Jamaica are shown in Table 14. In 2014, the informal sector is estimated to be 40.3 percent of GDP. Over the last two decades, the informal sector has ranged from 38.34 percent of GDP in 1992 to 51.8 percent of GDP in 2000. These results also roughly accord with those obtained from the macroelectric approach using 2007 as the base year and an estimated electricity-GDP elasticity.

Table 14. Jamaica: Estimates of Informal Economy, Using Average Tax Rate, 1992–2014

Year	Illegal money (1)	Legal money (2)	Income velocity of legal money (3)	Informal economy (4)	Informal economy (in % of GDP) (5)
1992	2850.11	7433.49	93.36	266073.38	38.34
1993	3785.81	10612.89	71.55	270858.54	35.67
1994	5046.68	11327.32	67.96	342975.37	44.55
1995	7101.93	16125.77	48.86	346998.38	44.04
1996	8059.11	21107.39	37.29	300489.79	38.18
1997	9162.20	19461.60	39.98	366283.53	47.08
1998	9777.93	20399.07	37.25	364228.14	47.93
1999	11651.91	27417.29	28.01	326314.31	42.50
2000	13005.44	25105.96	30.85	401246.24	51.80
2001	14141.28	31168.82	25.19	356149.90	45.37

Year	Illegal money (1)	Legal money (2)	Income velocity of legal money (3)	Informal economy (4)	Informal economy (in % of GDP) (5)
2002	15863.34	35623.36	22.48	356544.27	44.53
2003	18214.83	37039.87	22.41	408175.34	49.18
2004	21137.68	46685.77	18.01	380780.67	45.28
2005	22847.25	49888.98	17.01	388594.00	45.80
2006	25564.85	61320.71	14.24	364010.96	41.69
2007	30167.06	75387.60	11.75	354394.05	40.02
2008	31907.24	68189.89	12.89	411409.33	46.79
2009	35279.43	72538.53	11.58	408696.71	48.64
2010	36085.27	76149.11	10.87	392282.09	47.39
2011	36782.96	83786.89	10.05	369678.31	43.90
2012	40582.15	92682.35	9.03	366490.25	43.79
2013	44663.49	104070.52	8.09	361178.92	42.92
2014	47408.63	117601.78	7.21	341599.82	40.31

6.3.5 Suriname

Table 15 reports the results for Suriname. In 2013, the informal sector is estimated at 11 percent of GDP, down from 164 percent of GDP in 2001. This clear downward trend over the period is also reflected in the macroelectric results shown in Table 8. The magnitudes of these results are larger than those reported in Table 8, but in more recent years there appears to be some convergence in the estimated magnitudes. Over the entire period, the informal sector averages 60 percent of GDP, and since 2004, the informal sector has averaged 39 percent of GDP.

Table 15. Suriname: Estimates of Informal Economy, Using Average Tax Rate, 2001–2013

Year	Illegal money (1)	Legal money (2)	Income velocity of legal money (3)	Informal economy (4)	Informal economy (in % of GDP) (5)
2001	118.66	72.16	19.68	2335.16	164.45
2002	306.98	247.23	5.99	1838.98	124.17
2003	295.89	258.20	6.08	1799.22	114.60
2004	291.09	461.47	3.72	1082.03	63.08
2005	405.57	510.55	3.51	1424.94	79.44
2006	428.19	815.66	2.28	977.86	52.50

Year	Illegal money (1)	Legal money (2)	Income velocity of legal money (3)	Informal economy (4)	Informal economy (in % of GDP) (5)
2007	581.78	1076.25	1.82	1058.36	54.06
2008	591.06	1311.28	1.55	919.10	45.08
2009	519.36	1797.51	1.17	606.89	28.89
2010	443.65	2077.72	1.06	471.64	21.35
2011	509.93	2653.64	0.88	446.81	19.22
2012	479.86	3343.38	0.72	343.97	14.35
2013	453.40	4108.25	0.60	272.00	11.04

6.3.6 Trinidad and Tobago

Estimates of the size of Trinidad's informal sector are shown in Table 16. The informal sector size ranged from 19.36 percent of GDP in 2001 to 37.10 percent of GDP in 2008. On average, the estimates appear to suggest that Trinidad's informal sector is just under 30 percent of GDP. This compares somewhat favourably with estimates reported in Table 9 using the macroelectric approach indicating that Trinidad and Tobago's informal sector size is above 30 but under 40 percent.

Table 16. Trinidad and Tobago: Estimates of Informal Economy, Using Average Tax Rate, 1992–2014

Year	Illegal money (1)	Legal money (2)	Income velocity of legal money (3)	Informal economy (4)	Informal economy (in % of GDP) (5)
1992	470.71	1806.69	18.51	8711.55	26.05
1993	486.81	2005.19	16.43	7999.67	24.28
1994	544.85	2527.45	13.50	7356.64	21.56
1995	…	…	…	…	…
1996	…	…	…	…	…
1997	640.81	3257.39	12.55	8044.64	19.67
1998	675.84	3396.56	13.02	8797.18	19.90
1999	716.59	3565.31	13.40	9599.22	20.10
2000	891.97	3995.23	12.86	11469.03	22.33
2001	1086.22	5609.38	9.54	10362.25	19.36
2002	1153.13	6178.47	9.35	10779.98	18.66
2003	1412.97	5896.43	11.21	15839.65	23.96
2004	1702.04	6675.56	10.69	18193.11	25.50
2005	2718.06	9598.04	7.90	21461.73	28.32
2006	3189.90	10318.00	8.32	26524.26	30.92
2007	3549.25	11572.85	7.77	27563.26	30.67
2008	4508.27	12151.43	7.65	34474.41	37.10
2009	5037.99	18122.31	4.90	24697.99	27.80
2010	6008.91	19274.09	4.61	27671.63	31.18
2011	7204.52	23980.28	3.70	26668.13	30.04
2012	7609.12	28071.78	3.21	24389.38	27.11
2013	9139.11	30984.49	2.95	27001.30	29.50
2014	10473.17	37246.03	2.48	25951.21	28.12

7 Discussion, Limitations and Conclusion

7.1 Discussion

This study applies two commonly used methodologies: (i) the electricity consumption method and (ii) the currency demand method, to determine the size of the informal sector in the heterogeneous Caribbean countries of The Bahamas, Barbados, Guyana, Jamaica, Suriname, and Trinidad and Tobago. The extent of unrecorded economic activity has several implications for the sustainable economic management of Caribbean countries.

As outlined at the beginning of the study, a deeper understanding of the informal sector offers revenue authorities information about the extent to which they can efficiently expand revenue. Measurement of informal sector activity is the foundation upon which policymakers can begin to understand and determine the optimal tax burden. In addition to providing an idea of the extent of untaxed activities (and thus potential for revenue gain), because the size of the informal sector is in part determined by the tax and regulatory burden imposed by government, measuring it allows broad understanding and indication of when policymakers have gone too far and created an environment with a preponderance of disincentives.

Most studies that estimate informal sector size utilize a single methodology. The various methodologies discussed in the methods section all attempt to measure the extent of recorded activity but embed within them different dimensions of the informal sector or slightly different definitions or interpretations of what it means to engage in informal sector activity. For example, the currency demand approach is largely based on the view that the overall level of taxation induces informal activity, whereas the electricity approach is a much broader interpretation. As a result of this variation, the results obtained should come as no surprise. Yet using two approaches allows either more robust conclusions in the case of similarities in the estimates or, in the case of substantive differences, leads to a more cautious interpretation of the results. Table 17 summarizes the results obtained in the study using period averages for both the electricity consumption methodology and the currency demand methodology and benchmarks these results against what others have found more often than not using other methods, such as the MIMIC methodology.

Table 17: Summary of Results Based on Period Averages (in % of GDP) and Non-sample Information (literature)

Country	Electricity consumption estimate	Currency demand estimate	Estimates from the literature	Conclusion
The Bahamas	15-25% 1999 b.y 28-29% 2007 b.y	3%	25.9% SBN using MIMIC	Under 30%, likely 20-30%
Barbados	34-36% 1999 b.y 29-41% 2007 b.y	33%	34% GHM using currency demand, 36% Vuletin (2008)	30-40%
Guyana	32-33% 1999 b.y 29-33% 2007 b.y	19%	34 % SBN using MIMIC, 27-101%	29-33%

Country	Electricity consumption estimate	Currency demand estimate	Estimates from the literature	Conclusion
			(1970–1989) 55% in 2000 Faal (2003) using currency demand, 57% Vuletin (2008)	
Jamaica	19-39% 1999 b.y 35-44% 2007 b.y	44%	38% SBN using MIMIC, 24% in 1984 WK, 40% in 2001 IADB (2006), 35% in 2001 Vuletin (2008)	35-44%
Suriname	29-33% 1999 b.y 46% 2007 b.y	61% & 39% from 2004–2013	42% SBN using MIMIC, 38% KL using currency demand	35-45%
Trinidad & Tob.	31-33% 1999 b.y 38-41% 2007 b.y	26%	35% SBN, 20% in 1999 MSW, 25% in 2000 Vuletin (2008)	26-33%

Note: b.y-base year; GHM-Greenidge et. al (2009), KL-Kamau and Lin (2015); MSW- Maurin, Sookram, Watson (2006); SBN- Schneider et. al (2010); WK-Witter and Kirton (1990).

The two methods produce vastly different results for The Bahamas. As previously discussed, due to the difficulties associated with estimating currency demand in a pseudo-dollarized economy where U.S. dollars and Bahamian dollars are used interchangeably, greater confidence must be placed in the electricity consumption estimates, which match very closely those of Schneider et al. (2010). The evidence thus suggests that the Bahamian informal sector is no more than 30 percent of GDP and likely falls in the 20–30 percent range.

Both methods produce similar results for Barbados and closely match the results obtained by Vuletin (2008) and Greenidge et al. (2009), suggesting that the average informal sector size in Barbados varies between 30 and 40 percent of GDP.

Estimates for Guyana range between 19 and 33 percent of GDP. The currency demand results produce a lower estimate of 19 percent, and the electricity consumption approach produces estimates of 29–33 percent of GDP. Several studies have been conducted on the Guyanese informal sector and its decline due to market reforms implemented in the late 1980s and early 1990s that transitioned Guyana from an inward-

oriented socialist economy to an outward-looking, liberalized, market-based economy. Faal (2003) has documented the rise and fall of the informal sector size associated with Guyana's move to a more command-based economy and back to a free market economy. The results of this study are consistent with a much smaller informal sector, under the magnitude of 50 percent of GDP. Schneider et al. (2010) conclude that Guyana's informal sector is approximately 34 percent of GDP. This study concludes that the size of Guyana's informal sector is likely in this range produced by the electricity consumption approach.

Several studies have been conducted on the rise of Jamaica's informal sector from the 1970s into the 1980s (Vuletin 2008; Witter and Kirton, 1990). For Jamaica, the currency demand and electricity consumption approaches produce similar results that also match what other studies have found. Schneider et al. (2010) estimate Jamaica's informal sector at 38 percent of GDP, Vuletin (2008) estimated it at 35 percent in 2001, and the IDB (2006) report on the informal sector in Jamaica estimated its size at 40 percent of GDP. In this study, the currency demand results indicate an informal sector size of 44 percent, whereas the electricity consumption estimates indicate that the informal sector ranges from 35 to 44 percent using a 2007 base year. This study concludes that Jamaica's informal sector likely ranges from 35 to 44 percent of GDP.

Like Guyana, Suriname has had a history of transition and reform, causing informal sector activity to vary considerably. Kamau and Lin (2015) document this comprehensively. The results of the electricity consumption approach produce estimates of 29–33 percent of GDP and 46 percent of GDP using 1999 and 2007, respectively, as base years. The currency demand estimate for the entire period is 61 percent, and in more recent years, 39 percent. Taking a broad average, this study concludes that the informal sector size in Suriname ranges between 35 and 45 percent of GDP. This is broadly consistent with the period average estimates of Kamau and Lin (2015) of 38 percent and the estimates of Schneider et. al (2010) of 42 percent.

Finally, the currency demand approach produces an estimate of 26 percent for Trinidad and Tobago, whereas the electricity consumption approach produces an estimate of 31–33 percent of GDP and 38–41 percent of GDP using 1999 and 2007 base years, respectively. Other estimates in the literature range from early estimates of 20 percent by Maurin, Sookram, Watson (2006) in 1999 to 25 percent of GDP by Vuletin (2008) in 2000. More recently, Schneider et. al (2010) produced an estimate of 35 percent of GDP. This study concludes that the informal sector in Trinidad and Tobago likely ranges from 26 to 33 percent.

Caribbean countries, though heterogeneous in many respects, exhibit many similarities, such as porous borders (both the Caribbean islands and continental Caribbean countries such as Guyana), similar tax administration regimes, and similar technologies within the formal and in the informal sector. The economic and institutional history of the Caribbean suggests that countries that had previously implemented socialist policies have implemented market reforms and are now more institutionally similar to their Caribbean neighbours. The evidence appears to suggest some convergence in the role, size, and importance of informal sector activity across these six Caribbean countries.

7.2 Limitations

Gathering information about unofficial activities is challenging because in many instances participants in the informal economy do not wish to be identified. This is further compounded by the fact that there are several approaches to defining the informal economy and estimating its size, causes, and impact. These challenges are general, but additional limitations abound. In general, the Caribbean is a limited data environment, a limitation that is sometimes compounded by poor data quality.

7.3 Conclusion

The objective of this study was to estimate the size of the informal sector in the six heterogeneous countries of Caribbean, namely: The Bahamas, Barbados, Guyana, Jamaica, Suriname, and Trinidad and Tobago. To do so, two analytical approaches were employed: first, the macroelectric approach (alternatively referred to as the electricity consumption approach), a method based primarily on the empirical relationship between electricity consumption and economic activity, that allows a researcher to track the growth of hidden activities on the basis of an assumed electricity consumption-GDP elasticity. The second is the currency demand approach, which assumes that hidden activity can be tracked by cash transactions and that they vary by the degree of taxation burden in a country.

Considering the results of both methods and taking into account non-sample-based information from the literature, this study concludes that the informal sector size is 20–30 percent in The Bahamas, 30–40 percent in Barbados, 29–33 percent in Guyana, 35–44 percent in Jamaica, 35–45 percent in Suriname, and 26–33 percent in Trinidad and Tobago.

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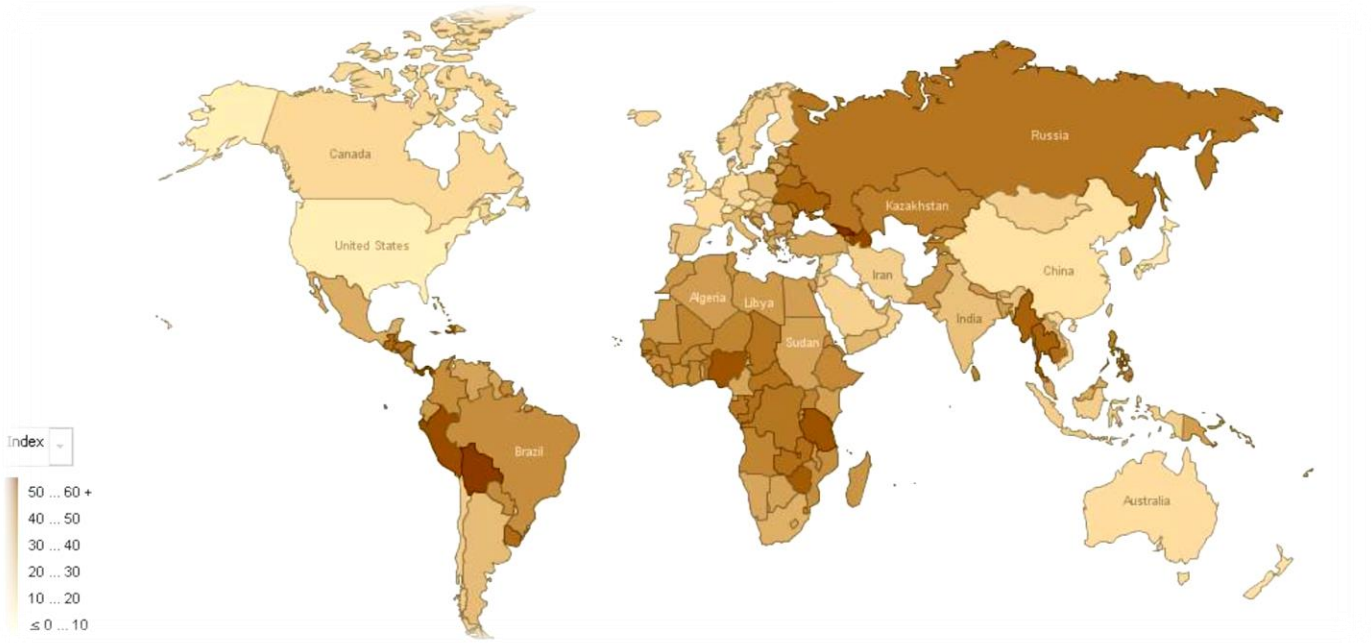
Appendix A

Figure A-1



Source: Schneider, Buehn, and Montenegro (2010).

Table A.1.1: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for The Bahamas: Base year=1999, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	19.3	19.3	72.8	59.5	13.3
1992	3.0	3.0	75.0	57.2	17.8
1993	3.9	3.9	77.9	57.4	20.6
1994	5.7	5.7	82.4	59.2	23.2
1995	-1.8	-1.8	80.9	61.8	19.1
1996	2.7	2.7	83.1	64.4	18.7
1997	5.3	5.3	87.5	65.7	21.8
1998	9.2	9.2	95.6	68.8	26.8
1999	4.6	4.6	100.0	73.7	26.3
2000	7.4	7.4	107.4	76.8	30.6
2001	3.4	3.4	111.0	78.8	32.3
2002	6.0	6.0	117.6	80.9	36.7
2003	5.0	5.0	123.5	79.9	43.6
2004	-0.6	-0.6	122.8	80.6	42.2
2005	5.4	5.4	129.4	83.3	46.1
2006	1.7	1.7	131.6	85.4	46.2
2007	6.1	6.1	139.7	86.7	53.1
2008	-13.2	-13.2	121.3	84.6	36.7
2009	-10.3	-10.3	108.8	81.1	27.7
2010	3.4	3.4	112.5	82.4	30.1
2011	-3.3	-3.3	108.8	82.9	26.0
2012	16.2	16.2	126.5	84.7	41.8

Table A.1.2. Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for The Bahamas: Base year=2007, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	19.3	19.3	52.1	50.6	1.5
1992	3.0	3.0	53.7	48.7	5.0
1993	3.9	3.9	55.8	48.8	6.9
1994	5.7	5.7	58.9	50.4	8.6
1995	-1.8	-1.8	57.9	52.6	5.3
1996	2.7	2.7	59.5	54.8	4.7
1997	5.3	5.3	62.6	55.9	6.7
1998	9.2	9.2	68.4	58.6	9.8
1999	4.6	4.6	71.6	62.8	8.8
2000	7.4	7.4	76.8	65.4	11.5
2001	3.4	3.4	79.5	67.1	12.4
2002	6.0	6.0	84.2	68.9	15.3
2003	5.0	5.0	88.4	68.0	20.4
2004	-0.6	-0.6	87.9	68.6	19.3
2005	5.4	5.4	92.6	71.0	21.7
2006	1.7	1.7	94.2	72.7	21.5
2007	6.1	6.1	100.0	73.8	26.2
2008	-13.2	-13.2	86.8	72.1	14.8
2009	-10.3	-10.3	77.9	69.1	8.8
2010	3.4	3.4	80.5	70.1	10.4
2011	-3.3	-3.3	77.9	70.6	7.3
2012	16.2	16.2	90.5	72.1	18.4

Table A.1.3: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for The Bahamas: Base year=1999, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	19.3	19.3	82.2	59.5	22.8
1992	3.0	3.0	83.7	57.2	26.5
1993	3.9	3.9	85.7	57.4	28.4
1994	5.7	5.7	88.7	59.2	29.5
1995	-1.8	-1.8	87.7	61.8	26.0
1996	2.7	2.7	89.2	64.4	24.8
1997	5.3	5.3	92.1	65.7	26.4
1998	9.2	9.2	97.3	68.8	28.5
1999	4.6	4.6	100.0	73.7	26.3
2000	7.4	7.4	104.5	76.8	27.7
2001	3.4	3.4	106.7	78.8	27.9
2002	6.0	6.0	110.5	80.9	29.6
2003	5.0	5.0	113.9	79.9	34.0
2004	-0.6	-0.6	113.5	80.6	32.9
2005	5.4	5.4	117.2	83.3	33.9
2006	1.7	1.7	118.5	85.4	33.0
2007	6.1	6.1	122.9	86.7	36.2
2008	-13.2	-13.2	113.0	84.6	28.4
2009	-10.3	-10.3	105.9	81.1	24.8
2010	3.4	3.4	108.1	82.4	25.8
2011	-3.3	-3.3	106.0	82.9	23.1
2012	16.2	16.2	116.4	84.7	31.7

Table A.1.4: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for The Bahamas: Base year=2007, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	19.3	19.3	66.9	50.6	16.3
1992	3.0	3.0	68.1	48.7	19.4
1993	3.9	3.9	69.8	48.8	20.9
1994	5.7	5.7	72.2	50.4	21.8
1995	-1.8	-1.8	71.4	52.6	18.8
1996	2.7	2.7	72.6	54.8	17.8
1997	5.3	5.3	74.9	55.9	19.0
1998	9.2	9.2	79.1	58.6	20.6
1999	4.6	4.6	81.4	62.8	18.6
2000	7.4	7.4	85.0	65.4	19.6
2001	3.4	3.4	86.8	67.1	19.7
2002	6.0	6.0	90.0	68.9	21.0
2003	5.0	5.0	92.7	68.0	24.7
2004	-0.6	-0.6	92.4	68.6	23.7
2005	5.4	5.4	95.4	71.0	24.4
2006	1.7	1.7	96.4	72.7	23.6
2007	6.1	6.1	100.0	73.8	26.2
2008	-13.2	-13.2	92.0	72.1	19.9
2009	-10.3	-10.3	86.2	69.1	17.1
2010	3.4	3.4	88.0	70.1	17.8
2011	-3.3	-3.3	86.2	70.6	15.6
2012	16.2	16.2	94.7	72.1	22.6

Table A.2.1: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Barbados: Base year=1999, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	16.2	16.2	69.5	59.1	10.4
1992	3.7	3.7	72.1	55.7	16.3
1993	-0.6	-0.6	71.6	56.2	15.4
1994	5.1	5.1	75.2	57.3	18.0
1995	6.2	6.2	79.9	58.5	21.5
1996	6.6	6.6	85.2	60.8	24.4
1997	6.2	6.2	90.5	63.7	26.8
1998	2.7	2.7	92.9	66.0	26.9
1999	7.6	7.6	100.0	66.2	33.8
2000	6.2	6.2	106.2	69.2	37.0
2001	4.6	4.6	111.0	67.5	43.5
2002	4.9	4.9	116.5	68.1	48.4
2003	5.1	5.1	122.4	69.6	52.8
2004	3.2	3.2	126.3	70.5	55.7
2005	6.6	6.6	134.6	73.4	61.2
2006	2.5	2.5	138.0	77.5	60.4
2007	2.7	2.7	141.7	78.9	62.8
2008	3.2	3.2	146.2	79.2	67.0
2009	1.0	1.0	147.7	76.0	71.7
2010	0.8	0.8	148.9	76.2	72.7
2011	-5.3	-5.3	141.1	76.8	64.3
2012	0.4	0.4	141.7	77.0	64.7

Table A.2.2: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Barbados: Base year=2007, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	...	...	...	...	...
1991	16.2	16.2	49.0	46.4	2.6
1992	3.7	3.7	50.9	43.8	7.0
1993	-0.6	-0.6	50.5	44.2	6.4
1994	5.1	5.1	53.1	45.0	8.1
1995	6.2	6.2	56.4	46.0	10.4
1996	6.6	6.6	60.1	47.8	12.3
1997	6.2	6.2	63.9	50.0	13.8
1998	2.7	2.7	65.6	51.9	13.7
1999	7.6	7.6	70.6	52.1	18.5
2000	6.2	6.2	75.0	54.4	20.5
2001	4.6	4.6	78.4	53.1	25.3
2002	4.9	4.9	82.2	53.5	28.7
2003	5.1	5.1	86.4	54.7	31.7
2004	3.2	3.2	89.1	55.5	33.7
2005	6.6	6.6	95.0	57.7	37.3
2006	2.5	2.5	97.4	61.0	36.4
2007	2.7	2.7	100.0	62.0	38.0
2008	3.2	3.2	103.2	62.3	40.9
2009	1.0	1.0	104.3	59.8	44.5
2010	0.8	0.8	105.1	59.9	45.2
2011	-5.3	-5.3	99.6	60.4	39.2
2012	0.4	0.4	100.0	60.5	39.5

Table A.2.3: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Barbados: Base year=1999, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	16.2	16.2	86.9	59.1	27.8
1992	3.7	3.7	88.1	55.7	32.3
1993	-0.6	-0.6	87.9	56.2	31.7
1994	5.1	5.1	89.6	57.3	32.3
1995	6.2	6.2	91.7	58.5	33.2
1996	6.6	6.6	94.0	60.8	33.2
1997	6.2	6.2	96.2	63.7	32.5
1998	2.7	2.7	97.2	66.0	31.2
1999	7.6	7.6	100.0	66.2	33.8
2000	6.2	6.2	102.4	69.2	33.1
2001	4.6	4.6	104.1	67.5	36.6
2002	4.9	4.9	106.1	68.1	38.0
2003	5.1	5.1	108.1	69.6	38.5
2004	3.2	3.2	109.4	70.5	38.9
2005	6.6	6.6	112.2	73.4	38.8
2006	2.5	2.5	113.2	77.5	35.7
2007	2.7	2.7	114.4	78.9	35.5
2008	3.2	3.2	115.8	79.2	36.6
2009	1.0	1.0	116.2	76.0	40.2
2010	0.8	0.8	116.6	76.2	40.4
2011	-5.3	-5.3	114.3	76.8	37.5
2012	0.4	0.4	114.4	77.0	37.4

Table A.2.4: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Barbados: Base year=2007, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	16.2	16.2	75.9	46.4	29.5
1992	3.7	3.7	77.0	43.8	33.2
1993	-0.6	-0.6	76.8	44.2	32.7
1994	5.1	5.1	78.3	45.0	33.3
1995	6.2	6.2	80.2	46.0	34.2
1996	6.6	6.6	82.2	47.8	34.4
1997	6.2	6.2	84.1	50.0	34.1
1998	2.7	2.7	85.0	51.9	33.1
1999	7.6	7.6	87.4	52.1	35.4
2000	6.2	6.2	89.5	54.4	35.1
2001	4.6	4.6	91.0	53.1	37.9
2002	4.9	4.9	92.7	53.5	39.2
2003	5.1	5.1	94.5	54.7	39.8
2004	3.2	3.2	95.7	55.5	40.2
2005	6.6	6.6	98.1	57.7	40.4
2006	2.5	2.5	99.0	61.0	38.0
2007	2.7	2.7	100.0	62.0	38.0
2008	3.2	3.2	101.2	62.3	38.9
2009	1.0	1.0	101.6	59.8	41.9
2010	0.8	0.8	101.9	59.9	42.0
2011	-5.3	-5.3	99.9	60.4	39.5
2012	0.4	0.4	100.1	60.5	39.5

Table A.3.1: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2013 for Guyana: Base year=1999, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	14.0	14.0	59.6	43.2	16.4
1992	-2.3	-2.3	58.2	46.6	11.6
1993	1.2	1.2	58.9	50.4	8.5
1994	28.4	28.4	75.6	54.7	20.9
1995	0.0	0.0	75.6	57.4	18.2
1996	20.7	20.7	91.3	61.9	29.3
1997	0.0	0.0	91.3	65.8	25.5
1998	8.8	8.8	99.3	64.7	34.6
1999	0.7	0.7	100.0	66.6	33.4
2000	0.0	0.0	100.0	65.7	34.3
2001	1.0	1.0	101.0	67.2	33.9
2002	-0.7	-0.7	100.3	67.9	32.5
2003	-6.9	-6.9	93.4	67.2	26.2
2004	9.0	9.0	101.7	69.4	32.3
2005	3.1	3.1	104.9	68.0	36.8
2006	3.7	3.7	108.7	71.5	37.2
2007	12.2	12.2	122.0	76.6	45.4
2008	1.7	1.7	124.0	78.1	46.0
2009	3.9	3.9	128.9	80.7	48.3
2010	11.9	11.9	144.3	84.2	60.1
2011	3.9	3.9	149.8	88.8	61.1
2012	5.8	5.8	158.5	93.0	65.5
2013	4.6	4.6	165.9	97.9	68.0

Table A.3.2: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2013 for Guyana: Base year=2007, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	14.0	14.0	48.9	37.2	11.6
1992	-2.3	-2.3	47.7	40.2	7.6
1993	1.2	1.2	48.3	43.5	4.8
1994	28.4	28.4	62.0	47.2	14.8
1995	0.0	0.0	62.0	49.5	12.5
1996	20.7	20.7	74.9	53.4	21.4
1997	0.0	0.0	74.9	56.7	18.1
1998	8.8	8.8	81.4	55.8	25.7
1999	0.7	0.7	82.0	57.4	24.6
2000	0.0	0.0	82.0	56.6	25.4
2001	1.0	1.0	82.9	57.9	25.0
2002	-0.7	-0.7	82.3	58.5	23.8
2003	-6.9	-6.9	76.6	57.9	18.6
2004	9.0	9.0	83.4	59.8	23.6
2005	3.1	3.1	86.0	58.7	27.3
2006	3.7	3.7	89.1	61.7	27.5
2007	12.2	12.2	100.0	66.0	34.0
2008	1.7	1.7	101.7	67.3	34.4
2009	3.9	3.9	105.7	69.5	36.2
2010	11.9	11.9	118.3	72.6	45.7
2011	3.9	3.9	122.9	76.5	46.3
2012	5.8	5.8	130.0	80.2	49.8
2013	4.6	4.6	136.0	84.4	51.6

Table A.3.3: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2013 for Guyana: Base year=1999, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	14.0	14.0	68.8	43.2	25.7
1992	-2.3	-2.3	67.7	46.6	21.2
1993	1.2	1.2	68.3	50.4	17.9
1994	28.4	28.4	81.9	54.7	27.2
1995	0.0	0.0	81.9	57.4	24.4
1996	20.7	20.7	93.8	61.9	31.8
1997	0.0	0.0	93.8	65.8	27.9
1998	8.8	8.8	99.5	64.7	34.8
1999	0.7	0.7	100.0	66.6	33.4
2000	0.0	0.0	100.0	65.7	34.3
2001	1.0	1.0	100.7	67.2	33.6
2002	-0.7	-0.7	100.2	67.9	32.4
2003	-6.9	-6.9	95.4	67.2	28.2
2004	9.0	9.0	101.4	69.4	32.0
2005	3.1	3.1	103.5	68.0	35.5
2006	3.7	3.7	106.2	71.5	34.7
2007	12.2	12.2	115.2	76.6	38.7
2008	1.7	1.7	116.6	78.1	38.6
2009	3.9	3.9	119.8	80.7	39.2
2010	11.9	11.9	129.8	84.2	45.6
2011	3.9	3.9	133.3	88.8	44.6
2012	5.8	5.8	138.7	93.0	45.7
2013	4.6	4.6	143.2	97.9	45.3

Table A.3.4: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2013 for Guyana: Base year=2007, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	14.0	14.0	59.7	37.2	22.5
1992	-2.3	-2.3	58.8	40.2	18.6
1993	1.2	1.2	59.3	43.5	15.8
1994	28.4	28.4	71.0	47.2	23.9
1995	0.0	0.0	71.0	49.5	21.5
1996	20.7	20.7	81.4	53.4	27.9
1997	0.0	0.0	81.4	56.7	24.6
1998	8.8	8.8	86.4	55.8	30.6
1999	0.7	0.7	86.8	57.4	29.4
2000	0.0	0.0	86.8	56.6	30.1
2001	1.0	1.0	87.4	57.9	29.5
2002	-0.7	-0.7	87.0	58.5	28.5
2003	-6.9	-6.9	82.8	57.9	24.8
2004	9.0	9.0	87.9	59.8	28.1
2005	3.1	3.1	89.8	58.7	31.2
2006	3.7	3.7	92.1	61.7	30.5
2007	12.2	12.2	100.0	66.0	34.0
2008	1.7	1.7	101.2	67.3	33.9
2009	3.9	3.9	104.0	69.5	34.4
2010	11.9	11.9	112.6	72.6	40.1
2011	3.9	3.9	115.7	76.5	39.2
2012	5.8	5.8	120.4	80.2	40.2
2013	4.6	4.6	124.3	84.4	39.9

Table A.4.1: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Jamaica: Base year=1999, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	-17.7	-17.7	31.2	51.0	-19.7
1992	103.2	103.2	63.5	52.0	11.5
1993	5.7	5.7	67.1	56.9	10.2
1994	11.4	11.4	74.7	57.6	17.1
1995	21.1	21.1	90.5	59.0	31.5
1996	2.4	2.4	92.7	58.9	33.7
1997	2.6	2.6	95.1	58.3	36.8
1998	3.7	3.7	98.6	56.9	41.7
1999	1.4	1.4	100.0	57.5	42.5
2000	0.8	0.8	100.8	58.0	42.8
2001	0.2	0.2	101.0	58.8	42.2
2002	3.3	3.3	104.3	60.0	44.4
2003	3.0	3.0	107.4	62.2	45.2
2004	-1.0	-1.0	106.4	63.0	43.4
2005	0.9	0.9	107.3	63.5	43.8
2006	-0.9	-0.9	106.4	65.4	41.0
2007	-18.6	-18.6	86.5	66.3	20.2
2008	-39.7	-39.7	52.2	65.8	-13.7
2009	5.5	5.5	55.0	62.9	-7.9
2010	-0.3	-0.3	54.9	62.0	-7.1
2011	-0.7	-0.7	54.5	63.1	-8.6
2012	-5.0	-5.0	51.7	62.7	-10.9

Table A.4.2: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Jamaica: Base year=2007, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	-17.7	-17.7	36.1	50.6	-14.5
1992	103.2	103.2	73.3	51.2	22.1
1993	5.7	5.7	77.5	55.6	21.9
1994	11.4	11.4	86.4	56.0	30.4
1995	21.1	21.1	104.6	56.8	47.8
1996	2.4	2.4	107.1	56.1	51.0
1997	2.6	2.6	109.9	54.9	55.0
1998	3.7	3.7	114.0	53.2	60.8
1999	1.4	1.4	115.6	53.4	62.2
2000	0.8	0.8	116.5	53.5	63.0
2001	0.2	0.2	116.7	53.9	62.8
2002	3.3	3.3	120.5	54.8	65.8
2003	3.0	3.0	124.1	56.6	67.5
2004	-1.0	-1.0	122.9	57.1	65.8
2005	0.9	0.9	124.0	57.4	66.6
2006	-0.9	-0.9	122.9	58.9	64.0
2007	-18.6	-18.6	100.0	59.5	40.5
2008	-39.7	-39.7	60.3	58.9	1.4
2009	5.5	5.5	63.6	56.1	7.6
2010	-0.3	-0.3	63.4	55.0	8.4
2011	-0.7	-0.7	63.0	55.8	7.2
2012	-5.0	-5.0	59.8	55.3	4.5

Table A.4.3: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Jamaica: Base year=1999, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	-17.7	-17.7	87.6	51.0	36.7
1992	103.2	103.2	95.8	52.0	43.8
1993	5.7	5.7	96.3	56.9	39.4
1994	11.4	11.4	97.2	57.6	39.6
1995	21.1	21.1	99.1	59.0	40.1
1996	2.4	2.4	99.3	58.9	40.4
1997	2.6	2.6	99.5	58.3	41.3
1998	3.7	3.7	99.9	56.9	43.0
1999	1.4	1.4	100.0	57.5	42.5
2000	0.8	0.8	100.1	58.0	42.1
2001	0.2	0.2	100.1	58.8	41.3
2002	3.3	3.3	100.4	60.0	40.4
2003	3.0	3.0	100.7	62.2	38.5
2004	-1.0	-1.0	100.6	63.0	37.6
2005	0.9	0.9	100.6	63.5	37.1
2006	-0.9	-0.9	100.6	65.4	35.2
2007	-18.6	-18.6	98.9	66.3	32.6
2008	-39.7	-39.7	95.3	65.8	29.5
2009	5.5	5.5	95.8	62.9	32.9
2010	-0.3	-0.3	95.8	62.0	33.8
2011	-0.7	-0.7	95.7	63.1	32.7
2012	-5.0	-5.0	95.3	62.7	32.6

Table A.4.4: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Jamaica: Base year=2007, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	-17.7	-17.7	88.6	50.6	38.0
1992	103.2	103.2	96.9	51.2	45.6
1993	5.7	5.7	97.4	55.6	41.7
1994	11.4	11.4	98.4	56.0	42.4
1995	21.1	21.1	100.2	56.8	43.4
1996	2.4	2.4	100.4	56.1	44.3
1997	2.6	2.6	100.7	54.9	45.8
1998	3.7	3.7	101.0	53.2	47.8
1999	1.4	1.4	101.1	53.4	47.8
2000	0.8	0.8	101.2	53.5	47.7
2001	0.2	0.2	101.2	53.9	47.3
2002	3.3	3.3	101.5	54.8	46.8
2003	3.0	3.0	101.8	56.6	45.2
2004	-1.0	-1.0	101.7	57.1	44.6
2005	0.9	0.9	101.8	57.4	44.4
2006	-0.9	-0.9	101.7	58.9	42.8
2007	-18.6	-18.6	100.0	59.5	40.5
2008	-39.7	-39.7	96.4	58.9	37.6
2009	5.5	5.5	96.9	56.1	40.8
2010	-0.3	-0.3	96.9	55.0	41.8
2011	-0.7	-0.7	96.8	55.8	41.0
2012	-5.0	-5.0	96.4	55.3	41.1

Table A.5.1: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Suriname: Base year=1999, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	10.6	10.6	118.2	57.9	60.3
1992	3.2	3.2	122.0	57.8	64.2
1993	1.2	1.2	123.5	53.6	69.9
1994	1.2	1.2	125.0	55.3	69.7
1995	-10.9	-10.9	111.4	55.9	55.4
1996	-12.2	-12.2	97.7	56.6	41.1
1997	0.8	0.8	98.5	59.9	38.6
1998	0.0	0.0	98.5	60.8	37.7
1999	1.5	1.5	100.0	60.3	39.7
2000	-3.0	-3.0	97.0	60.3	36.7
2001	0.8	0.8	97.7	63.0	34.7
2002	3.9	3.9	101.5	65.7	35.8
2003	1.5	1.5	103.0	69.7	33.4
2004	0.7	0.7	103.8	76.1	27.7
2005	0.7	0.7	104.5	79.6	25.0
2006	3.6	3.6	108.3	82.6	25.7
2007	-0.7	-0.7	107.6	86.9	20.7
2008	-0.7	-0.7	106.8	90.5	16.3
2009	0.0	0.0	106.8	93.2	13.6
2010	1.4	1.4	108.3	98.0	10.3
2011	4.9	4.9	113.6	103.2	10.5
2012	4.7	4.7	118.9	106.3	12.6

Table A.5.2: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Suriname: Base year=2007, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	10.6	10.6	109.9	43.3	66.6
1992	3.2	3.2	113.4	43.2	70.2
1993	1.2	1.2	114.8	40.0	74.8
1994	1.2	1.2	116.2	41.3	74.9
1995	-10.9	-10.9	103.5	41.8	61.7
1996	-12.2	-12.2	90.8	42.3	48.5
1997	0.8	0.8	91.5	44.7	46.8
1998	0.0	0.0	91.5	45.4	46.1
1999	1.5	1.5	93.0	45.1	47.9
2000	-3.0	-3.0	90.1	45.0	45.1
2001	0.8	0.8	90.8	47.1	43.8
2002	3.9	3.9	94.4	49.1	45.3
2003	1.5	1.5	95.8	52.0	43.7
2004	0.7	0.7	96.5	56.9	39.6
2005	0.7	0.7	97.2	59.5	37.7
2006	3.6	3.6	100.7	61.7	39.0
2007	-0.7	-0.7	100.0	64.9	35.1
2008	-0.7	-0.7	99.3	67.6	31.7
2009	0.0	0.0	99.3	69.6	29.7
2010	1.4	1.4	100.7	73.2	27.5
2011	4.9	4.9	105.6	77.1	28.6
2012	4.7	4.7	110.6	79.4	31.1

Table A.5.3: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Suriname: Base year=1999, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	10.6	10.6	102.7	57.9	44.8
1992	3.2	3.2	103.2	57.8	45.4
1993	1.2	1.2	103.4	53.6	49.8
1994	1.2	1.2	103.6	55.3	48.3
1995	-10.9	-10.9	101.7	55.9	45.8
1996	-12.2	-12.2	99.6	56.6	43.0
1997	0.8	0.8	99.7	59.9	39.8
1998	0.0	0.0	99.7	60.8	38.9
1999	1.5	1.5	100.0	60.3	39.7
2000	-3.0	-3.0	99.5	60.3	39.2
2001	0.8	0.8	99.6	63.0	36.6
2002	3.9	3.9	100.3	65.7	34.6
2003	1.5	1.5	100.5	69.7	30.9
2004	0.7	0.7	100.7	76.1	24.5
2005	0.7	0.7	100.8	79.6	21.2
2006	3.6	3.6	101.4	82.6	18.8
2007	-0.7	-0.7	101.3	86.9	14.4
2008	-0.7	-0.7	101.2	90.5	10.7
2009	0.0	0.0	101.2	93.2	8.0
2010	1.4	1.4	101.4	98.0	3.4
2011	4.9	4.9	102.2	103.2	-0.9
2012	4.7	4.7	103.1	106.3	-3.3

Table A.5.4: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2012 for Suriname, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	10.6	10.6	101.4	43.3	58.1
1992	3.2	3.2	101.9	43.2	58.7
1993	1.2	1.2	102.1	40.0	62.1
1994	1.2	1.2	102.3	41.3	61.0
1995	-10.9	-10.9	100.4	41.8	58.7
1996	-12.2	-12.2	98.4	42.3	56.0
1997	0.8	0.8	98.5	44.7	53.7
1998	0.0	0.0	98.5	45.4	53.0
1999	1.5	1.5	98.7	45.1	53.7
2000	-3.0	-3.0	98.2	45.0	53.2
2001	0.8	0.8	98.4	47.1	51.3
2002	3.9	3.9	99.0	49.1	49.9
2003	1.5	1.5	99.3	52.0	47.2
2004	0.7	0.7	99.4	56.9	42.5
2005	0.7	0.7	99.5	59.5	40.0
2006	3.6	3.6	100.1	61.7	38.4
2007	-0.7	-0.7	100.0	64.9	35.1
2008	-0.7	-0.7	99.9	67.6	32.3
2009	0.0	0.0	99.9	69.6	30.3
2010	1.4	1.4	100.1	73.2	26.9
2011	4.9	4.9	101.0	77.1	23.9
2012	4.7	4.7	101.8	79.4	22.3

Table A.6.1: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2014 for Trinidad and Tobago: Base year=1999, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	-0.6	-0.6	67.6	46.5	21.1
1992	8.1	8.1	73.1	45.7	27.4
1993	-0.6	-0.6	72.7	45.1	27.6
1994	3.1	3.1	74.9	46.7	28.3
1995	7.8	7.8	80.8	48.5	32.3
1996	5.1	5.1	84.9	51.9	33.0
1997	12.1	12.1	95.2	55.9	39.3
1998	3.6	3.6	98.6	60.4	38.1
1999	1.4	1.4	100.0	65.3	34.7
2000	5.0	5.0	105.0	70.2	34.8
2001	3.1	3.1	108.2	73.2	35.1
2002	0.0	0.0	108.2	79.0	29.3
2003	17.4	17.4	127.1	90.4	36.7
2004	-1.0	-1.0	125.8	97.6	28.2
2005	10.0	10.0	138.4	103.6	34.8
2006	3.7	3.7	143.5	117.3	26.2
2007	7.3	7.3	154.0	122.9	31.1
2008	1.1	1.1	155.8	127.0	28.7
2009	0.6	0.6	156.7	121.5	35.2
2010	8.8	8.8	170.6	121.4	49.2
2011	3.8	3.8	177.0	121.4	55.6
2012	4.3	4.3	184.5	123.0	61.5
2013	0.5	0.5	185.5	125.2	60.4
2014	-0.8	-0.8	184.0	126.2	57.8

Table A.6.2: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2014 for Trinidad and Tobago: Base year=2007, Unitary Elasticity Assumption

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	-0.6	-0.6	43.9	25.9	18.0
1992	8.1	8.1	47.5	25.5	22.0
1993	-0.6	-0.6	47.2	25.1	22.1
1994	3.1	3.1	48.7	26.0	22.6
1995	7.8	7.8	52.4	27.0	25.4
1996	5.1	5.1	55.1	28.9	26.2
1997	12.1	12.1	61.8	31.2	30.6
1998	3.6	3.6	64.0	33.7	30.3
1999	1.4	1.4	64.9	36.4	28.5
2000	5.0	5.0	68.2	39.2	29.0
2001	3.1	3.1	70.3	40.8	29.5
2002	0.0	0.0	70.3	44.0	26.3
2003	17.4	17.4	82.5	50.4	32.1
2004	-1.0	-1.0	81.7	54.4	27.3
2005	10.0	10.0	89.9	57.8	32.1
2006	3.7	3.7	93.2	65.4	27.8
2007	7.3	7.3	100.0	68.5	31.5
2008	1.1	1.1	101.1	70.8	30.3
2009	0.6	0.6	101.8	67.7	34.0
2010	8.8	8.8	110.8	67.7	43.1
2011	3.8	3.8	114.9	67.7	47.3
2012	4.3	4.3	119.8	68.6	51.2
2013	0.5	0.5	120.5	69.8	50.7
2014	-0.8	-0.8	119.5	70.3	49.1

Table A.6.3: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2014 for Trinidad and Tobago: Base year=1999, Estimated Elasticity

Year	Growth rate in electricity consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (1999=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	-0.6	-0.6	63.4	46.5	16.9
1992	8.1	8.1	69.4	45.7	23.7
1993	-0.6	-0.6	69.0	45.1	23.9
1994	3.1	3.1	71.5	46.7	24.8
1995	7.8	7.8	78.0	48.5	29.5
1996	5.1	5.1	82.7	51.9	30.8
1997	12.1	12.1	94.4	55.9	38.5
1998	3.6	3.6	98.4	60.4	37.9
1999	1.4	1.4	100.0	65.3	34.7
2000	5.0	5.0	105.9	70.2	35.6
2001	3.1	3.1	109.7	73.2	36.5
2002	0.0	0.0	109.7	79.0	30.7
2003	17.4	17.4	132.0	90.4	41.7
2004	-1.0	-1.0	130.4	97.6	32.9
2005	10.0	10.0	145.7	103.6	42.1
2006	3.7	3.7	152.0	117.3	34.7
2007	7.3	7.3	165.1	122.9	42.2
2008	1.1	1.1	167.3	127.0	40.2
2009	0.6	0.6	168.4	121.5	47.0
2010	8.8	8.8	185.9	121.4	64.5
2011	3.8	3.8	194.0	121.4	72.7
2012	4.3	4.3	203.7	123.0	80.7
2013	0.5	0.5	205.0	125.2	79.8
2014	-0.8	-0.8	203.0	126.2	76.8

Table A.6.4: Electricity Consumption (as a proxy of Overall GDP) and Official GDP 1990–2014 for Trinidad and Tobago: Base year=2007, Estimated Elasticity

Year	Growth rate in Electricity Consumption (%)	Estimated growth rate in overall GDP (%)	Overall GDP Index	Official GDP Index (2007=100)	Unofficial Economy Index
1990	…	…	…	…	…
1991	-0.6	-0.6	38.4	25.9	12.5
1992	8.1	8.1	42.1	25.5	16.6
1993	-0.6	-0.6	41.8	25.1	16.7
1994	3.1	3.1	43.3	26.0	17.3
1995	7.8	7.8	47.3	27.0	20.2
1996	5.1	5.1	50.1	28.9	21.1
1997	12.1	12.1	57.2	31.2	26.0
1998	3.6	3.6	59.6	33.7	25.9
1999	1.4	1.4	60.6	36.4	24.2
2000	5.0	5.0	64.1	39.2	25.0
2001	3.1	3.1	66.4	40.8	25.7
2002	0.0	0.0	66.4	44.0	22.4
2003	17.4	17.4	80.0	50.4	29.6
2004	-1.0	-1.0	79.0	54.4	24.6
2005	10.0	10.0	88.3	57.8	30.5
2006	3.7	3.7	92.1	65.4	26.7
2007	7.3	7.3	100.0	68.5	31.5
2008	1.1	1.1	101.3	70.8	30.5
2009	0.6	0.6	102.1	67.7	34.3
2010	8.8	8.8	112.6	67.7	45.0
2011	3.8	3.8	117.6	67.7	49.9
2012	4.3	4.3	123.4	68.6	54.9
2013	0.5	0.5	124.2	69.8	54.4
2014	-0.8	-0.8	123.0	70.3	52.7

Appendix B

Table B.1 The Bahamas: Actual and Predicted Values of Currency Holdings, Using Average Tax Rate, 1990–2014

	Currency				
	Actual	Predicted with tax	Predicted without tax	Differences	
Year	C	$\hat{C}$	$\hat{\hat{C}}$	$C-\hat{C}$	$\hat{C}-\hat{\hat{C}}$
2000	155.00	142.78	113.15	12.22	29.62
2001	144.80	143.89	115.34	0.91	28.55
2002	154.90	153.49	123.74	1.41	29.75
2003	162.00	159.18	128.41	2.82	30.77
2004	181.40	188.89	151.98	-7.49	36.91
2005	205.50	210.70	168.39	-5.20	42.31
2006	225.10	222.58	176.58	2.52	45.99
2007	213.10	226.00	179.10	-12.90	46.89
2008	205.80	214.05	169.11	-8.25	44.95
2009	198.30	191.91	152.76	6.39	39.15
2010	194.00	195.61	155.70	-1.61	39.91
2011	198.30	197.92	155.58	0.38	42.34
2012	205.20	206.80	163.04	-1.60	43.75
2013	212.90	210.24	166.80	2.66	43.44

Table B.2 Barbados: Actual and Predicted Values of Currency Holdings, Using Average Tax Rate, 1980–2008

Year	Currency			Differences	
	Actual	Predicted with tax	Predicted without tax		
	C	$\hat{C}$	$\hat{\hat{C}}$	$C-\hat{C}$	$\hat{C}-\hat{\hat{C}}$
1980	101600.00	82564.39	7811.38	19035.61	74753.00
1981	111200.00	98740.95	8657.00	12459.05	90083.95
1982	110600.00	120808.17	10375.68	-10208.17	110432.49
1983	114100.00	122178.78	10164.03	-8078.78	112014.75
1984	118100.00	120343.82	10010.72	-2243.82	110333.10
1985	123500.00	124738.48	10216.33	-1238.48	114522.14
1986	137400.00	113794.88	9112.47	23605.12	104682.41
1987	156600.00	128571.25	10665.95	28028.75	117905.31
1988	171300.00	138760.75	11426.78	32539.25	127333.97
1989	182723.00	129656.97	10057.58	53066.03	119599.39
1990	192848.00	154399.81	11024.65	38448.19	143375.16
1991	178675.00	193701.11	15952.14	-15026.11	177748.96
1992	176847.00	218597.61	17084.99	-41750.61	201512.63
1993	176987.53	214338.31	17544.13	-37350.78	196794.18
1994	189602.66	228256.49	19143.23	-38653.83	209113.26
1995	200325.41	240869.21	20233.49	-40543.80	220635.72
1996	220051.06	259456.38	21218.23	-39405.32	238238.15
1997	239599.55	249243.28	20547.67	-9643.73	228695.61
1998	268163.21	233581.91	18121.94	34581.30	215459.97
1999	302684.91	250763.85	19281.77	51921.06	231482.07
2000	310658.08	259651.09	19822.31	51006.99	239828.77
2001	312357.74	337783.36	24850.85	-25425.62	312932.51
2002	337472.28	354780.01	26242.88	-17307.73	328537.12
2003	328969.35	361821.02	27332.57	-32851.67	334488.44
2004	398732.09	388842.48	28909.51	9889.61	359932.97
2005	448566.43	474017.42	37419.58	-25450.99	436597.83
2006	467460.29	485872.46	37890.46	-18412.17	447982.00
2007	492061.51	607309.80	48942.05	-115248.29	558367.75

Year	Currency			Differences	
	Actual	Predicted with tax	Predicted without tax		
	C	$\hat{C}$	$\hat{\hat{C}}$	$C-\hat{C}$	$\hat{C}-\hat{\hat{C}}$
2008	479922.98	548628.81	40758.27	-68705.83	507870.54

Table B.3 Guyana: Actual and Predicted Values of Currency Holdings, Using Average Tax Rate, 2005–2013

	Currency				
	Actual	Predicted with tax	Predicted without tax	Differences	
Year	C	$\hat{C}$	$\hat{\hat{C}}$	$C-\hat{C}$	$\hat{C}-\hat{\hat{C}}$
2005	2.4E+10	2.3E+10	1.6E+10	4.8E+08	7.3E+09
2006	2.9E+10	2.9E+10	2.0E+10	2.7E+06	9.0E+09
2007	3.3E+10	3.4E+10	2.3E+10		1.1E+10
2008	3.8E+10	3.8E+10	2.6E+10		1.2E+10
2009	4.2E+10	4.3E+10	3.0E+10		1.3E+10
2010	5.0E+10	5.1E+10	3.5E+10		1.6E+10
2011	6.2E+10	5.9E+10	4.1E+10	2.5E+09	1.8E+10
2012	6.8E+10	6.6E+10	4.6E+10	1.9E+09	2.0E+10
2013	6.7E+10	6.9E+10	4.8E+10		2.1E+10

Table B.4 Jamaica: Actual and Predicted Values of Currency Holdings, Using Average Tax Rate, 1992–2014

Year	Currency			Differences	
	Actual	Predicted with tax	Predicted without tax		
	C	$\hat{C}$	$\hat{\hat{C}}$	$C-\hat{C}$	$\hat{C}-\hat{\hat{C}}$
1992	3733.00	3858.25	1008.14	-125.25	2850.11
1993	5215.60	5102.91	1317.10	112.69	3785.81
1994	7115.10	6827.25	1780.57	287.85	5046.68
1995	9512.10	9555.38	2453.45	-43.28	7101.93
1996	10753.70	10918.64	2859.53	-164.94	8059.11
1997	12442.80	12436.13	3273.94	6.67	9162.20
1998	13494.70	13425.15	3647.22	69.55	9777.93
1999	17810.00	15927.47	4275.56	1882.53	11651.91
2000	17583.60	17734.33	4728.89	-150.73	13005.44
2001	18744.80	19319.64	5178.37	-574.84	14141.28
2002	20366.20	21644.67	5781.33	-1278.47	15863.34
2003	23145.50	24465.59	6250.76	-1320.09	18214.83
2004	26643.70	28287.91	7150.24	-1644.22	21137.68
2005	29630.16	30541.32	7694.06	-911.16	22847.25
2006	35780.85	34028.78	8463.93	1752.07	25564.85
2007	40674.92	39982.30	9815.24	692.62	30167.06
2008	41995.78	42231.82	10324.59	-236.05	31907.24
2009	44614.83	46718.25	11438.82	-2103.42	35279.43
2010	48476.72	47927.66	11842.39	549.05	36085.27
2011	52853.83	49068.71	12285.75	3785.12	36782.96
2012	54734.69	53797.70	13215.55	936.99	40582.15
2013	58641.37	59297.06	14633.57	-655.69	44663.49
2014	63583.49	62956.47	15547.84	627.02	47408.63

Table B.5 Suriname: Actual and Predicted Values of Currency Holdings, Using Average Tax Rate, 2001–2013

Year	Currency			Differences	
	Actual	Predicted with tax	Predicted without tax		
	C	$\hat{C}$	$\hat{\hat{C}}$	$C-\hat{C}$	$\hat{C}-\hat{\hat{C}}$
2001	192.45	121.07	2.41	71.38	118.66
2002	135.95	316.02	9.04	-180.08	306.98
2003	383.46	304.21	8.32	79.25	295.89
2004	449.70	299.50	8.41	150.20	291.09
2005	334.30	417.61	12.04	-83.31	405.57
2006	390.10	444.21	16.02	-54.11	428.19
2007	473.40	600.80	19.02	-127.40	581.78
2008	568.00	612.31	21.25	-44.31	591.06
2009	672.10	538.18	18.83	133.92	519.36
2010	790.30	461.55	17.91	328.75	443.65
2011	821.90	527.03	17.10	294.87	509.93
2012	976.70	495.05	15.18	481.65	479.86
2013	106.80	467.28	13.87	-360.48	453.40

Table B.6 Trinidad and Tobago: Actual and Predicted Values of Currency Holdings, Using Average Tax Rate, 1992–2014

	Currency				
	Actual	Predicted with tax	Predicted without tax	Differences	
Year	C	$\hat{C}$	$\hat{\hat{C}}$	$C-\hat{C}$	$\hat{C}-\hat{\hat{C}}$
1992	1663.50	2113.39	1642.68	-449.89	470.71
1993	1819.30	2160.64	1673.83	-341.34	486.81
1994	2860.10	2342.02	1797.17	518.08	544.85
1995	2846.00	…	7909.33	2846.00	-7909.33
1996	3032.10	…	7790.96	3032.10	-7790.96
1997	3575.40	2772.96	2132.15	802.44	640.81
1998	3790.10	3089.41	2413.57	700.69	675.84
1999	3850.10	3166.12	2449.54	683.98	716.59
2000	4214.00	3557.22	2665.25	656.78	891.97
2001	4839.30	4407.36	3321.14	431.94	1086.22
2002	4573.40	4692.41	3539.27	-119.01	1153.13
2003	4663.80	5397.76	3984.79	-733.96	1412.97
2004	4739.90	6247.11	4545.07	-1507.21	1702.04
2005	7097.90	8993.51	6275.46	-1895.61	2718.06
2006	8342.40	10360.81	7170.91	-2018.41	3189.90
2007	9269.30	11650.54	8101.29	-2381.24	3549.25
2008	14038.80	13586.65	9078.37	452.15	4508.27
2009	18408.40	17032.79	11994.81	1375.61	5037.99
2010	20423.40	19276.77	13267.85	1146.63	6008.91
2011	25767.80	22299.16	15094.64	3468.64	7204.52
2012	27540.50	24339.26	16730.14	3201.24	7609.12
2013	32144.80	27382.91	18243.80	4761.89	9139.11
2014	33727.10	31122.30	20649.13	2604.80	10473.17