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Currency Demand, the Underground Economy, and Tax Evasion: The Case of Guyana

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and, Tax Evasion—The Case of Guyana**

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Abstract

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The persistence in Guyana of a substantial underground economy is an important consequence of economic and social policy over 1964–2000. The paper attempts to estimate the magnitude of, and changes to the underground economy in Guyana, as well as its adverse effect on tax collection, during this period.

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I. INTRODUCTION

One of the major problems in formulating economic policy in Guyana is the absence of reliable, accurate, timely, and consistent official economic and social statistics. In particular, although national accounts statistics are usually compiled in line with the conventional guidelines of the *System of National Accounts* (1993), official national income statistics suffer from both incomplete coverage and inaccuracies in the valuation of economic activities. Deficiencies in estimation techniques and difficulties associated with data collection lead to misreporting and underreporting of national accounts statistics. Also, economic agents deliberately conceal information from the authorities either because they are involved in illegal activity, or if the activity is legal, there is a conscious effort to avoid paying taxes. These activities are usually conducted in the *underground economy*. Obtaining accurate statistics about economic activities and the allocation of economic resources in the underground economy is important for the formulation and implementation of effective economic and social policies.

The presence of a large underground economy undermines government revenue collection, while increasing the cost of providing public services. For these reasons, it is crucial to know who is engaged in the underground economy, with what frequency, and more importantly, the magnitude of their activities in order to assess the implications for national account statistics and fiscal revenues.

Approaches to measuring the size of the underground economy have been an important concern of policymakers since the late 1970s for many reasons.² The presence of a large and growing underground economy understates the size of the economy, signals the existence of market distortions and excessive regulations, and raises governance issues. It therefore sends inaccurate signals about the state of the economy and leads to suboptimal policy recommendations and outcomes (see Frey and Pommerrehne, 1984). In studies, initially based on market economies, it was the rising budget deficits and other public choice issues that sparked research interest in this area. However, in economies like Guyana with substantial state intervention in the 1970s and 1980s, the underground economy was, in part, associated with pervasive regulations of the productive sectors and markets and the ensuing shortages.

In the past, the underground economy in Guyana was considered to be “as large as the official economy.” Thomas (1989) refers to the widely held view in Guyana that the underground economy amounted to between 80 and 100 percent of the official economy during the 1980s. Empirical studies have indeed found the size of the underground economy to be large.

² Schneider and Enste (2000b) provide an excellent survey of the literature on the underground economy.

Thomas used trend line analysis of income velocities with respect to currency to obtain estimates of the underground economy that range from 26 percent to 99 percent of the official economy during 1982–86. In another study covering the period 1979–89, Bennett (1995) estimated a currency ratio model for Guyana and found that the size of the informal sector of Guyana was about one-third of the official economy.

This study differs from these earlier studies for Guyana in three important respects. First, to improve on the validity and robustness of previous estimates, we use an alternative econometric method based on a variant of Tanzi's currency demand approach and an error correction model (ECM) to derive estimates of the underground economy. A useful feature of this approach is that it allows for other explanatory variables in modeling the behavior of currency balances. Second, in our model, in addition to the standard demand for money arguments, we incorporate a measure of "excess sensitivity" to taxes (Bajada, 1999), and financial innovations that theory suggests can be important in explaining currency holdings. Third, some official statistics have been revised since the Thomas and Bennett studies. To generate more robust results, this study incorporates these revisions in the data and extends the time series data to cover 1964–2000.

The rest of the paper is organized as follows: Section II discusses the definition and scope of the underground economy and reviews the main empirical issues in the economic literature. Section III discusses some of the salient features of the underground economy in Guyana. Section IV presents time series estimates of demand for currency holdings, while Section V presents estimates of the size of the underground economy. The implication for tax policy and estimates of the scope of tax evasion in Guyana is presented in Section VI. Section VII concludes the paper by bringing together the main aspects of the analysis and discussing the role of policy in reducing the size of the underground economy.

II. DEFINITION AND MEASUREMENT ISSUES

By its very nature, any attempt to estimate the size of the underground economy must first deal with the problem of defining it. As the nomenclature suggests, it is by definition a concealed activity and therefore, direct observation by statisticians is impossible. As a result, the econometric estimation of the underground economy, for the most part, is carried out with techniques of indirect observation through the use of proxies.³

The definition of the underground economy often differs with the objective and approach of the study, but in general, it encompasses a myriad of activities that are deemed to be both

³ For a discussion of and application of the various methodologies see Tanzi (1992), Bhattacharyya (1990), and Schneider and Enste (2000a).

legal and illegal. Feige (1979) defines the underground economy to encompass all unreported activity that goes unmeasured “by society’s current techniques for monitoring economic activity.” Smith (1994) defines it as “market based production of goods and services, whether legal or illegal, that escapes the official estimates of GDP.” These definitions adopt a broad view of the underground economy to include both legal (unreported income that would normally be recorded in GDP) and illegal activities such as prostitution, money laundering, and drug trafficking.

Table 1. Taxonomy of Underground Economy Activity

	Monetary Transactions	Nonmonetary Transactions
1. Illegal activities	Trade in stolen goods <ul style="list-style-type: none"> • Drug dealing and manufacturing • Gambling and racketeering • Prostitution • Money laundering • Smuggling • Fraud 	<ul style="list-style-type: none"> • Barter of drugs • Theft for own use • Production of drugs for own use
2. Legal activities	Tax evasion <ul style="list-style-type: none"> • Unreported income (profits, rental income, tips, etc.) • Wages, salaries, and assets from unreported work related to legal goods and services • Under invoicing Tax avoidance <ul style="list-style-type: none"> • Employee discounts • Fringe benefits 	Tax evasion <ul style="list-style-type: none"> • Barter of legal goods and services Tax avoidance <ul style="list-style-type: none"> • All do-it-yourself and other unpaid help

Source: Schneider and Enste (2000b, p. 79), with some modifications.

A somewhat different emphasis is provided by Tanzi (1980, 1982), Tucker (1982), and Schneider (1986) as they restricted themselves to measuring the extent by which official statistics are distorted, namely the extent to which fiscal income is evaded or goes underreported. This definition identifies, as potential distortions to the measurement of aggregate economic activity, *all* unreported income which has contributed to value added

according to the *System of National Accounts* (1993), but which is not included in the official statistics. These include unreported profits, interest income, rental income and receipt of tips, welfare benefits, moonlighting, domestic employment, under invoicing, and exchange of professional services (barter). Table 1 provides a useful reference for developing a consensus definition of legal and illegal activities in the underground economy.

The definition used in this paper follows that of Tanzi (1980, 1983) and of Schneider (1986) and defines the underground economy to comprise income generated from activities that are concealed from the tax authorities in an attempt to evade taxes. This includes parallel and black market activities and the informal sector. While it is common to use the terms parallel and black markets interchangeably, it is important to view them as describing differing phenomena since they do have different implications for policy. The parallel market involves the illegal production and distribution of goods and services that are legal and have an alternative legal market. Parallel market activities often develop to maximize the huge rents associated with excessive government interventions and restrictions in goods or factor markets. Black market activities involve the production and distribution of market and nonmarket goods that are illegal and strictly forbidden by government law. The informal sector is used to describe very small-scale units that are engaged in the production and distribution of goods and services by both employed workers and the self-employed. They are informal, since in the main, they are unregistered, unrecorded, and in the rural areas have little or no access to formal education, credit facilities, and organized markets.

The considerable attention given to the definition and measurement of the underground economy reflects a concern regarding the sub optimal allocation of resources. If the underground economy is large and growing rapidly, then it implies a shrinking of the tax base, while at the same time, placing large demands on public expenditures as public services provided are consumed by entities in both the official and underground sectors.

III. THE UNDERGROUND ECONOMY IN GUYANA

Gathering information about the underground economy is difficult since no one engaged in this sector wants to be identified. Nevertheless, the evidence tends to suggest that participation in the underground economy in Guyana became widespread in the 1970s and 1980s for several reasons. First, it compensated for the weak functioning of the official Guyanese economy and offered consumers access to goods and services that were not available in the official economy because of inadequate supply. Second, it provided opportunities for entrepreneurs, who could not otherwise participate in the official economy, to profit from the critical shortages of goods and services in the latter economy by adopting strategies that were not approved by the government.

Third, during 1975–87, import substitution and nationalization policies formed a major part of Guyana's development strategy. Foreign exchange was strictly rationed at the fixed

exchange rate. High tariffs and a complex system of import licensing requirements were put in place to encourage import substitution and a high degree of self-sufficiency. A ban was placed on the importation of a range of consumer goods in order to foster the development of import substitution industries. The pattern of protection had many effects. Direct restrictions on imports and distortions introduced by quantitative restrictions and tariffs resulted in a highly protected domestic market with a high cost structure, while demand for goods and services remained unfulfilled. Moreover, the emphasis on state ownership of the factors of production and controls on foreign exchange and investment limited the opportunity for private sector initiatives. The excessive interference by the state in the economy, poorly designed regulations, and an overvalued currency in the official foreign exchange market led to favorable conditions for the rapid growth of rent seeking activities and the institutionalization of the underground economy.⁴

With the liberalization of the economy beginning in 1988, profits in the parallel economy were eroded as controls on trade, foreign exchange, and prices were removed. The incentive to engage in underground activity was reduced as the supply of commodities increased in official markets. With these favorable conditions, and as the economy transitioned toward a market-based economy, the size of the underground economy diminished somewhat and the formal economy grew.

Nonetheless, the underground economy remained large mainly reflecting the still burdensome regulatory environment combined with inefficiency of public institutions; a distortionary system of taxation; weak tax collection and enforcement; and a large informal sector. As a result, a significant share of economic activity remained in the underground economy during the 1990s. We can classify the entities operating in the underground economy into two broad categories. The first group includes entities that carry out value-added activities producing goods and services, without paying taxes to the government. This group ranges from the small entrepreneur—such as vendors, craftsmen, and tradesmen—and professionals—such as lawyers and doctors—to large family-owned companies. Their participation in the underground economy usually reflects a desire to evade high corporate and personal tax payments.⁵

The second group includes entities/persons who are involved in clandestine activities. The range and scope of this group's activities is difficult to judge, but would entail the use of cash

⁴ See Egoumé-Bossogo, Faal, Weisman, and Nallari (2002) for a detailed discussion of economic policy in Guyana since 1970.

⁵ In addition to a 2 percent minimum turnover tax, companies pay 35–45 percent of profits in taxes and for certain consumer items more than 100 percent of the value is levied as import taxes and duties (see Appendix I for a summary of the tax system).

as a preferred mode of conducting business. Like the first group, participants in the second group engage in the underground economy in search of greater disposable incomes and are driven there mainly for institutional, legal, and economic reasons.

IV. ESTIMATING THE SIZE OF THE UNDERGROUND ECONOMY FOR GUYANA

Cagan (1958) provided the first attempt to investigate the size of the underground economy using monetary variables as a proxy. Cagan's approach to modeling the underground economy assumed that the share of currency in the money supply in a base year was representative of the behavior of economic agents. The residuals around this ratio, together with a velocity assumption, were then used to gauge the size of the underground economy.⁶ Similar approaches based on the assumption that proceeds of the underground economy were laundered through currency and currency substitutes were adopted by Guttman (1977) and Feige (1979); these approaches did not use statistical techniques procedures but rather concentrated only on the ratio of currency to demand deposits.

Tanzi (1980, 1983) modified Cagan's approach by estimating a currency demand function for the United States for 1929–80. In his approach, the influence of the underground economy on currency demand, proxied by tax rates to indicate the incentive to avoid taxes and participate in a cash-based underground economy, was estimated directly in the regressing equation linking currency demand and tax rates. With the key assumption that underground economy transactions are conducted in cash, an increase in the size of the underground economy increases the demand for currency and vice versa.⁷

The model estimated here uses a demand for currency specification to measure the size of the underground economy by looking at the excess sensitivity of real currency holdings to average tax rates (Bajada, 1999). That is, the model measures whether changes in tax rates changes currency holdings in addition to the expected effects on disposable income. As currency is part of money demand, our model has the standard demand for money arguments (income and opportunity costs of holding currency) and also incorporates the average tax rates and a variable to capture financial innovations and other structural changes in the financial sector.⁸ Tax rates can affect currency holding by creating incentives to avoid tax

⁶ The residuals around this ratio were assumed to reflect money laundering, and were used together with the velocity assumption to measure the underground economy.

⁷ The Tanzi approach has been criticized by Thomas (1999) and addressed in Bhattacharyya (1999). In general, the Tanzi approach is superior to Guttman's currency deposit ratio in that it does not assume constancy in the currency deposit ratio or a base year.

⁸ The average tax rate is used to proxy marginal tax rates, which is not readily available.

payments by engaging in more cash transactions. Since we are interested in the excess sensitivity of taxes, we use disposable income, rather than gross income as an explanatory variable, and expect this variable to be positively correlated with currency demand. Financial innovations can affect desired currency holdings by influencing the transaction cost of holding money. In its most general form, demand for currency can be written as follows:

$$C = f(Y^d, R, \pi, F) \quad (1)$$

Since disposable income is defined as income net of direct taxes, equation (1) can be written as:⁹

$$C = f(Y - T, R, \pi, F) \quad (1a)$$

According to the conventional demand for money specification, (C) is the sum of currency demanded for the economy as a whole (both official and underground). A rise in disposable incomes (Y^d) will increase currency demand, while a rise in the opportunity costs of holding money—interest rate (R) and the inflation rate (π)—or financial innovations will reduce demand for currency. Given the key assumption in the Tanzi approach that the underground economy is more cash intensive than the official economy, an increase in taxes is expected to increase demand for currency. Cagan (1958) and Tanzi (1982) have found evidence of such a relationship.¹⁰

The period 1994–2000 saw significant financial innovations and technological changes in the Guyanese financial system. The expansion of bank branches, the introduction of checkable savings deposits, the computerization of banking services, and the proliferation of automatic teller machines (ATMs) were key advances. In this era, the cost of obtaining currency depends on the number of ATMs and the number of branches of financial institutions. In a real sense, ATMs and bank branches have become close substitutes so that for the purposes of this paper we regard ATMs as branch networks of banks.¹¹ As a result, the financial innovation variable, F, is the sum of the number of bank branches and the number of ATMs. Improvements in banking services would, according to the transactions demand model (Baumol, 1952), lower the demand for currency.

⁹ Transfers in the form of welfare benefits are negligible and assumed to be zero.

¹⁰ In the absence of proper records and documentation, including bank records, the revenue authority cannot detect a person's tax liability. It is, therefore, in the interest of those who wish to evade taxes to explicitly request payments in cash.

¹¹ See Hill and Kabir (2000) for a similar treatment.

Thus our formulation for the estimation of currency demand is:

$$C = f(Y - T, R, \pi, F, T) \quad (2)$$

Definition of the data

The data consists of annual observations from 1964 to 2000 and are taken from two sources: the *International Financial Statistics* (published by IMF) and the *Bank of Guyana Statistical Bulletins*. Real currency holding (C) is measured by nominal currency deflated by the implicit GDP deflator; real income in 1988 prices is measured by GDP (income based at current prices less direct taxes) deflated by the implicit GDP deflator; the average tax rate (T) is calculated as direct taxes on income and imports (current prices) expressed as a percent of GDP; the opportunity costs variable (R) and inflation (π) are measured by the 91-day treasury bill rate and the percentage change in the implicit GDP deflator respectively. (F) represent financial innovation and structural change, which is proxied by the sum of ATM machines and bank branches.

Estimation of currency demand

In traditional estimates of currency demand, the adjustment of actual currency demand toward the long run desired currency demand was typically modeled by a partial adjustment mechanism. However, in recent years, various error correction models have been used to model dynamic adjustment to long run equilibrium. This paper follows this approach. It is well known that if the time series is not stationary, the distributions of the conventional test statistics are not the same as those derived under the stationarity assumption. In that event, no asymptotically correct critical values for the conventional significance tests exist. As a result, time series data must be investigated for stationarity.

To do so, we first identified which of the variables in our model follow a random walk by taking the natural logarithm of each variable and testing for the presence of a unit root. The results are reported in Table 2. All variables exhibited evidence of a unit root in their levels. To test for a second unit root we redid the tests on the first differences of the variables and established that none of the variables contain more than one unit root.¹² In other words, all the variables are nonstationary in levels but are clearly stationary when they are first differenced; i.e., integrated of order 1 or I (1). This suggests that the variables are indeed cointegrated since the calculated t-statistics from the Augmented Dickey-Fuller equations are larger in absolute terms than the critical values at 5 percent level of significance.

¹² A useful review and applications of unit root tests can be found in Perron (1989) and Phillips and Perron (1988).

The preferred specification follows a general to specific modeling strategy and estimates a general dynamic error-correction model (ECM). The general specification we consider takes the form of an autoregressive distributed lag model of the type below:¹³

$$\Delta \ln(C_t) = \alpha_1 \Delta \ln(Y^d_t) + \alpha_2 \Delta \ln(T_t) + \alpha_3 \Delta \ln(R_t) + \alpha_4 \Delta \ln(\pi_t) + \alpha_5 \Delta \ln(F_t) + \beta_1 \ln(Y^d_{t-1}) + \beta_2 \ln(T_{t-1}) + \beta_3 \ln(R_{t-1}) + \beta_4 \ln(\pi_{t-1}) + \beta_5 \ln(F_{t-1}) + \beta_6 \ln(C_{t-1}) + \mu_t \quad (3)$$

The ECM embodies both the short-run dynamics and the long-run equilibrium of the series so that when the system is at rest, all the differences vanish and the long-run equilibrium relationship holds. The coefficient of the $\ln(C_{t-1})$ captures the speed of adjustment $(1-\beta_6)$ to changes in currency demand away from equilibrium currency holdings. It also allows for suitable economic interpretation of the results, while at the same it is robust to standard diagnostic testing.

Table 2. Dickey-Fuller Unit Root Tests

Optimal Lag = 1	Levels		First Differences	
	Constant $\alpha_1 = 0$	Constant and trend $\alpha_1 = \alpha_2 = 0$	Constant $\alpha_1 = 0$	Constant and trend $\alpha_1 = \alpha_2 = 0$
Log (C _t)	-1.838	-1.891	-5.533	-5.489
Log (Y ^d _t)	-0.415	-1.610	-4.082	-4.188
Log (T _t)	-1.892	-2.513	-7.464	-8.248
Log (R _t)	-1.577	-1.412	-5.266	-5.267
Log (π _t)	-0.374	-1.837	-3.701	-3.751
Log (F _t)	-2.664	-2.591	-6.931	-7.376

The following equation represents the augmented Dickey-Fuller Test with a constant:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum b_1 \Delta y_{t-1} + \varepsilon_t;$$

and with time trend

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 y_t + \sum b_1 \Delta y_{t-1} + \varepsilon_t.$$

¹³ Equation 2 could have been estimated in first differences since the unit root test established that all variables are I (1). However, doing so would not account for long-run behavior in the demand for currency.

The null hypotheses are found at the top of the columns. The 5 percent critical (McKinnon) t-statistic for columns 2 and 4 is -2.945 and for columns 3 and 5 is -3.539.

Estimation results

With the issue of stationarity resolved, the real currency equations were estimated using ordinary least squares (OLS) estimation techniques.

The results of the econometric estimation of the general model are reported in Table 3. All of the coefficients have the expected sign. Contemporaneous changes in taxes, interest rate, and income are however not significant. The diagnostic tests suggest that the model is well-specified and could be reduced to derive a parsimonious and stable ECM. We searched for the most parsimonious model, by systematically dropping insignificant variables.

Table 4 summarizes the final version of our currency demand model estimated from 1964 to 2000. The results indicate that the overall explanatory power of the model is strong, with adjusted R-squared of 0.83. The coefficients indicate that in the long run, the demand for real currency is driven by inflation, taxes, and financial innovations while in the short run by changes in the inflation rate.

The coefficient on contemporaneous inflation is negative and significant, reflecting the opportunity costs of holding money, while the coefficient on financial innovations is negative, in line with expectations. The results indicate that the tax variable has no contemporaneous effect on real currency demand but has important effects with a one-period lag. The long-run elasticity of the average tax rate at -2.857 is extremely large indicating that the underground economy is strongly driven by the incentive for tax evasion. The model satisfies all of the basic diagnostic tests, as can be seen from Table 4. The test for functional form (Ramsey RESET) shows no evidence of misspecification at the 5 percent significance level. Also, the Breusch-Godfrey and Arch tests indicate no evidence of serial correlation or heteroskedastic disturbances. Furthermore, the Jarque-Bera test statistic indicates that the errors are normally distributed.¹⁴

¹⁴ Hendry (1995) provides a useful reference for these tests.

Table 3. Estimation Results Unrestricted Model

Dependent Variable: First Difference of the Natural Logarithm Real Currency-Unrestricted Model			
Data Series: 1964–2000			
Variable	Coefficient	t-ratio	P-value ^{1/}
+ln (T _t)	0.061	0.511	0.614
+ ln (Y ^d _t)	0.199	0.658	0.517
+ ln (R _t)	-0.068	0.820	0.421
+ ln (π _t)	-0.791	7.541	0.000
+ ln (F _t)	0.329	2.538	0.018
ln (T _{t-1})	0.413	3.053	0.006
ln (Y _{t-1})	0.036	0.215	0.832
ln (R _{t-1})	-0.004	0.057	0.955
ln (π _{t-1})	-0.049	0.441	0.663
ln (F _{t-1})	0.031	0.200	0.816
ln (C _{t-1})	-0.172	2.071	0.049
Constant	-0.980	3.615	0.001
Misspecification and diagnostic testing			
Number of observations		37	
R-squared		0.811	
L-M (Arch) test		0.599	0.445
Breusch-Godfrey test		5.899	0.032 ^{2/}
Jarque-Bera normality		0.435	0.942
Ramsey (RESET) test		0.882	0.425
Average long-run tax rate (η)		-2.401	

^{1/} The p-values indicate the probability of obtaining a test statistic whose absolute value is greater than or equal to that of the sample statistics if the null hypothesis is true. Thus, low p-values lead to the rejection of the null hypothesis.

^{2/} Null hypothesis is rejected at the 5 percent level.

Table 4. Estimation Results Restricted Model

Dependent Variable: First Difference of the Natural Logarithm Real Currency-Restricted Model			
Data Series: 1964–2000			
Variable	Coefficient	t-ratio	P-value
+ ln (π_t)	-0.743	-10.11	0.000
ln (T_{t-1})	0.28	-3.88	0.006
ln (π_{t-1})	-0.555	-7.717	0.000
ln (Innov $_{t-1}$)	-0.056	-1.948	0.061
ln (C_{t-1})	-0.098	-1.673	0.105
Constant	-0.436	-3.126	0.004
Misspecification and Diagnostic Testing			
Number of observations		37	
R-squared		0.830	
L-M (Arch) test		0.267	0.608
Breusch-Godfrey test		1.159	0.329
Jarque-Bera normality		2.552	0.279
Ramsey (RESET) test		0.782	0.405
Average long-run tax rate (τ)		-2.857	

V. ESTIMATING THE UNDERGROUND ECONOMY

Using equation (3) and the estimation results from Table 4, we can estimate the size of the underground economy in Guyana as follows. We begin by solving equation (3) for nominal currency holdings expressed in logarithms so that the estimated currency in the hands of the public at time (t) given observed average tax rates is given by the following:

$$\Delta \ln (C_t^*) = (-0.436 + 0.280 \cdot \ln(T_{t-1}) - 0.743 \cdot \Delta \ln(\pi_t) - 0.555 \cdot \ln(\pi_{t-1}) - 0.056 \cdot \ln(F_{t-1}) - 0.098 \ln(C_{t-1}^*)) + \Delta \ln(P_t), \quad (4)$$

where C_t^* = estimated nominal currency in the hands of the public in millions of Guyana dollars. A corresponding series of legal currency holdings was then derived by eliminating the tax variable in equation (4) and therefore the incentive for economic agents to participate in the underground economy. In the absence of this variable, the currency holdings by the

public would be lower because there is less demand for cash payment of goods and services for the purposes of evading taxes. From values expressed in logarithms we converted them in level terms to yield estimates of nominal currency holdings with and without the tax variable. The difference between these two estimates yields estimates of nominal underground currency holdings in time (t).¹⁵

Assuming that the velocity of circulation of money is the same in both the official and underground economies, the GDP for the underground economy was obtained as the product of estimated underground currency holdings and the calculated velocity.¹⁶ Figures 1 and 2 show the size of the underground economy expressed as a percentage of official GDP and real GDP growth in the official and underground economies. Detailed yearly estimates are tabulated in Table 5.

¹⁵ The sum of currency held by persons participating in the underground economy such that, underground currency (IC_t) is:

$$(IC_t = C^*_t - C^*_{wt})$$

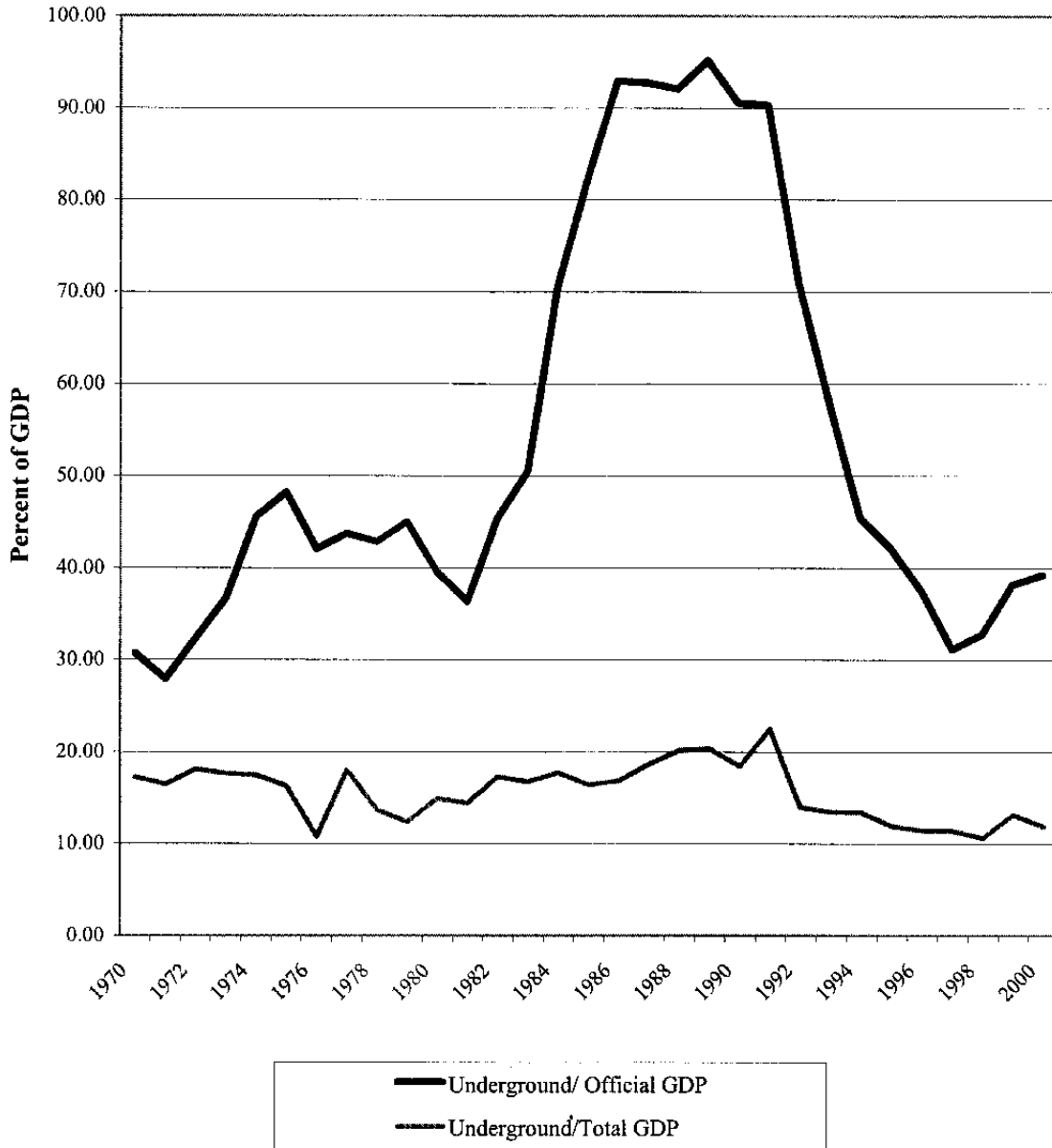
¹⁶ Given the assumption in the currency demand approach that cash is the predominant medium of payment to carry out economic and financial transactions in the underground economy, the velocity of circulation in the official economy was obtained by dividing official GDP by nominal money narrowly defined for the legal economy. Unfortunately, there is little that can be done about such an assumption. However, casual observations will suggest that the velocity of currency is likely to be higher in the underground economy, with the implication that our derived estimates may err on the side of underestimating the size of the underground economy.

Table 5. Estimates of the Underground Economy and Tax Evasion, 1970–2000

Year	Underground Currency (Million G\$)	Legal Currency (Million G\$)	Underground Economy (Million G\$)	Underground Economy (Percent of GDP)	Maximum Tax Collection (Million G\$)	Maximum Tax Collection (Percent of GDP)
1970	18	37	104	27	21	5
1971	18	41	120	29	27	6
1972	20	57	183	41	46	10
1973	23	64	190	40	46	9
1974	30	88	289	55	98	12
1975	33	117	388	49	159	16
1976	42	91	215	21	68	7
1977	46	186	552	60	163	18
1978	66	175	430	47	119	12
1979	75	147	286	28	82	8
1980	71	186	461	44	133	11
1981	76	191	443	37	158	14
1982	82	260	641	55	240	22
1983	102	288	644	59	277	27
1984	121	418	1,000	97	416	34
1985	157	487	1,096	91	470	34
1986	192	586	1,276	91	656	43
1987	516	1,154	1,452	96	527	21
1988	555	1,562	2,199	89	969	30
1989	2,322	3,642	3,206	101	1,013	12
1990	568	3,391	6,763	82	2,339	19
1991	4,359	9,253	10,786	88	3,531	12
1992	413	3,175	12,728	43	6,299	18
1993	2,444	6,959	15,178	43	6,356	15
1994	3,127	9,436	21,175	51	7,542	14
1995	3,915	9,185	17,771	33	6,765	11
1996	4,131	9,668	18,614	29	7,368	10
1997	4,475	11,122	22,255	32	7,775	10
1998	1,851	10,618	29,327	38	10,013	13
1999	5,204	15,908	35,662	45	11,275	12
2000	6,096	14,850	32,385	35	11,380	12

Note: Ratios are in percent of official GDP.

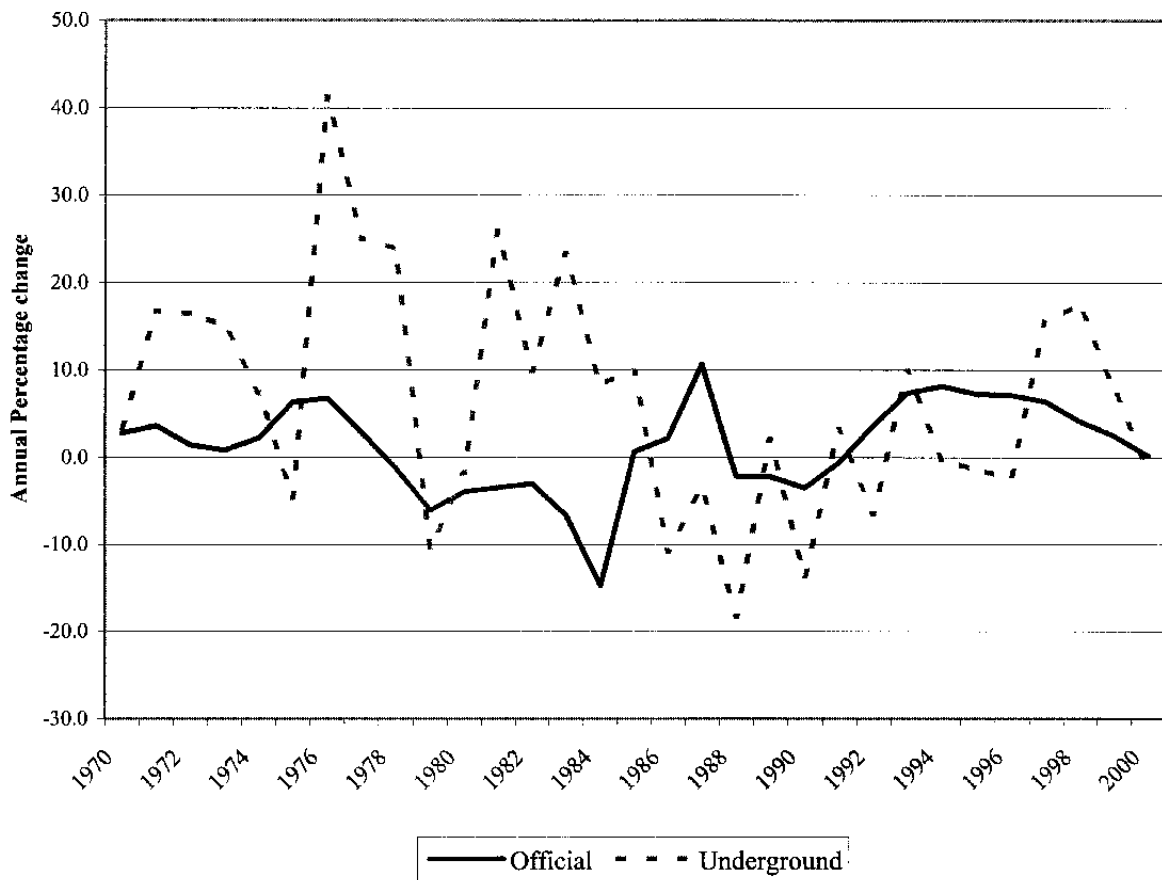
Figure 1. Guyana: The Underground Economy, 1970-2000
(3-year moving average)



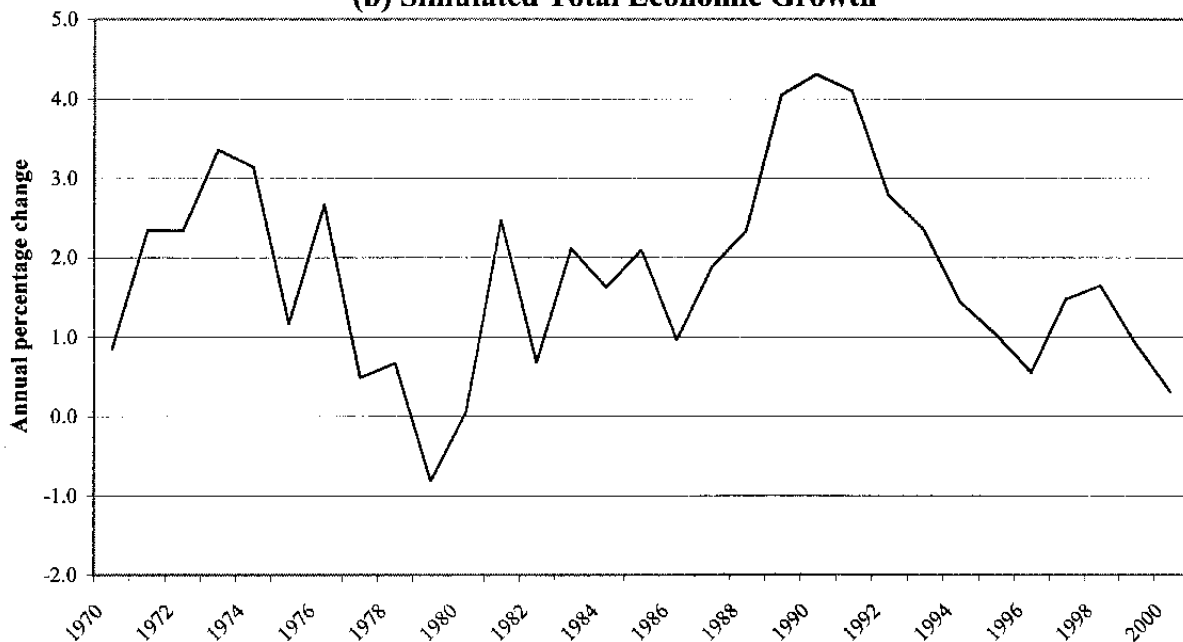
Sources: Bank of Guyana and Bureau of Statistics.

**Figure 2. Guyana: Real Growth Rates, 1970-2000
(3-year moving average)**

(a) Official and Underground Economy



(b) Simulated Total Economic Growth



Sources: Bank of Guyana and Bureau of Statistics.

Interpretations

Figure 1 and estimates in Table 4 confirm the presence of a large underground economy in Guyana, representing a significant part of overall economic activity. Figure 1 shows significant fluctuations, with an upward trend in the size of the underground economy as a percentage of official GDP, which averaged about 40 percent of GDP in the 1970s, before increasing sharply to an average of 76 percent of official GDP during 1980–89. The increase in the 1980s reflected mainly excessive government regulation and inward-looking economic policies that were the norm at that time. By 1989, the underground economy reached 66 percent of official GDP and two years later in 1991 reached 73 percent of official GDP. During the 1990s the size of the underground economy fell, but at an average of 47 percent, is still higher than the levels of two decades earlier.

The share of the underground economy in total GDP (Figure 1) has been relatively stable over the period 1970–89 despite the fluctuations in the official economy. This is not surprising given the very low average growth of real GDP in the official economy during this period. Also, it may be due, in part, to the fact that increases in real incomes have tended to push people into higher marginal tax brackets and that regulations and controls were not relaxed even in periods when the economy was expanding. In addition, since production and distribution of almost all goods and services were confined to public enterprises, increases in income were being funneled into investments in the underground sector that are difficult to tax and control.

Figure 2a shows the path of real GDP growth in the underground and official economies. There appears to be no systematic relationship between real changes in the official and underground economies. Surprisingly, the computed coefficient of correlation between the real official and underground growth rates is negative and very low (-0.05). This implies that cyclical movements in the underground economy tend not to coincide with movements in the official economy.

Also, Figures 2a and 2b show that the average annual growth of the official economy during the sample period at 1.3 percent was significantly lower than the 6.7 percent growth in the underground economy. The latter grew much faster than the official economy in the 1980s, but declined sharply in the 1990s, mostly due to the consolidation of productive activities back into the official sector. The variance of growth in the underground economy was significantly higher than that in the formal economy during the 1980s, indicating more volatility in overall economic growth than the official statistics would indicate during that period.¹⁷

¹⁷ The standard deviation of real growth in the underground during 1970–2000 was about 13 compared with 5 in the official economy.

VI. TAX EVASION

A natural extension of the analysis in the preceding sections is to ask what is the impact of the existence of a large underground economy and its variability for tax policy in Guyana. In other words, to what extent can the observed tax rates and estimates of the underground economy provide insights to the level and proliferation of tax evasion as shown in Table 5. To examine this issue, a series is constructed for the entire sample period for the upper bound approximation of the potential revenue that the government could collect if the underground economy could be taxed. The series is derived using the product of the estimate of the size of the combined official and the underground economy at time t and the average tax rate. This indicates that on average, if the underground economy had been incorporated in the official sector, government revenue would have been higher by, at least, an estimated 7 percent of formal GDP per year over period 1970–2000 (Figure 3).¹⁸

Thus, the widespread tax evasion associated with the underground economy has de facto increased the fiscal deficit and contributed to unsustainable debt dynamics.

VII. CONCLUSION

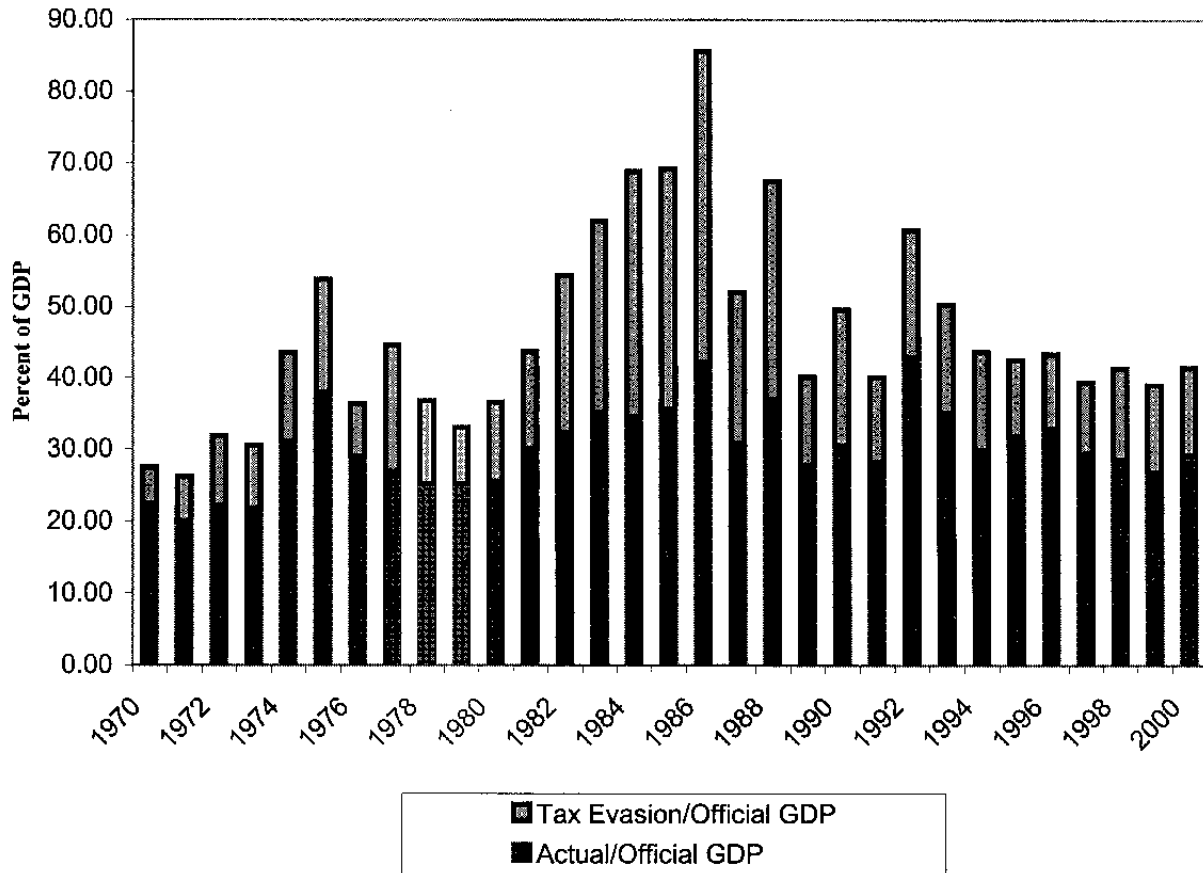
The objective of this study was to estimate and analyze the size and consequences of the underground economy in Guyana using a parsimonious and stable error-correction-based currency demand model. Our findings indicate the existence of a large underground economy in Guyana. While the share of the underground economy fell substantially following the implementation of economic reform programs beginning in 1989, it still remained high in the 1990s. The underground economy may have included activities such as cross-border smuggling of exports like gold and diamonds and of imports of fuel and other consumer goods; as well as private professional and informal services and various other illegal activities.

The existence of a sizable underground economy of unrecorded domestic and international economic transactions suggests that the existing national accounts series are not adequate for meaningful economic analysis or for policy formulation. Efforts must be made by the national authorities to establish credible estimates of the key components of the underground economy with a view to incorporating them in the compilation of official statistics.

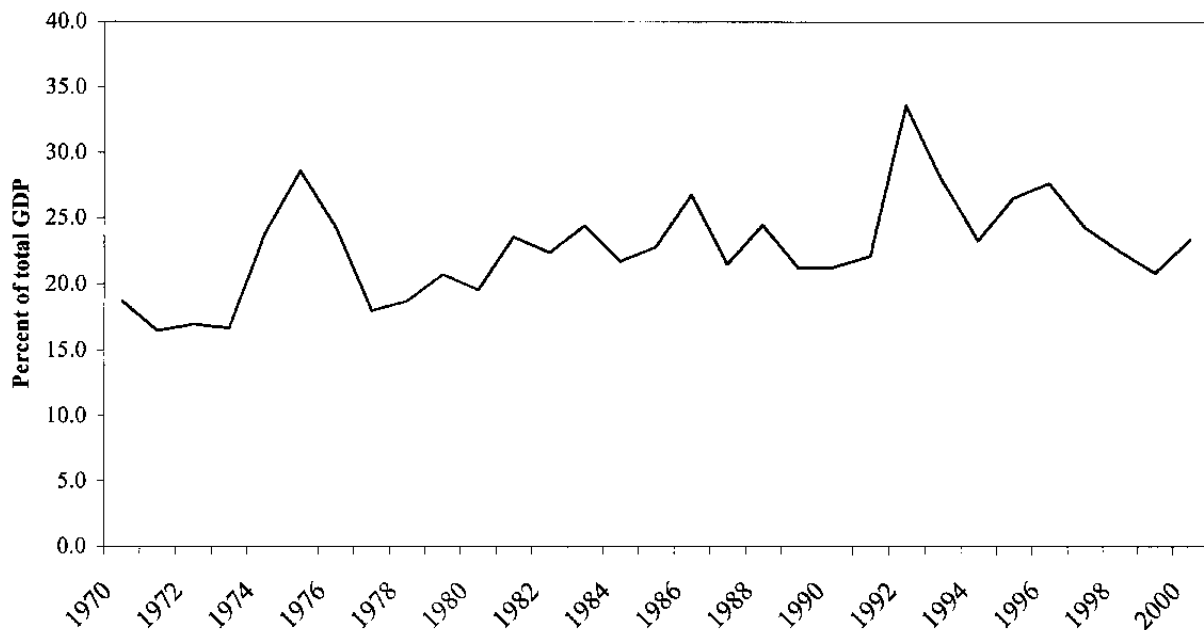
¹⁸ For illustrative purposes, the paper assumes a tax yield of 50 percent from maximum collectible taxes.

Figure 3. Guyana Tax Revenue, 1970-2000

(a) Actual and Potential Tax Revenues to Official GDP 1/



(b) Actual and Potential Tax Revenues to Total GDP



1/ Assumes a tax yield of 50 percent from maximum collectible taxes.

Although the total elimination of the underground economy is impossible, it is imperative that the government considers implementing policies to reduce its size. The relative decline in the size and growth rate of the underground economy during the 1990s, when compared with the preceding two decades, has shown that a long-run strategy based on market-based reforms, including fiscal reforms, along with improved governance and stronger institutions, are effective in meeting these goals. A comprehensive reform of the current tax system and its administration as well as deregulation and an improved provision of government services (such as land titling, domestic security, and judicial services), would likely help reduce the size of the underground economy.

Guyana: Summary of the Tax System
As of December 31, 2001

Tax (Taxpayer)	Description/Tax Base	Rates	Deductions and Main Exemptions 1/
I. Income Tax			
<p>(a) Personal and corporate: Individuals and corporations receiving income earned from carrying out productive activities (including the rendering of services) within the territory of the Republic of Guyana.</p>	<p>Tax base: The total amount of net taxable income—whether in money or in kind—earned by the taxpayer (gross income less expenses and deductions).</p>	<p>Personal: Individuals pay rates of 20 percent on annual income exceeding G\$216,000 but below G\$350,000 (monthly income exceeding G\$18,000 but below G\$29,083); and 33¼ percent on annual income from G\$350,000 upwards (monthly income from G\$29,083 upwards).</p> <p>Corporate: 1. Commercial corporations—45 percent. 2. Corporations other than commercial—35 percent</p> <p>Companies pay a minimum tax of 2 percent. This is credited when they return to profitability.</p>	<p>Deductions: Threshold: G\$216,000 per year.</p> <p>Exempted types of income:</p> <ol style="list-style-type: none"> 1. Donations to charitable organizations 2. Dividends. 3. Annual leave passage allowances to traditional public servants (which equals one month salary). 4. Interest and other income which attracts withholding tax.
<p>(b) Withholding: Individuals and corporations</p>	<p>Interest earned on:</p> <p>(i) Interest bearing deposit accounts</p> <p>(ii) Loans secured by bonds and similar instruments.</p> <p>Payments other than interest to nonresidents.</p>	<p>15 percent</p> <p>15 percent</p> <p>10 percent</p>	<p>Exempted persons or entities:</p> <ol style="list-style-type: none"> 1. Disabled individuals and senior citizens whose total annual income does not exceed G\$216,000 2. Charitable organizations

	Discount earned on treasury bills.	15 percent tax.	Exempted types of income: 1. Treasury bill discounts earned by commercial banks.
	Gross sales to the Gold Board by individual gold miners.	2 percent	
2. Entertainment Tax	Income generated from entertainment, foreign artists and cinemas.	25 percent	Exempted types of income: Performances by Caribbean and nonresident Guyanese artists.
3. Premium	Tax paid on insurance premiums to: (i) Nonresident companies carrying on business in Guyana. (ii) Nonresident companies not carrying on business in Guyana	6 percent 10 percent	
4. Property Taxes			
(a) Property	Tax base: Personal (i) On the first G\$7,500,000 of net property (ii) For every dollar of the next G\$5,000,000 of net property (iii) For every dollar of the remainder of the net property	Zero rate $\frac{1}{2}$ percent $\frac{3}{4}$ of 1 percent	Exempted persons/entities: 1. United Nations officials and members of consular services 2. Any expert, adviser, technician or official whose salary is not payable by the Government of Guyana 3. Local authorities 4. Charitable organizations
	Tax base: Corporate. (i) On the first G\$1,500,000 of net property. (ii) For every dollar of the next G\$5,000,000 of net property. (iii) For every dollar of the remainder of the net property.	Zero rate $\frac{1}{2}$ percent $\frac{3}{4}$ percent	
b) Process Fee (previously estate duty)	Estates with gross value exceeding G\$100,000	$\frac{1}{2}$ of 1 percent	
Heirs or Recipients			

c) Capital gains	Income gained from the sale, disposal or transfer of capital items (e.g. vehicles, real estate)	20 percent	Disposal of public corporation shares
5. Purchase Tax	Tax paid on the accumulated retail value of vehicles purchased, based on engine capacity:		Exempted persons/ entities 1. Eligible remigrants and public servants for vehicles 2000 cc and below 2. Members of parliament and members of the diplomatic corps .
	(i) Under 1500 cc	10 percent	
	(ii) From 1500 cc to 2000 cc	20 percent	
	(iii) From 2000 cc to 3000 cc	70 percent	
	(iv) From 3000 cc and above	100 percent	
6. Travel Taxes			
a) Travel voucher tax	Tax paid on the cost of any airline ticket for which the journey originates in Guyana	10 percent	Exempted persons or entities: 1. Children under seven years of age
b) Travel tax	Tax exit required to be paid by passengers departing Guyana	G\$2,500 per passenger	2. United Nations officials and members of permanent consular services
7. Import Duties			
Any individual or corporation importing goods liable to taxation.	All goods liable for taxation that are imported into Guyana.		Exempted companies/Items 1. All oil commodities imported by mining companies. 2. Imports originated from CARICOM countries. 3. Fuel imported from Venezuela and Curacao. 4. Eligible remigrants and public servants (vehicles). 5. Certain manufacturing equipment and raw materials.
	Tax base: The c.i.f., value of the merchandise	0–20 percent	
	General rates	40 percent	
	Special rates (natural agricultural products)		
	Motor vehicles	45 percent	
	Luxury items	100 percent	
8. EXPORT DUTIES			
	Aquarium fish – value of export	5 percent	Exempted Items 1. Manufactured articles. 2. Goods other than bauxite and sugar exported to another community state.
	Shrimp	1 percent	
	Bauxite – tonne	G\$0.45	

9. Consumption Tax

Timber	
Rough green hard logs – cubic meter	G\$0.29
Sawn green hard wood – cubic meter	G\$5.09
Live birds – value of export	1.5 percent
Sugar – tonne	G\$1 (deposited in Sugar Industry Stabilization Fund).
All other articles	1½ percent

- 3. Forest products other than those mentioned under tax base.
- 4. Agriproducts and by product other than sugar and molasses.

Tax Base:

On imported goods.	
The c.i.f. value of the merchandise plus:	
(i) Value of duty paid on oil imports.	50 percent
(ii) Value of duty paid on nonoil imports.	0–30 percent
On local goods:	
(i) Sales value of alcoholic beverages.	50 percent
(ii) Production cost of tobacco.	128 percent
(iii) Other goods:	
Primary inputs and capital goods	0–10 percent
Intermediate inputs and final goods	15–30 percent
On local services:	
(i) Value of overseas telephone calls	10 percent
(ii) Betting shops – value of the bet	10 percent

- 1. Partial exemption granted for the importation of motor vehicles by public servants and eligible remigrants.
- 2. Certain manufacturing equipment and raw materials.

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