REVISITING THE UNDERGROUND ECONOMY IN GUYANA 2001-2008

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Content

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Introduction

This study revisits the phenomenon of the underground economy in Guyana utilising the techniques of earlier studies. Three previous studies have been done on the phenomenon on Guyana: (Thomas 1989; Bennett 1995; Faal 2003). Together these covered the period from the 1970s to 2000. This study focuses on the period 2001-08. *Section I* introduces the definitions used in this study and outlines our approach. *Section II* considers in some detail the methods used in the three previous studies. S*ection III* highlights some key macro-economic features of 2001-08 in order to contrast these with the circumstances prevailing in the earlier period covered by the previous studies. *Section IV* presents the results from applying the methods of measurement used in earlier studies to the period of our inquiry (2001-08). The final *Section (V)* is devoted to concluding remarks.

Section 1: Defining the Underground Economy

Many terms have been used to label the phenomenon we are addressing in this study. The three previous studies (Thomas 1989; Bennett (1995); and Faal 2003) have used the terms underground economy and/or informal sector. In the literature other terms have been used interchangeably: parallel economy, shadow economy, hidden economy and black market. This has been somewhat confusing and it has become obligatory in recent studies for authors to make clear the definition of the terms they employ because of the obvious relation between the meaning attributed to the phenomenon and what is in fact being measured and the methodologies used.

The four key parameters of all the definitions used so far in the literature are, on the one hand, whether the transactions involved are legal or illegal and on the other hand, whether the transactions are consumated with monetary instruments or non-monetary methods, such as barter, own consumption of goods and services not mediated through a market, or theft. Some definitions aim at being broad while others are strictly narrow. For example, in the latter case it may be confined narrowly to the black market for foreign currency when strict currency restrictions and capital controls apply. In the former case, it could include in the widest sense traditional informal and subsistence sector activities in developing economies. And, for developed ones, unreported income (tips), "moon-lighting" activities, as well as household and individual own consumption of goods and services produced, which go unrecorded and unreported.

In the literature the two key drivers of the underground economy are 1) tax evasion and 2) non-compliance with the regulatory authorities in the pursuit of either profit or the capture of those economic rents associated with regulatory non-compliance. These drivers would embrace both illegal and legal transactions. Illegal transactions refer to both those that are strictly prohibited by law for all persons, as well as those, which become illegal only when they are undertaken by unauthorised providers. Such illegal activities could be undertaken by highly organised transnational criminal enterprises/operators or locally based networks engaged in such activities as drug

trafficking; arms smuggling; trafficking in persons; organised prostitution; and money laundering.

At the same time, local operators who engage in such activities as trade in stolen goods, extortion, and corruption are by law acting illegally. These forms of illegal activities distinguish themselves by the fact that they are deliberately hidden from the Authorities. **Concealment** is a key embedded feature in all economic transactions of this type. This makes it next to impossible to directly measure the size of the underground economy with any reasonable degree of accuracy. Nevertheless, some direct methods have been employed, such as sample surveys, tax auditing, or tracking social security payments. These however can produce only point estimates. For time series, indirect methods of measurement are employed ***utilising the main drivers of the process as incentives***: tax evasion and regulatory non-compliance. And as ***disincentives***, the legal penalties attached to being caught, and the opportunity cost of the effort involved in pursuing illegality (including moral concerns).

In his study Bennett defined the informal sector as:

> "embracing activities which function outside the rules and regulations set out by the state to govern such activities" (Bennett 1995 page 231).

Writing at a later date when the confusion in terminology and usage was more apparent, Faal spent time elaborating his definition: According to him the underground economy

> "comprises income generated from activities in an attempt to evade taxes. This includes parallel and black market activities and the informal sector" (Faal 2003, page 6).

Each of the three key terms used by Faal is further defined. Thus the ***parallel markets*** in his definitions involve "the illegal production and distribution of goods and services that are legal and have an alternative legal market" (ibid). For him the ***parallel market*** is driven by the need to maximize rents through regulatory non-compliance, in a period in Guyana when government regulations were excessive.

Similarly ***black markets*** involve:

> "the production and distribution of market and non-market goods and services that are strictly prohibited by law" (ibid page 6)

Finally, the ***informal sector*** refers to:

> "small scale units that are engaged in the production and distribution of goods and services, otherwise employed workers and the self-employed" (ibid page 6)

In the main the informal agents are unregulated and go unrecorded because they are in the main located among the rural and urban-based poor with little access to formal markets for assets and credit.

For the purposes of this study however, by underground economy we refer to economic transactions undertaken with 1) the explicit intent of not being reported, because they are illegally undertaken or criminal, 2) to evade taxes and 3) to circumvent regulatory provisions of the Authorities. It would ***not*** include subsistence production or household own consumption. Further, all such economic transactions are required to take place in the economic space of the territory of Guyana, although it is recognized that they may involve agents who do not reside in Guyana. These activities are not captured or recorded in the official GDP measures either because they are illegal or deliberately unreported. As we shall argue later, following Thomas (2003-04) the portion of the underground economy driven by organised crime is labelled as the ***phantom economy,*** a term that has acquired popular usage in Guyana.

Section II: Previous Studies

At the time of its Independence the underground economy in Guyana took the typical form of those colonial developing countries that were small poor open and heavily dependent on primary production and exports, with agriculture accounting for a large share of national output and also having a significant small farming rural sector. There was also significant informalisation of the economy. Financial and fiscal institutions were underdeveloped. The Colonial Authorities regulated the system tightly so that the underground economy consisted mainly of:

1. the subsistence sector
2. informal agrarian markets, and
3. own consumption and non-marketisation of some goods and services

There was no strong evidence of developed and well-organised black markets with their usual operatives. There was also no strong evidence of significant underground cross-border trading. Consequently, colonial government policy in regard to it was minimal. Therefore, we may safely conclude that the effects of the underground economy were not "visible" either to the Authorities or the general public.

With Independence (1966) and the establishment of the Cooperative Socialist Republic in 1970, commandist economic policies substituted for the former *laissez faire* policy stance of the colonial Administration that carried over to the early years of Independence. These commandist socialist economic policies were based on the nationalisation of the principal means of production with the proclaimed goal of the Central Government to establish state ownership and /or control of between 80 to 90 percent of the economy. Several studies (see Thomas C.Y (1996)) record the economic consequences of this pursuit. From the latter part of the 1970s until the introduction of the IMF/World Bank Economic Recovery Program in 1989 shortages of basic necessities, other consumer items, raw materials, equipment, and machinery led to the emergence of black markets for these. The basic cause was the shortage of foreign exchange, following the collapse of the export sectors, and reduced inflow of foreign direct investment. The introduction of direct controls over foreign exchange and capital movements, aggravated these effects. Further,

the imposition of extensive capital controls, licensing of imports, restriction and banning of many necessary consumer items (wheaten flour, fruits, vegetables, milk products, detergents, toiletries etc) compounded the difficulties. As this occurred the economy went into a serious depression (growth rates became highly negative). In 1987 real official GDP was 20 percent lower than in 1976. Between 1980 and 1990 total real GDP and per capita GDP declined at a negative rate of *minus* 3.5 and 3.9 per annum. This was described as a period of immiserizing growth (Thomas 1989) defined as one of sustained decline of absolute real income per head; negative population growth (the intercensual population data show an absolute ***decline*** between 1970 and 1980 and 1990); sustained deterioration in the physical plant of enterprises in both the private and public sector as well as economic and social infrastructure.

As a consequence massive macroeconomic disequilibria emerged. For example:
- Persistent balance of payment deficits (exceeding 25 percent of GDP)
- Government budgetary deficits
- Acute indebtedness (the external debt rose from 288 million US dollars to 752 million in the period 1975 to 1987; the scheduled external debt service reached 93 percent of export earnings in 1987). The consequential growth in arrears was staggering. The ***internal*** debt grew 20 times between 1975 and 1987 with more than two-thirds of this short-term debt).
- The money supply expanded by a multiple of 8 between 1975 and 1987
- Inflation grew by nearly six-fold over the same period.

It is in this context therefore, that the underground economy first came into prominence. Currency substitution, capital flight and black markets for foreign currency were its key ***monetary*** indicators and basic shortages of many needed items its key *real* indicators.

This period produced the first study aimed at estimating 1) the nature of the underground economy 2) its size and 3) its defining characteristics. Thomas (1989) studied the period 1982-86. This was followed by Bennett's study (1995) covering the period (1977 to 1989).

With the IMF/World Bank Economic Recovery Programme (ERP) the basic shortages were overcome, the country was afforded significant debt relief. External indebtedness became more manageable; the exchange rate stabilised more or less around its current levels; and, economic growth for the years 1991-1997 exceeded 7 percent per annum. This was the period of Faal's study (Faal 2003) 1970-2000. It was found in that study, the underground economy persisted into the 1990s, but shifted from organising itself around (shortages, particularly of foreign exchange) to tax avoidance and corruption. The period since then (2001-2008) is the focus of this study.

What the previous studies show

Thomas (1989) used an indirect approach to estimate the underground economy. This was based on the study of monetary and income behaviour, utilising the official reported statistics. He measured the income velocity of three monetary variables: currency (Vc); currency and commercial bank demand deposits (Vm1) and currency plus all commercial bank deposits (Vm2). For GDP he used the official reported factor cost data measured in current prices as the numerator. The period covered by the income velocity measures was 1964-86.

On examination the data presented by Thomas showed three distinct phases in the behaviour of income velocity: 1966-76; 1977-81 and 1982-86. The data indicated significant scale declines in the income velocity variables. For all three measures there was a more than one-third decrease in the size of the income velocity measures when compared to the preceding period. Using Ordinary Least Squares methods he then compared trend lines for all three income velocity measures for the periods 1964-76 and 1964-81. These were then projected for the years 1982-86. The crucial assumption was that values recorded from 1982-86 were not the actual ones as the role of the underground economy was not accounted for in the official GDP data.

The difference between the trend values and the values using the reported data provided an indirect estimate of the underground economy. On this basis Thomas projected

estimates of the GDP, including the underground economy, for the years 1982-86. In addition to this he utilised the *lowest* trend value for the income velocities from the data, using Vc and Vm1 over the two periods of the trend analysis (1964-76 and 1964-81) to project two additional estimates of GDP, including the underground economy, which should have been recorded if the trend line values were sustained. The results he obtained are presented in Table 1 below.

Table 1: Thomas (1989) Estimates of the Underground Economy (% of official GDP)

Year	Method				
	1	**2**	**3**	**4**	**5**
1982	26	52	44	26	3
1983	44	79	68	52	59
1984	41	54	72	58	69
1985	32	60	78	63	83
1986	33	59	85	98	99
1982-86*	35(33)	61(59)	70(72)	59(58)	68(69)

* Arithmetic mean and (median)
Source: Calculated from Thomas (1989) Table 8

Method 1: Using trend line projection of Vm1 for 1964-81

Method 2: Using tend line projection of Vm2 from 1964-81

Method 3: Using tend line projection of Vc from 1964-81

Method 4: Using lowest observed value of Vm1 for 1964-81

Method 5: Using lowest observe value of Vc for 1964-81

The robustness of these results is affected by the use of end of year data for the income and monetary variables, because weekly or monthly data were not available. The implicit thesis in this analysis is that the income velocity of monetary variables is the same in the underground and official economy. Thomas had also estimated separately, a "foreign currency black market ranging from just under US$40 million to over US$100 million".

Bennett (1995)

Following Gautamn's (1977) study of the USA and Feige's (1989) study of developed and developing countries Bennett utilises the basic assumption that tax evasion is the main driver of the underground economy. The consequence of this is that using currency as a medium of exchange for economic transactions of whatever type eliminates possible "paper trails" and allows users to evade the regulatory authorities and their compliance requirements and therefore cost.

However, in Guyana over the period of his study, bank services and financial intermediation were growing in importance. To the extent this did occur, it would have an independent effect on the demand for currency relative to other monetary instruments for economic transactions.

Whatever the course of events, for Bennett the behaviour of the ratio of currency used to demand deposits is a good indicator of the size of the underground economy. Bennett first examines income velocity. He shows that over the period 1960-89 there was a decline in the GDP/currency ratio (falling from 12 in the early 1960 to about 2 in the late 1980s). The income velocity for currency plus demand deposits also showed a decline from 7+ in the early 1960 to less than 2 in the late 1980s. As regards the currency to demand deposits ratio this exceeded one for the entire period, except briefly during 1974-76. The results of these calculations are shown in Table 2 below.

Table 2: Guyana: Income velocities and Currency/Demand Deposits ratio (1960-89) (Bennett)

Year	GDP/currency	GDP/M1	Currency/Demand Deposits
1960	12.0	6.9	1.38
1961	12.5	7.8	1.64
1962	12.7	7.3	1.33
1963	10.5	6.2	1.44
1964	11.5	6.4	1.24
1965	11.6	7.2	1.65
1966	12.2	7.3	1.47
1967	12.5	7.6	1.58
1968	11.9	7.4	1.62
1969	12.2	7.4	1.56
1970	12.7	8.0	1.68
1971	12.2	7.4	1.58
1972	11.1	6.2	1.30
1973	10.3	5.9	1.33
1974	13.6	6.7	0.89
1975	11.9	5.4	0.84
1976	9.8	4.7	0.95
1977	7.1	3.6	1.05
1978	7.3	3.9	1.13
1979	8.0	4.2	1.10
1980	8.0	4.1	1.08
1981	7.3	3.9	1.18
1982	5.4	2.0	1.16
1983	4.5	2.4	1.14
1984	4.2	2.3	1.22
1985	3.9	2.2	1.35
1986	3.7	2.1	1.39
1987	4.0	2.2	1.21
1988	3.4	1.7	1.03
1989	3.5	1.8	1.07

Source: Bennett (1995) Table 1.

Bennett's model of the currency-deposit ratio for Guyana was then specified as follows:

$C = Co + Ci$	(1)	C = actual stock of currency; D = actual stock of demand deposits;
$D = Do + Di$	(2)	0 = subscript to denote official sector; i = subscript to denote
$Ko = Co / Do$	(3)	informal sector; Y_0 = official income;
$Ki = Ci / Di$	(4)	K_0 = ratio of currency to demand deposits in the official sector
$Vi = Yi / (Ci + Di)$	(5)	
$Vo = Yo / (Co + Do)$	(6)	
$\beta = Vi / Vo$	(7)	

The first two equations identify the stocks of currency and demand deposits into formal and informal components. Equations (3) and (4) similarly identify the currency-deposit ratio in their formal and informal components. And, equations (5) and (6) do the same for the income velocity and equation (7) expresses the ratio of income velocity for these two sectors. Estimates of income in the informal sector Yi is then provided by solving for the general equation.

$$Y_i = \frac{\beta Y_0 (K_i + 1)(C - K_0 D)}{(K_0 + 1)(K_i D - C)}$$

Bennett's results for the years 1977-1988 are shown in Table 3. These are based on the following assumptions 1) a period in 1955, where it is assumed the informal economy equalled 15 percent of the official G.D.P; 2) the ratio of income velocity in the formal to informal sectors was 1.1, that is 10 percent higher in the latter and, 3) a ratio of currency to demand deposits in the official economy was constant over the period. With the assumed value of the ratio of formal to informal income in the base period the ratio of currency to demand deposits in the official sector was estimated as:

$K_{ot} = (C_t - a_t D_t)/ (a_t D_t + D_t)$; where $a = Y_t/Y_o$ and the subscript t refers to the base period values.

**Table 3: Bennett estimates of Informal Income in
Guyana (as a % of Official GDP)**

Year	Percent Informal
1977	24.8
1978	31.4
1979	29.2
1980	26.9
1981	35.3
1982	33.9
1983	33.0
1984	38.8
1985	50.6
1986	54.4
1987	38.1
1988	22.7
Arithmetic Mean (1977-1988)	34.93

Source: Bennett (1995) Table 3.

When calculated Bennett's results show that for purposes of comparison with Thomas' estimates the arithmetic mean of the size of the underground economy for1982-86 was 42 percent of official GDP, with a median of 38.8 percent. This comes closest to Thomas' estimates based on his Method 1.

The key assumptions of Bennett's approach are: 1) the use of the base year in 1955 when it was assumed the underground economy was 15 percent 2) the income velocity in the informal economy sector is assumed to be 10 percent higher than that in the formal sector and 3) the currency ratio in the official economy remained the same over the period.

The key weaknesses are firstly, the Bennett approach is highly sensitive to the choice of the base year. Second, currency substitution has taken place as foreign currencies (and the US dollar in particular) were used as monetary instruments for ordinary transactions during that period in Guyana. Thirdly, no attempt has been made to isolate the exogenous impact of growing financial intermediation and the expansion of banking services in the economy. Finally, growth in the monetary variables is not at a uniform rate. Thus a slowing of the deposit rate can cause a rise in currency-demand deposits ratio as much as a rise in currency demand is explaining the behaviour of the currency-demand deposits ratio.

Faal (2003)

Faal utilised an econometric approach in which he modelled estimates of the demand for currency to measure the size of the underground economy. He looks at factors such as disposable income, tax rates, the opportunity cost of holding currency (proxied by the interest rate), the inflation rate, and the rate of financial innovation. The increases in disposable income and taxes will increase currency demand, while increases in the other variables will reduce it. The key assumption is that the underground economy is more cash intensive than the official economy for the same reason as Bennett, tax evasion. The period of analysis is 1964-2000.

As currency is part of money demand, this approach is the standard one used in modelling the standard money demand function. In its most general form, the demand for real currency holdings (C) is expressed as:

$$C = f(Y\text{-}T, R, \pi, F, T),$$

where (Y-T) is real disposable income or real income net of direct taxes (ignoring welfare benefits), R is the interest rate or opportunity cost of holding currency, π the inflation rate (proxied by the GDP deflator), F is financial innovation (as proxied by such factors as bank branches and ATM machines) and T is direct taxes on income and imports at current prices as a percent of GDP.

The Error Correction Models were used to model the dynamic adjustment of actual currency demand toward the long run currency demand. The tests indicate that the variables were cointegrated, using the Augmented Dickey-Fuller equation and calculating the t-statistic. After the issue of stationarity was resolved, Faal utilised Ordinary Least Squares (OLS) estimation techniques to measure the real currency holdings. Faal's estimates of the underground economy as a percent of official GDP is shown in Table 4 below.

Table 4: Faal (2003) Estimates of the underground Economy (% of Official GDP)

End of Period 1970s	Underground economy (Percent of GDP)	End of Period 1980s	Underground economy (Percent of GDP)	End of Period 1990s to 2000	Underground Economy (Percent of GDP)
1970	27	1980	44	1990	82
1971	29	1981	37	1991	88
1972	41	1982	55	1992	43
1973	40	1983	59	1993	43
1974	55	1984	97	1994	51
1975	49	1985	91	1995	33
1976	21	1986	91	1996	29
1977	60	1987	96	1997	32
1978	47	1988	89	1998	38
1979	28	1989	101	1999	45
				2000	35
Arithmetic Mean	39.7		76		47.18

The data revealed that as a percent of official GDP the underground economy averaged 40 percent in the 1970s, 76 percent in the 1980s, and 47 percent in the 1990s. For 2000 it was 35 percent. For purposes of comparison with the period of Thomas' estimate (1982-86), Faal's results indicate a size of 79 percent. This was higher than any of Thomas' five estimates but close to that provided by Method 3 (70 percent). As was just noted, Bennett' estimates for 1982-86 was 42 percent. Bennett's estimated average for the entire period he covered (1977-88) was 35 percent. Faal's estimate for the period covered by Bennett (1977-88) was 66.2 percent. The average for all of Thomas' five separate estimates for the period 1982-86 was 59 percent.

The conclusion is clear .The more sophisticated techniques Faal utilised led to higher estimates of the size of the underground economy. All three studies, however, indicated that by any standard the underground economy accounted for a considerable share of the value of economic transactions in Guyana.

Section III: Review of the period 2001-08

As the data in the previous Section clearly portray, the underground economy in Guyana established its full presence in the latter part of the 1970s and 1980s. The origins of this lay in many factors, but chief among those were three. The first of these is the ***commandist/control/state-led orientation of economic and public policy***. As we saw in the previous Section the goal was central government ownership and or control of the

"means of production", meaning 80-90 percent of economic production. Second, the emergence of **widespread shortages of goods and services** in the official economy. Third, the emergence and consolidation of a **culture of non-compliance** with the incredibly numerous and complex rules, regulations, and market restrictions, which were then applied to economic agents and economic transactions. This latter localised entrepreneurial endeavour and talent in the socially unproductive tasks of circumvention and non-compliance with the then legal regulatory, monitoring, and oversight framework. At the same time ordinary citizens routinely broke the then laws and came to see this as their *only* means of survival in desperate times.

The massive macroeconomic disorder led to an IMF/World Bank Economic Recovery Programme (ERP), which commenced in 1989. The stabilisation period of the ERP lasted about 3 years and by 1991 economic turnaround began. The stabilisation period saw the drastic reduction in government expenditures, liberalisation of markets and accompanying this, massive increases in prices, including in particular the price of credit (interest rate) foreign currency (the Guyana dollar exchange rate) and the general price level (inflation). These effects on the GDP growth rate are clearly seen when we examine the data shown below in Table 5 and Graph 1.

Table 5: Gross Domestic Product (AT 1988 Prices)
(G$ Million)

End of Period	G.D.P 1988 prices	% Change in G.D.P at 1988 prices
1989	3,422	(4.94)
1990	3,319	(3.01)
1991	3,519	6.03
1992	3,792	7.76
1993	4,104	8.43
1994	4,450	8.43
1995	4,675	5.06
1996	5,048	7.98
1997	5,360	6.18
1998	5,270	(1.68)
1999	5,426	2.96
2000	5,352	(1.36)
2001	5,474	2.28
2002	5,536	1.13
2003	5,501	(0.63)
2004	5,587	1.58
2005	5,478	(1.95)
2006	5,757	5.13
2007	6068	5.37
2008	6253	3.05

Source: Bank of Guyana Statistical Bulletin

Graph 1

Percent change in GDP at 1988 Prices
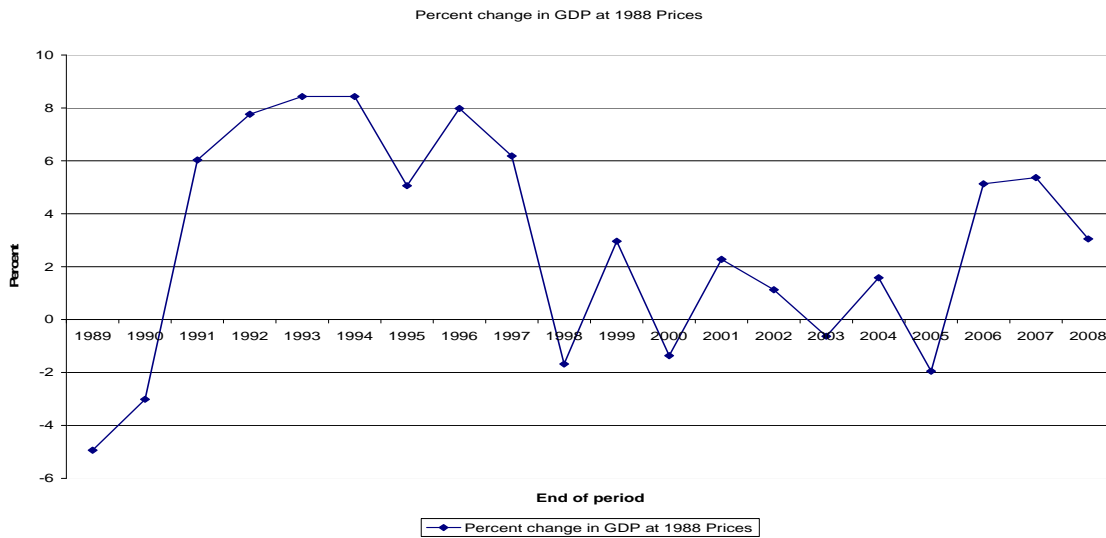
The data in Table 5 Graph 1 show that real GDP continued to decline in the 1989/90 period but by the years 1991 to 1997 the annual rate of increase of real GDP exceeded 7 percent. Thereafter, growth plateaued and over the decade with the average annual rate of increase falling less than 1.5 percent. Much of the growth in the period 1991-1997, no doubt reflected the low base from which growth started (given the preceding long depression) and the ERP policies designed to absorb the underground economy stimulated by the economic policies previously in place, into the official economy. That the growth would plateau was expected, but not the failure to maintain even a modest rate of growth in the years which followed. For the 11 years over the past decade (1998-2008), the growth rate of GDP was negative for four of these. And indeed it is only in the last three years 2006/08 it has exceeded 3 percent.

Policy variables also showed a similar pattern. Thus the Bank rate and the 91-day Treasury bill rate remained quite high in the initial stabilisation period (1989-1991) and thereafter declined from peaks exceeding 30 percent to the present lows of 6.75 and 4.19 percent, respectively in 2008 (see Table 6 and Graph 2).

Table 6: Comparative Treasury Bill Rates and Bank Rates

End of Period	Treasury Bill Rate (%)	Bank Rate (%)
1989	33.75	35.00
1990	28.75	30.00
1991	30.89	32.50
1992	22.99	24.25
1993	15.44	17.00
1994	18.64	20.25
1995	15.49	17.25
1996	9.94	12.00
1997	8.16	11.00
1998	8.84	11.25
1999	11.07	13.25
2000	9.20	11.75
2001	6.25	8.75
2002	3.91	6.25
2003	3.40	5.50
2004	3.79	6.00
2005	3.74	6.00
2006	4.16	6.75
2007	3.90	6.50
2008	4.19	6.75

Source: Bank of Guyana Statistical Bulletin

Graph 2

**Comparative Treasury Bill Rtaes and bank Rates**
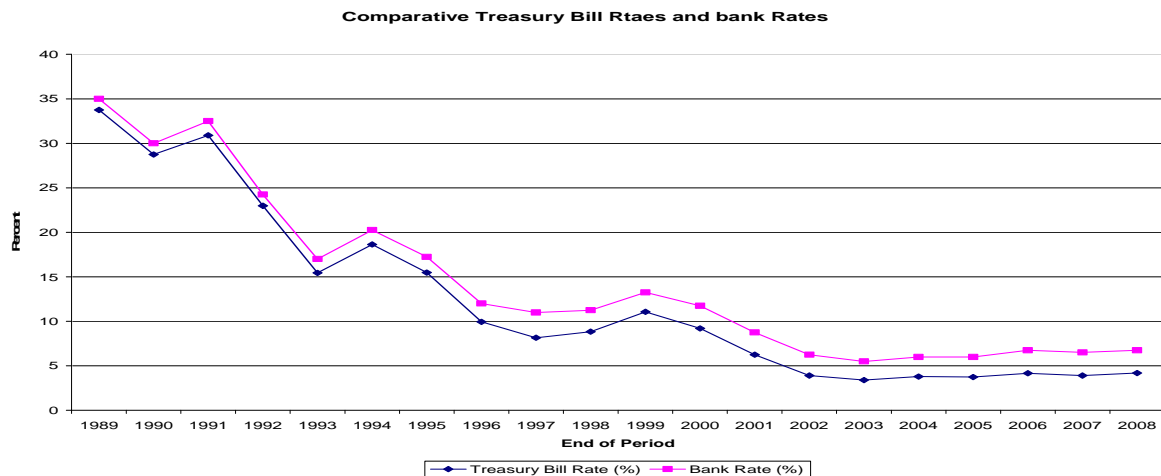
A main foundation of the ERP was the unification of the official exchange rate with that in the underground economy. The effect of this is clearly seen in Table 7 Graph 3. The exchange rate rapidly depreciated in the initial stabilisation period (1989-1991) as the price of foreign exchange increasingly reflected the liberalisation of the market for foreign currency and the removal of capital controls. This depreciation continued but at a far slower rate after 1992. Over the past three years the exchange has hovered between G$ 201 to G$205: US$ 1.

Table 7: Exchange Rate (G$/US$)

End of Year	Period Ended	Period Average
1989	33.00	27.16
1990	45.00	39.53
1991	122.75	111.80
1992	126.00	125.00
1993	130.75	126.82
1994	142.50	142.50
1995	140.50	141.89
1996	141.225	140.45
1997	144.00	143.65
1998	165.25	163.74
1999	180.50	180.43
2000	184.75	182.44
2001	189.50	189.50
2002	191.75	191.75
2003	194.25	195.50
2004	199.75	199.78
2005	200.25	200.14
2006	201.00	200.92
2007	203.50	203.49
2008	205.25	203.84

Source: Bank of Guyana Annual Reports

Graph 3

Exchange Rate (US$/G$)
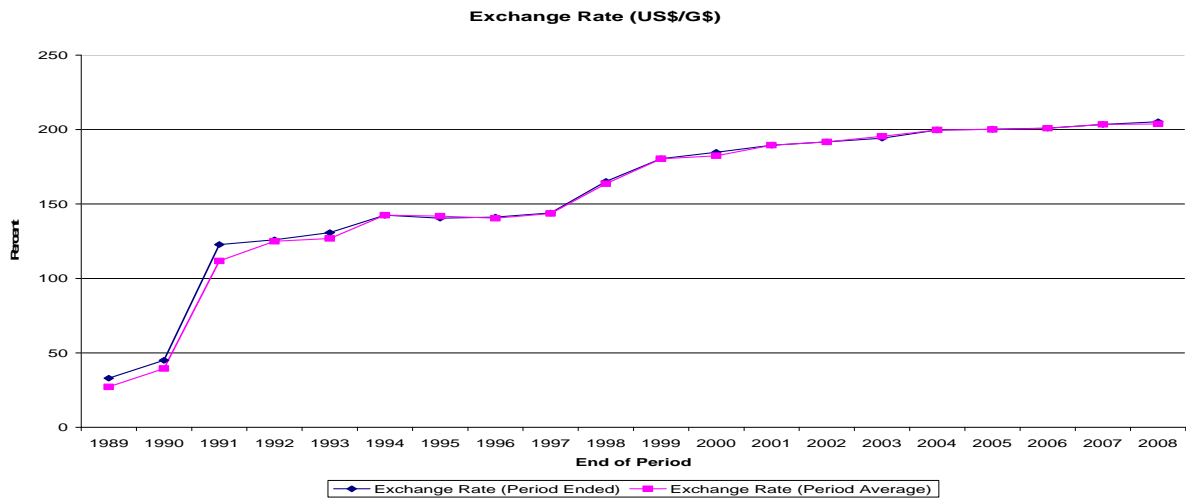
Finally, as an example of the completely changed macroeconomic picture, the data on inflation shown in Table 8 Graph 4 revealed that the inflation rate declined from over 100 percent annually during the stabilisation period to single digits after 1995, except for the sudden rise to 14 percent in 2007.

**Table 8 Georgetown: Urban Consumer Price Index**
(Jan 1994 = 100)

End of Period	All Items Index	% Change
1989*	2415.6	92.46
1990*	5055.4	109.28
1991*	9587.0	89.64
1992*	12105.0	26.26
1993*	13238.3	9.36
1994**	315.68	16.03
1995	124.3	8.09
1996	129.9	4.51
1997	153.3	4.16
1998	141.7	4.73
1999	154.0	8.68
2000	163.0	5.84
2001	165.5	1.47
2002	175.5	6.11
2003	184.3	5.01
2004	194.4	5.48
2005	210.4	8.23
2006	219.2	4.16
2007	250.0	14.05
2008	265.9	6.36

Source: Bank of Guyana Statistical Bulletin
* (1970 = 100)
** Calculated using 1990 base year

Graph 4

All Items Index
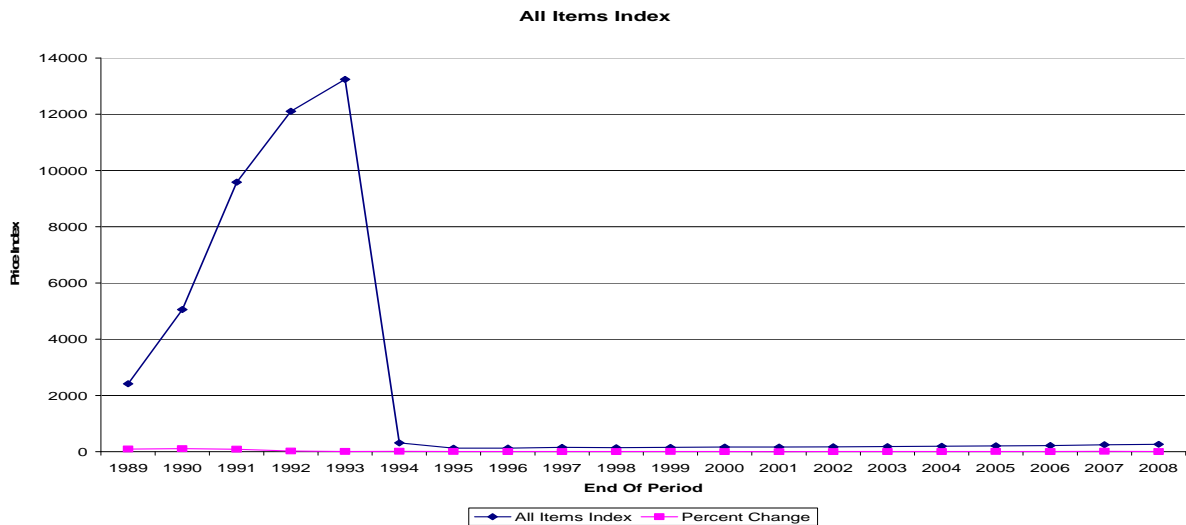
In cooperation with the international financial community, Guyana has graduated from being a Highly Indebted Poor Community (HIPC). From an external debt in excess of US$2 billion, it is presently at US$0.7billion. Internal (government) and external (balance of payments) deficits have been brought under control. Thus the overall deficit of the non-financial sector was 6.5 percent of GDP in 2008 as compared to the massive deficits recorded in the 1980s (in excess of 50 percent) of GDP.

While the macroeconomic situation has been stabilised real economic growth for the period 1998-2008 has averaged about 2 percent. Indeed for those years as we saw were four years of negative growth (1998, 2000, 2003 and 2005)

Section IV: The Results

In this section we show the results obtained from applying the Thomas, Bennett and Faal methods of estimating the underground economy in Guyana to the period 2001-2008.

Thomas Method Applied

Thomas' trend values approach as the basis for projecting the underground economy over the period 1982-86 made sense then because for the period preceding the 1980s there was no evidence of the type of underground economy he was seeking to measure then. In that case the three income velocities were not affected by the phenomenon he was seeking to

measure. For the recent period (2001-08) this is not the case. Instead we use the arithmetic means of the three income velocities (Vc1, Vm1 and Vm2) for estimating the underground economy. Based on this adjustment the results are shown in Table 8.

Table 8: Estimated GDP as a percent of Official GDP (Thomas)

Year	Method 1	Method 2	Method 3
2001	3.87	8.54	22.70
2002	0.76	9.93	23.35
2003	11.75	22.66	27.59
2004	15.30	30.17	29.81
2005	20.30	34.84	33.20
2006	32.16	56.10	40.74
2007	34.04	55.57	41.26
2008	39.49	57.13	42.90
Average	19.71	34.37	32.69

Method 1: (C) [2001-2008]*Vc1 mean (1989-2000)

Method 2: [C+ demand deposits][2001-2008]*Vm1mean (1989-2000)

Method 3: [C+ total deposits] [2001-2008]*Vm2 mean (1989-2000)

Vc1 Mean = 7.70

Vm1 Mean = 4.91

Vm2 Mean = 1.48

The data on M_1, M_2, and M_3 are shown in Table 9 along with the GDP data for the period 2001-2008.

Table 9: M1, M2, M3 and GDP

Year	M_1	M_2	M_3	GDP at current factor cost
2001	15,138.3	24,807.4	93,035.5	112,219
2002	15,409.7	26,364.8	98,147.4	117,762
2003	17,888.2	30,792.7	106,259.2	123,261
2004	19,545.6	34,606.3	114,494.5	130,534
2005	21,526.7	37,839.0	124,011.5	137,788
2006	25,952.0	48,069.9	143,776.7	151,198
2007	29,800.6	54,240.7	163,399.	171,190
2008	34,552.4	61,035.3	184153	190,728

The results show that the estimated size of the underground economy for the three methods ranged from 1 percent (2002 Method 1) to 57 percent (2007 Method 2). The average for Method 1 for the years 2001-2008 is 19.7 percent for Method 2, 34.37 percent and Method 3, 32.69 percent. Overall these suggest that the underground economy remains significant.

Bennett Method Applied

Applying the Bennett method the following results were obtained as shown in Table 10 below.

Table 10:

End of Period	Currency/Demand Deposits	Underground economy/Official GDP
2001	1.57	40.0
2002	1.41	27.7
2003	1.39	26.2
2004	1.30	19.6
2005	1.32	21.2
2006	1.17	10.7
2007	1.22	14.0
2008	1.30	20.1

1987: K0 =1.19; 1986: K0 = 1.02; 1985: K0 =1.02

Using the most conservative value for K_0 obtained from Bennett (Currency/Demand Deposits), the results obtained range from approximately 11 percent of Official GDP in 2006 to 40 percent in 2001. The average ratio for the period (2001-2008) was estimated at 22.4 percent. For information, M^*_1, M^*_2, and M^*_3 for the same period are also shown below:

Table 11: Income Velocities
(M^*_1, M^*_2 and M^*_3) (2001-2008)

End of Period	M^*_1	M^*_2	M^*_3
2001	7.41	4.52	1.21
2002	7.64	4.47	1.20
2003	6.89	4.00	1.16
2004	6.68	3.77	1.14
2005	6.40	3.43	1.05
2006	5.83	3.15	1.05
2007	5.74	3.16	1.05
2008	5.52	3.12	1.04

M* as defined by Bennett

Faal Method Applied

Similar to Faal (2003) we estimate an error correction model by following the Engle-Granger two-step approach. The model is estimated with annual data obtained from the Statistical Bulletin of the Bank of Guyana, the Budget Estimates (Published by the

Ministry of Finance), Statistical Bulletin of the Bureau of Statistics, and the Commercial Banks. The definitions of our variables along with the data sources are provided in Table 12.

Table 12: **Definition of variables and sources**

Variables	Definition	Sources
C	**Real currency** = nominal currency divided by the implicit GDP deflator	**M1** – Bank of Guyana Statistical Bulletins Implicit GDP deflator[1]
Y^d	**Real disposable income** = nominal GDP at factor cost divided by the implicit GDP deflator	**Nominal GDP** – Bureau of Statistics
R	**Interest rate** = 91-day treasury bills	**91-day treasury bills** - Bank of Guyana Statistical Bulletins
π	**Inflation rate** = percentage change in the implicit GDP deflator	See note 1
F	**Financial innovation** = the number of ATM machines and bank branches	**Commercial Banks**
T	**Average taxes** = direct taxes on income and exports as a percent of nominal GDP at factor cost	**Budget Estimates**

1) The implicit GDP deflator was calculated by dividing the Real GDP at factor cost by the nominal GDP at factor cost.

As is customary, we commenced by testing our variables for stationarity using the Augmented Dickey-Fuller (ADF) Unit Root test. The ADF Unit Root tests were performed using an intercept, as well as, an intercept and trend. Table 13 summarizes the results from this exercise. According to **Table 13**, all the variables are *I*(1) since they are only stationary after differencing once.

Variable	Intercept	Intercept and Trend	Order of Integration
GDP (Yd)	[-0.4189] -3.6661	[-2.1067] -4.2949	I(1)
Taxes	[-1.1759] -3.6661	[-1.9796] -4.2949	I(1)
Inflation	[-1.5923] -3.6752	[-1.7301] -4.3082	I(1)
Interest Rate	[-2.1014] -3.6661	[-2.5220] -4.2949	I(1)
Financial Innovation	[2.2349] -3.6661	[-0.3581] -4.2949	I(1)

The figures in [ ] are the McKinnon critical values for rejection of unit root at the 1% level of significance

We continue by estimating the co-integrating model annual data from 1977 to 2008 and ordinary least square.

$$\ln(C_t) = c + \ln(Y^d_t) + \ln(T_t) + \ln(R_t) + \ln(\pi_t) + \ln(F_t) + \ln(Y^d_{t-1}) + \ln(T_{t-1}) + \ln(R_{t-1}) + \ln(\pi_{t-1}) + \ln(F_{t-1}) + \ln(C_{t-1}) + e_t$$

where: $\ln(C_t)$ represents the log of real currency holdings and is calculated by dividing nominal currency in circulation by the GDP deflator; $\ln(Yd_t)$ represents the log of Real Income which is equal to nominal GDP divided by the GDP Deflator; $\ln(T_t)$ denotes the log of the Average Tax Rate which is direct taxes on income and imports as a percent of GDP; $\ln(R_t)$ is the log of the Interest Rate on 91-day Treasury Bills; $\ln(\pi_t)$ represents the log of the annual Inflation Rate which is calculated as the percent change in the GDP Deflator; $\ln(F_t)$ represents the log of Financial Innovation and structural change which is captured by taking the sum of ATM machines and branches of the Commercial Banks; and e_t is the error term. All of the dependent variables are introduced in the model contemporaneously (*t*) and with one lag (*t-1*).

The error term (e_t) is examined to determine whether it is stationary. Similar to Faal (2003) we use the ADF Unit Root tests for this exercise and find that (e_t) is stationary indicating the presence of co-integration between real currency holdings and the dependent variables. Given our results we continue by estimating the Error Correction Model (**ECM**) with the first difference series of all the variables along the residuals from the previous model (i.e., the co-integrating model). In particular, we estimate the model below using the ordinary least square estimation technique and annual data from 1977 to 2008:

$$d(\ln(C_t)) = c + d(\ln(Y^d_t)) + d(\ln(T_t)) + d(\ln(R_t)) + d(\ln(\pi_t)) + d(\ln(F_t)) + d(\ln(Y^d_{t-1})) + d(\ln(T_{t-1})) + d(\ln(R_{t-1})) + d(\ln(\pi_{t-1})) + d(\ln(F_{t-1})) + d(\ln(C_{t-1})) + e_t + v_t$$

In order to derive the restricted (best) model we followed the general to specific approach where insignificant variables are dropped and performed a battery of diagnostic tests to ensure that the final model selected is stable and robust to serial correlation and

heteroskedasticity. We utilized the Ramsey (RESET) tests and the Wald test to determine whether the final model is stable and correctly specified. The former is important given the structural transformation that occurred with the adoption of the Economic Recovery Programme in 1989 by the Government of Guyana. We also test for serial correlation, heteroskedasticity and normality using the L-M (Arch), White's and Jarque-Bera tests.[1]

The table below shows the regression result of the Restricted (Best) Error Correction Model:

$$d(\ln(C_t)) = c + d(\ln(Y^d_t)) + d(\ln(T_t)) + d(\ln(R_t)) + d(\ln(\pi_t)) + d(\ln(F_t)) + d(\ln(Y^d_{t-1})) + d(\ln(T_{t-1})) + d(\ln(R_{t-1})) + d(\ln(\pi_{t-1})) + d(\ln(F_{t-1})) + d(\ln(C_{t-1})) + e_t + v_t$$

where: $\ln(C)$ represents the log of real currency holdings and is calculated by dividing nominal currency in circulation by the GDP deflator; $\ln(Y^d)$ represents the log of real income which is equal to nominal GDP divided by the GDP deflator; $\ln(T)$ denotes log of the average tax rate which is direct taxes on income and imports as a percent of GDP; $\ln(R)$ is the log of the interest rate on 91-day treasury bill; $\ln(\pi)$ represents the log of the annual inflation rate which is the calculated as the percent change in the GDP deflator; $\ln(F)$ represents the log of the financial innovation and structural change which is captured by taking the sum of ATM machines and branches of the commercial banks, and e_t is the error from the co-integrating model.

The ECM model is estimated using the ordinary least squares (OLS) estimation technique and the first difference series of all the variables from 1977 to 2008.

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[1] Most of the diagnostic tests are similar to those in Faal (2003). This approach is adopted primarily to allow for the comparison of results in this study and Faal (2003).

Table 14: Regression Result of the Best Error Correction Model (ECM)

Variables	Coefficient	t-ratio	P-value
Constant	0.005932	0.709466	0.4849
e_t	1.011403	5.947768	0.0000
$\ln(Y^d_t)$	-	-	-
$\ln(T_t)$	-	-	-
$\ln(R_t)$	-0.07700	-.04896	0.0515
$\ln(\pi_t)$	-0.004143	-15.5071	0.0000
$\ln(F_t)$	-	-	-
$\ln(Y^d_{t-1})$	-	-	-
$\ln(T_{t-1})$	0.062090	1.59676	0.1234
$\ln(R_{t-1})$	-	-	-
$\ln(\pi_{t-1})$	-	-	-
$\ln(F_{t-1})$	-	-	-
$\ln(C_{t-1})$	-0.766798	-8.7047	0.0000

Diagnostic Test			
Adjusted-R^2	0.92950		
F-statistics	63.2845		
L-M (Arch) test	1.61282		
White's test	19.4451		
J-B Test	0.97235		

Our final model passes the battery of diagnostic tests and its overall explanatory power is strong based on the adjusted R^2 and F-statistics. Similar to Faal (2003) we found an inverse relationship between currency holdings today and currency holdings in the previous period. Our results show that inflation has a significant negative relationship with real currency holdings. Contrary to Faal (2003), however, our results show real interest (with a lag of one year) is negatively related to real currency holdings. We also found a significant positive relationship between taxes (with a lag of one year) and real currency holdings suggesting that higher taxes may encourage tax evasion.

Following Faal (2003), we conclude the empirical exercise by using the best ECM to estimate the underground economy. In particular, we forecast the real currency holdings using the restricted model in **Table 14**. We then re-estimate the real currency holdings by eliminating the tax $\ln(T_{t-1})$ variable from the restricted model. The difference between the two estimates provided the estimate for the underground currency. The underground GDP

was then estimated by taking the product of the underground currency and the income velocities for the period.

As a percent of GDP, the size of the underground economy fluctuated over the period under review (1977 to 2008). The underground economy contracted sharply after the implementation of the ERP in 1989 but expanded continuously from 1992 to 1996. After declining in 1997 the underground economy continued to trend upwards. On average, the underground economy as a percent of GDP amounted to 57.7 from 1979 to 2008.

The estimated size of the underground economy in Faal (2003) varies from our study for the period 1979 to 2000. The difference in the results may be attributed to several factors. Firstly, the empirical analysis in our study is based on annual data that covered the period 1977 to 2008 while Faal (2003) used annual data from 1964 to 2000. Moreover, Faal had access to a dataset not generally available to the public. Given the difference in the datasets, the parsimonious model in our study was different from Faal (2003). This suggests that the empirical model used by Faal (2003) may be time and dataset specific, i.e., it is affected by the sample period and availability of the time series data. Future research should therefore consider a better reduced form model. More robust estimation techniques should also be considered to account for endogeniety.

Section V: Concluding Remarks
(This Section is left intentionally incomplete as it is expected to benefit from discussions/feed back provided by our colleagues).

This section establishes six principal points. First, the study has been expressly designed to apply the techniques utilised in the three established earlier studies of the underground economy in Guyana to the recent years 2001-2008. These previous studies have the common property of seeking to utilise monetary indicators to establish the likely size of the underground economy: trend analysis of income velocity, the currency/demand deposits ratio and the econometric analysis of money (currency) demand.

Second, by construction this study is not (either explicitly or implicitly) suggesting that these three previous techniques represent the best approaches for measuring the underground economy in Guyana.

Third, in keeping with the above, it is recognised that other methodologies have been employed for the study of the underground economy in other Caribbean economies (Carolina, Miriela and Pau (2007); Greenidge, K. et al (2008); Witter and Kirton. C. (1990); Vuletin (2008)). The last cited reference covers 32 economies in the Latin America and the Caribbean region and provided results for Guyana "for the early 2000s". These results show for the three methods, which the study employed, the underground economy represented 36.7; 57.3, and 37.3 percent respectively, of official GDP.

Fourth, the results we obtained show that for all three methods used in the previous studies, the underground economy remains significant for the period under scrutiny 2001-2008.

Fifth, for the purposes of easy comparison, where the dates of the periods of study overlap, results from the studies are presented in a convenient tabular form (**see Table 15 and 16**). The overlapping periods are: 1) 1982-86 for all four studies

                                    (Thomas; Bennett; Faal; the Present Study)

                              2) 1979-88 for three studies (Bennett; Faal; and the
                                    Present Study

                              3) 1979-2000 for two studies (Faal and the Present
                                    Study

Sixth, the key drivers of the underground economy over the years will be discussed, based on a broader political economy of the periods under consideration, rather than a restricted monetary construction. The changing character of the main drivers will be highlighted as the country has gone through major political-economy transitions, including 1) statist and commandist economic regimes and the norms of illegality these engendered (black markets, smuggling etc.), 2) liberalisation and market-driven regimes (tax-evasion and regulatory non-compliance); and 3) the rise and influence of organised

crime (linked to the narcotics trade, money laundering, and trafficking in-persons (TIP))
in parallel underground economic activities in Guyana.

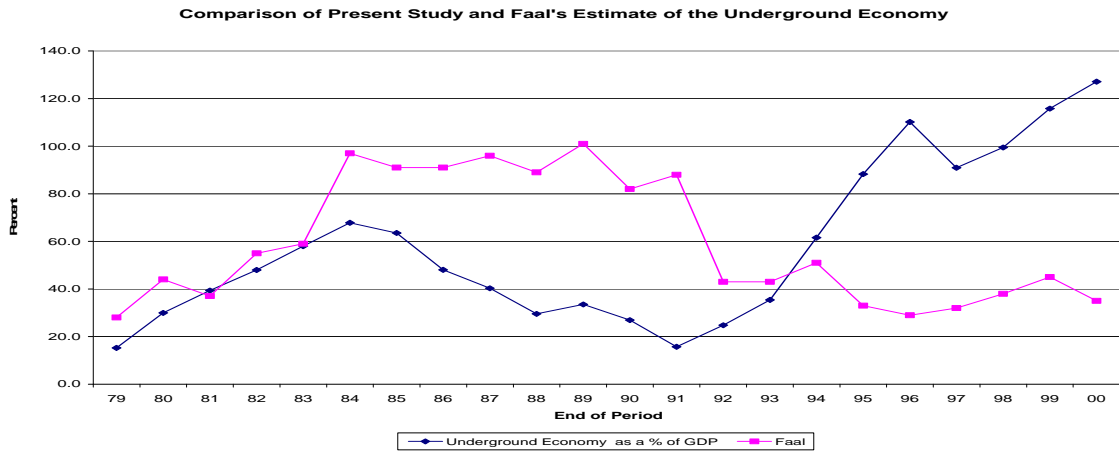**Table 15: Estimated Underground Economy: All methods**
(Arithmetic Mean)

Year	Thomas' Method					Bennett's Method	Faal's Method	Present Study
	1	2	3	4	5			
1982-1986	35	61	70	59	68	42.1	78.6	57.1
1979-1988	NA					36.3	68.7	44.0
1979-2000	NA					NA	59.4	57.7
2001-2008	NA					NA	NA	61.0

Note: NA means Not Applicable

Table 16: Estimates of the Present Study and Faal's
Underground Economy

End of Period	Real GDP	Present Study Underground Economy As a percent of GDP	Faal Underground economy estimate
1979	4721	15.3	28
1980	4623	29.9	44
1981	4649	39.3	37
1982	4236	48.0	55
1983	3749	58.0	59
1984	3829	67.8	97
1985	3843	63.5	91
1986	3834	48.0	91
1987	3829	40.3	96
1988	3600	29.5	89
1989	3422	33.5	101
1990	3320	26.9	82
1991	3519	15.7	88
1992	3792	24.8	43
1993	4103	35.4	43
1994	4471	61.6	51
1995	4676	88.3	33
1996	5044	110.1	29
1997	5360	90.9	32
1998	5289	99.4	38
1999	5426	115.8	45
2000	5386	127.1	35
2001	5474	111.0	NA
2002	5536	88.0	NA
2003	5501	73.8	NA
2004	5587	58.0	NA
2005	5478	48.2	NA
2006	5759	40.5	NA
2007	6068	36.8	NA
2008	6253	31.7	NA

Graph 5

Comparison of Present Study and Faal's Estimate of the Underground Economy

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