Malaysian Journal of Economic Studies 49 (2): 91-109, 2012 ISSN 1511-4554

Estimating the Underground Economy from the Tax Gap: The Case of Malaysia

Marliza Mohamed
University of Malaya

Abstract: The Underground Economy (UE) in Malaysia is estimated using ratio technique on tax and criminal annual time series enforcement data. For the period of 1980 to 2009, UE rose between 9 and 27 per cent of GDP. UE grows in the opposite direction of GDP during good and bad times, and has shrunk due to slower growth in the last decade. The size of the direct tax gap is about 10 per cent of direct tax revenue, 15 per cent of federal revenue or 33 per cent of federal deficit. There is a shift in the tax non-compliance mix in the irregular economy and a rise in 'fraud' activities in the illegal economy. The change in tax non-compliance mix is likely due to taxation reforms.The rise in fraud activities highlights the urgency of more efficient and effective enforcement.

Keywords: Irregular economy, illegal economy, tax gap, underground economy
JEL classification: E26, H26, H50

1. Introduction

A country's economic performance as indicated by the Official Economy (OE) is known as the GDP. It measures most lawful activities and excludes activities that evade rules due to their hidden nature. The unmeasured activities create a gap between GDP and the potential economy leading to the conceptualisation of a 'second economy', that has been submerged in various terminologies, wide scope definitions, and vague concepts which are often intermixed (Carter 1984; Schneider and Enste 2000; Hesam 2003). Among the various terms used are Hidden Economy, Informal Economy, Shadow Economy and Underground Economy (UE). The UE is often referred to as a subset of this 'second economy' that is taken to mean those activities which are concealed from 'government regulatory agencies' such as tax evasion.

There are positive and negative consequences of UE. The existence of the UE contributes positively in terms of employment creation and societal welfare as it provides survival lines for the unfortunate. According to McKinsey (2004) the benefits of the life line and the redeployed profits in the mainstream economy are only in the short term. They are greatly overweighed by the considerable long-term burden of socio-economic cost. The negative impacts include inefficient goods and labour markets, distorted statistics, deprived workers' rights and guarantees, and diverted finances through tax evasion. These collectively affect public finances and possibly lead to policy crises.

The UE is likely to be a permanent phenomenon both in the developing and developed countries. In developing countries, smaller enterprises would initiate the informal sector to support the larger ones, providing job opportunities and facilitating poverty eradication.

Faculty of Economics & Administration, University of Malaya, 50603 Kuala Lumpur, Malaysia.
Email: *marlizamrmd@yahoo.com; marliza@hasil.gov.my*

Meanwhile, in developed countries, rising electronic transactions have accelerated e-commerce sales. As 'cyberspace' businesses are paperless, borderless and voluminous, with securities of 'invisible' business trails, tax non-compliance is likely to rise (Sithamparan 2005).

Hence, its existence should be acceptable, but the size and the extent of its societal and economic costs is a major concern. As such, a continuous estimation of the size and growth of the UE remains important. Therefore governments need to formulate effective policies and appropriate strategic plans as well as draw up measures for efficient administration.

The aim of this study is to examine the extent of UE with the objective of estimating its size, growth and extent of tax loss relative to federal account. As it is not possible to measure the entire activities of the UE, its definition is narrowed down into the irregular economy (comprising legal commercial activities that are not reported to tax authorities) and illegal economy (comprising criminal commercial activities, which naturally escape tax because people would conceal their prohibited activities from the authorities). As both constitute unreported incomes that evade tax law, they are used as examples of the UE that contribute to tax loss (Figure 1).

We begin with an overview of the UE. Section 2 discusses the UE by its indicators, determinants, size, and trend. It also explores the proxy indicators of UE in Malaysia. The design of the conceptual framework, the appropriate methodology, data employed and analysis are found in Section 3. Section 4 reports the estimates and interprets the results. Section 5 summarises the results, outlines the limitations and contributions, and finally concludes.

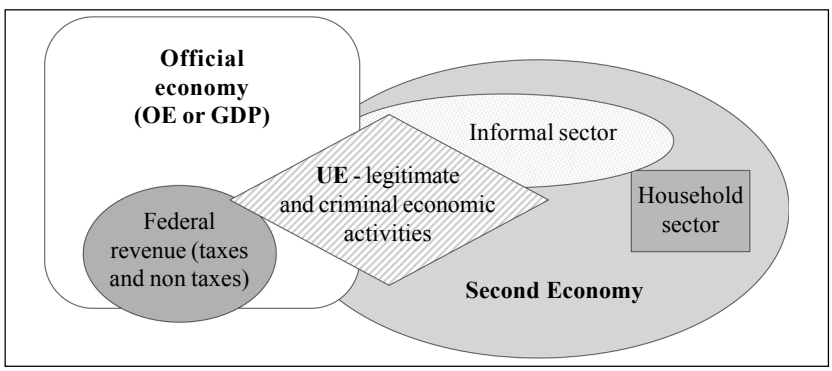

Figure 1. Schematic representation of the Potential Economy constituting the Official Economy, Second Economy and Underground Economy (UE)

2. Size of the Second Economy (SE) – International and Malaysian Estimates

Many studies have attempted to estimate the economic gap , however it is not clear whether it represents the SE or just a portion of it which is the UE. For the purpose of discussion in this journal, we refer to the past estimates as the UE which scope may not be as narrow as this study defines. As UE is a latent variable, its evidence would be captured in some observable traces of related variables in the spheres of income and expenditure which are

linked to the determinants of UE. These observable forms are the proxy indicators which are reflected in non-compliant activities. Tax non-compliance is commonly used because participants of UE would conceal their activities from the tax authority by not reporting the income derived to avoid being caught. From a tax perspective, where trade in the official economy is concerned, the trader gains money while the consumer gets the product. Trade is then completed with taxes paid. Whereas, trading in the UE ends without any tax paid. To curb UE, the government could intervene through effective and efficient law enforcement (Bhattacharya,1999). According to Tanzi (1982), Tucker (1982) and Slemrod (2007), the legal activities conducted underground to escape taxation appear to be the fastest growing component of the SE, largely because of the relaxed tax enforcement system.

Schneider (2002) and Shneider and Enste (2000) indicate that there is a significant, growing underground sector in most countries, which evolves over time and leads to a high degree of fund laundering. The size of the UE could range from 4 to 60 per cent of a country's GDP, depending on the country's economy and data coverage (activities measured and time period), methods employed and assumptions made. Hence, estimates require careful interpretation and comparisons remain somewhat crude. In general, the size is smaller for developed countries and larger for undeveloped countries. In 2000, it varied from 10 to 16 per cent of GDP for OECD countries, 21 to 30 per cent for transition economies and 35 to 60 per cent for developing and undeveloped countries. For countries in Asia, it ranges from 11.3 per cent in Japan to 44.6 per cent in Thailand. It is smaller in countries where involvement of the public sector is relatively smaller (Japan, United States and Switzerland) and there exists a comparatively high tax morality (United States and Switzerland). Kesner-Skreb (1997) concludes that UE is inherent in all countries with only its size differing.

In general, legal activities are about 3 to 4 times larger than the illegal activities, ranging in size from 5 per cent of GDP during a brisk economy to 20 per cent during a slow economy. Kadokura (2000) has shown that the UE in Japan consists of about 70 per cent legal activities (tax evasion) and 30 per cent illegal activities. Vaknin (2000) indicates that illegal activities constitute up to 20 per cent of the UE in the United States. Meanwhile, Schlosser (2003) estimates illegal activities in the United States to account for about 10 per cent of its economy. Despite the substantial size, the Revenue and Customs of the United Kingdom (2007-08) estimates about 80 per cent of the legal activities evade relatively small amounts of tax.

Burrow *et al.* (2004) reports that the UE has increased in relation to GDP. Based on a survey of 21 OECD countries (including Belgium, Denmark, Italy, Norway, Spain and Sweden), the UE has grown to at least 20 per cent from 1970 to 2000. In the United States, it has doubled from 4 per cent of the GDP in 1970 to 9 per cent in 2000, while in the states of the former Soviet Union, it grew between 1990 and 1998 from about 25 to 33 per cent. Esbenshade (2001) states that the growth of the informal economy follows the new global economy based on small units of production that lend themselves to informal relationships and practices. Kelchev (2006) concludes that over the last 13 years, countries have noted that the informal economy grew in tandem with the GDP.

For Malaysia, past studies show the estimated UE to range from 0.2 to 85 per cent (Table 1). Although the estimates could be interpreted according to the scope of definition, data coverage, methods employed and assumptions made, they do not show any structural proportion or trend and lack statistical information for policy and strategic positioning.

Table 1. Size of the Second Economy in Malaysia (1971-2000)

Researcher	Method	Data coverage		Second Economy as % of GDP/ GNP
		Period	Activities measured	
Kanbur (1993)	Direct tax non-compliance	1980 - 1985	Direct tax evasion as captured by fraud detection	0.2 - 1.2
Mahfar (1994)	Direct tax non-compliance	1994	Direct tax non reporting as captured by failure of filing return forms	30
Kasipillai (1997)	Indirect method - Monetarya	1971 - 1994	Cash transaction	8.7 - 3.7
Aziz (2004)	Survey	1987, 1993, 1996, 1997	Small establishment and household labour force	19.7 - 13.2
Abdul (2001)	US-Australia - Gap approach	1995 - 1997	National discrepancy	48
	Direct tax non-compliance		Direct tax non reporting as captured by failure of filing return forms	29
	Tax officer's opinion		Direct tax – perception of authority	85
OECD (2003) (interna-tional estimate)	Indirect method - Monetary	1999-2000	Cash transactions	33
Current study	Non-compliance	1980-2009	i. Irregular economy a. Direct taxes (evasion & debt) b. Indirect taxes (evasion & debt) ii Illegal economy (bribery, drugs, swindling, cheating etc.)	

Over the period 1960-2008, although Malaysia experienced impressive growth in tax revenue of about 115-fold, various proxy indicators of UE are seen. Among others are changes in tax mix revenue from indirect to direct tax (signifying more opportunities for tax evasion), higher indirect tax burden reform to inhibit certain types of consumption and to protect local products (creating incentives for smuggling), reducing tax-GDP ratio from 18 to 15 per cent (indicating an inelastic tax growth relative to GDP), rising federal deficit, widening of savings-investment gap (implying income is not properly streamed or utilised), citizens' dismay and dissatisfaction over 'pro-fligacy'(refusal of citizens to share income through taxes), moderate unemployment rate coupled with rising commercial crime (creation of informal jobs for desperate jobless), relative high growth of private and luxury

consumption (indicating a spendthrift culture), and widening of skewed income distribution (income disparity could emanate from unfair opportunities and burden).

3. Conceptual Framework, Methodology and Data

Past estimations have relied on two main methods. Indirect methods examine the growth of determinants of proxy indicators (e.g. income and expenditure discrepancy, labour force behaviour, monetary aggregates and physical consumption). Direct methods have resorted to experimental studies, survey data and compliant records of direct tax. Indirect methods do not allow estimation of its absolute value and the close proximity growth between determinants and proxy indicators are often subject to imprecision and controversy.

For this reason, this study employs the non-compliant method and to be more focused, uses tax and criminal enforcement records as it could uncover concealed income from tax authorities. Among researchers who employed the non-compliant method are Simon and Witte (1982) for United States, Frey and Pommerehne (1984) for Sweden, IRS (1979) and O'Higgins (1989) for United Kingdom and Kinsey (1987) for Netherlands.

The UE is computed in both point and range estimates, based on tax non-compliant ratio in annual time series of a 30-year period. The tax non-compliance comprises of unreported income and unpaid reported tax from tax payers who are already in the tax base, and unreported income from tax payers who are outside the tax base.

The schematic representation of the study framework constitutes the circular flow of tax compliance and non-compliance data for sampling (Figure 2: [A'+B'+C': R']) to infer the flow of a country's economy comprising the official economy and the UE. In other words, the tax non compliance ratio is assumed to mirror the non-compliant economy (UE) of the country (Figure 3: [Z: Y] ≡ [A'+B'+C': R']).

Data source consisted of the entire enforcement time series aggregate tax data of 1980-2009 and commercial criminal activities of 1998-2009. Tax data were obtained from the Inland Revenue Board Malaysia (direct tax) and Royal Malaysian Customs Department (indirect tax), while data on commercial criminal (activities of drug trafficking, gambling, betting, piracy, cyber and multimedia crimes, ATM crimes, forgeries, frauds, breach of trusts) from the Royal Police Force and Anti-Corruption Commission (bribery activities).

Several assumptions were made to the methodology and analyses. The tax base structure approximates the country's economic structure, the unreported incomes do not coincide with reported income and are all value added economy, and the income tax structure of both the UE and OE is identical. Although the enforcement data captures true non-compliant events, it is often argued that they under represent the actual level of violation. To overcome this under-estimation, the magnitude captured successfully are amplified by the upper and lower bound enforcement success rates (ESR). The ESR is based on the annual proportion of finalised over non-finalised cases. Assuming that they are consistent, the product of the successful enforcement cases (low bound estimate) and ESR, would increase proportionately to give higher estimates. The ESR for criminal activities is based on ESR on bribery while ESR for legal activities is based on ESR on direct tax non-compliance. The UE is estimated in a range of three-level series: UE in the lower series (the successful enforcement cases [SC]); UE in the moderate series (SC x upper ESR); and UE in the upper series (SC x lower ESR).

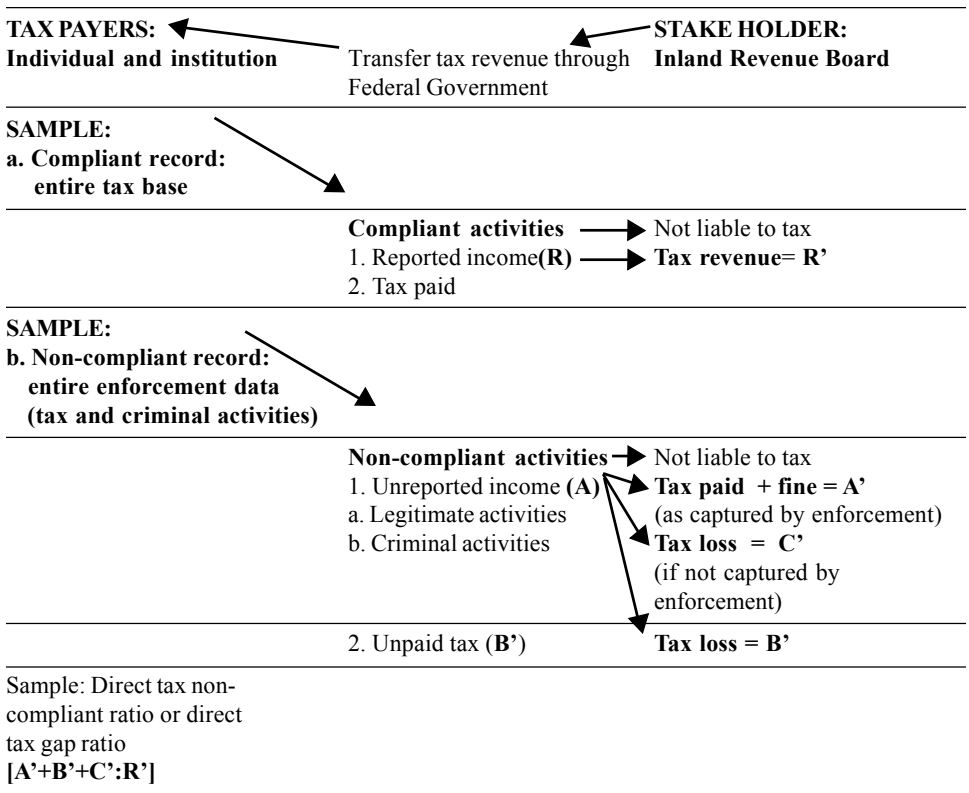

Figure 2. Schematic representation of data sampling to estimate direct tax gap

Notes:

a. The entire compliant record constitutes tax revenue, as part of the federal revenue
b. The entire non-compliant record consists of unreported taxable income (legal and illegal activities) and unpaid tax, tax paid plus fine or tax loss.
c. Direct tax non-compliant to compliant ratio is [A'+B'+C': R']

Assuming that income from the UE is taxable, in a tax system of progressive tax rates the amount of tax loss would depend on the income level. For appropriate estimation of tax loss, computation is based on three probable tax rates. UE in each level series is multiplied by the following: effective tax rate (UE x 10%); average enforcement tax rate (UE x 22%); and marginal progressive tax rate (UE x 27%).

The equations for estimating the size of UE are as follows:

1. Sample from the entire direct tax compliance (DTC) and indirect tax compliance (inDTC) of the tax base:
   i. DTC = [voluntary reported direct tax] + [voluntary paid direct tax]
      = [Dtxrev] + [Dtxp]
   ii. inDTC= [voluntary reported indirect tax] + [voluntary paid indirect tax]
      = [inDtxrev]+ [inDtxp]

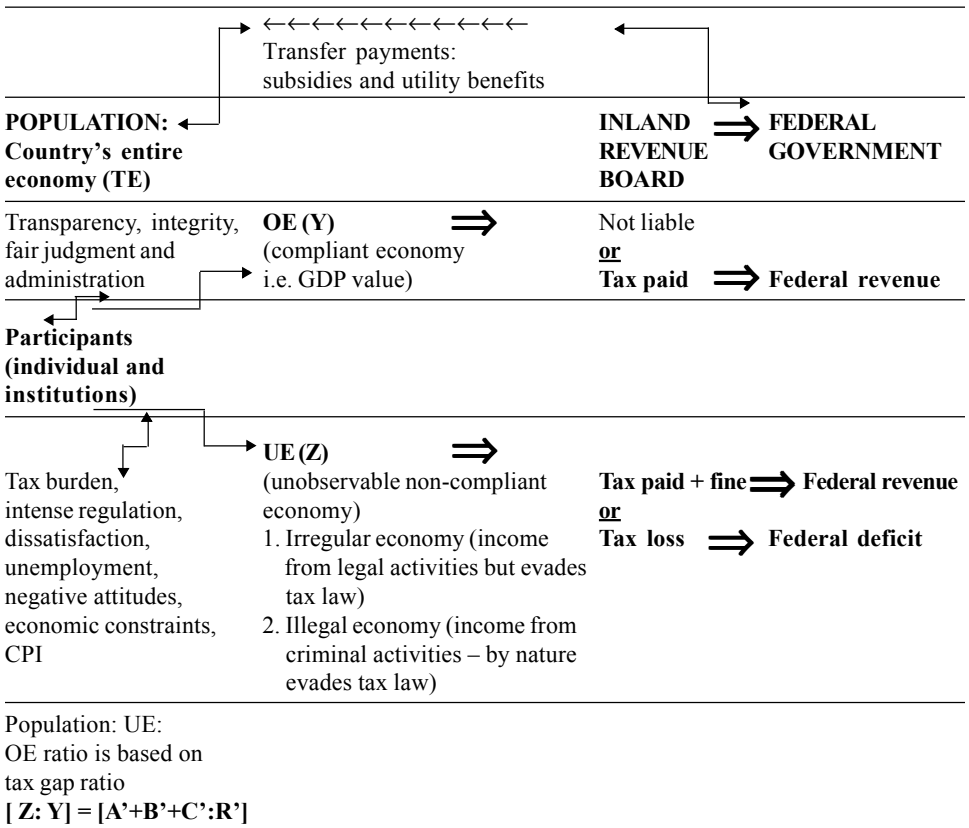

Figure 3. Schematic representation of the population inferred

Notes:

a. OE completes with tax paid – forms part of the federal revenue to be utilised for the benefit of citizens and country.

b. UE escapes tax – forms part of federal deficit for the citizens and country to bear the negative consequences.

c. A country's non-compliant to compliant economy is based on direct tax gap ratio – [Z: Y]≡ [A'+B'+C':R'].

2. Sample from the entire captured direct tax non compliance (DTNC) and indirect tax non compliance (inDTNC):
   i. DTNC = [Direct tax evasion due to under reporting] + [unpaid DT] + [Direct tax evasion due to non filing]= [Dtx$\underline{ev}$] + [Dtx$\underline{up}$] + [(inDt$\underline{ev}$ + inDtx$\underline{up}$) + ($UE_{crbribe}$ + $UE_{crdrugs}$ + $UE_{crothers}$)]
   ii. inDTNC = [inDirect tax evasion due to under reporting] + [unpaid inDT] = [inDt$\underline{ev}$] + [inDtx$\underline{up}$)

3. Tax non-compliant ratio (TNCR) for each activity is assumed to mirror in the UE ratio i.e. A'+B'+C': R' ≡ Z:Y as in Figures 2 and 3:
   i. TNCR due to direct tax evasion = [Dtx$\underline{ev}$: Dtxrev] ≡ $UE_{Dtx\underline{ev}}$: OE

ii. TNCR due to unpaid direct tax $= [\text{Dtx}\underline{\text{up}} : \text{Dtxp}] \equiv \text{UE}_{\text{Dtx}\underline{\text{up}}} : \text{OE}$
iii. TNCR due to $\underline{\text{indirect}}$ tax evasion $= [\text{inDtx}\underline{\text{ev}} : \text{inDtxrev}] \equiv \text{UE}_{\text{inDtx}\underline{\text{ev}}} : \text{OE}$
iv. TNCR due to unpaid $\underline{\text{indirect}}$ tax $= [\text{inDtx}\underline{\text{up}} : \text{inDtxp}] \equiv \text{UE}_{\text{inDtx}\underline{\text{up}}:} : \text{OE}$

4. Sum of TNCR (sample) mirrors in the non-compliant ratio of the legal activities in the entire economy ($\text{UE}_{\underline{\text{TNCR}}}$). Its absolute value ($\text{UE}_{\underline{\text{L}}}$) is computed based on the GDP value, and expressed as a percentage proportion of GDP.
   i. $\text{UE}_{\text{TNCR}} = \text{UE}_{\text{Dtx}\underline{\text{ev}}} + \text{UE}_{\text{Dtx}\underline{\text{up}}} + \text{UE}_{\text{inDtxev}} + \text{UE}_{\text{inDtx}\underline{\text{up}}}$
   ii. $\text{UE}_{\text{TNCR}} : \text{OE}$
   iii. $\text{UE}_{\text{L}} = \dfrac{\underline{\text{UE}}_{\text{TNCR}}}{\text{OE}} \text{ X GDP}$

5. Sample from the entire enforcement on criminal activities (cr):
   As it is not possible to compute non-compliant ratio for criminal activities ($\text{UE}_{\text{cr}} = \text{UE}_{\text{crbribe}} + \text{UE}_{\text{crdrugs}} + \text{UE}_{\text{crothers}}$], the incomes from these activities are added directly to the UE_{L}.
   $\text{UE}_{\text{cr}} + \text{UE}_{\text{L}} = \text{UE}$

6. UE consists of the irregular economy (UE_{L} =tax non compliance of legal activities) and illegal economy ($\text{UE}_{\underline{\text{cr}}}$= tax non-compliance of criminal activities) are estimated in point estimate for each year:
   i. $\{\text{UE}_{\text{L}} + \text{UE}_{\text{cr}}\}_{\text{t}} = \{\text{UE}_{\text{Dtx}\underline{\text{ev}}} + \text{UE}_{\text{Dtx}\underline{\text{up}}} + \text{UE}_{\text{inDtxev}} + \text{UE}_{\text{inDtx}\underline{\text{up}}} + \text{UE}_{\text{crbribe}}. + \text{UE}_{\text{crdrugs}} + \text{UE}_{\text{crothers}}\}_{\text{t}}$
   ii. $\{\text{UE}\}_{\text{t}} = \{\text{UE}_{\text{Dtx}(\underline{\text{ev}} + \underline{\text{up}})} + \text{UE}_{\text{inDtx}(\underline{\text{ev}} + \underline{\text{up}})} + \text{UE}_{\text{cr(bribe + drugs + others)}}\}_{\text{t}}$

7. Assuming that the point estimates represent UE in low series (Ls), amplifying them by ESR, would generate products of UE in the moderate series (Ms) and upper series (Us) as follows:
   i. TNC activities ≡ regular economy
      a. Ls estimate for DT evasion ≡ Ls $\text{UE}_{\text{Dtx}\underline{\text{ev}}}$
      b. Ls estimate for inDT tax evasion ≡ Ls $\text{UE}_{\text{inDtxev}}$
      c. $\text{Ls}_{\text{Dtx}\underline{\text{ev}}}$ x average ESR = Us estimate for DT evasion ≡ Us UE_{Dtxev}
      d. $\text{Ls}_{\text{inDtx}\underline{\text{ev}}}$ x average ESR = Us estimate for inDT evasion ≡ Us $\text{UE}_{\text{inDtx}\underline{\text{ev}}}$
   ii. Criminal activities (cr) ≡ illegal economy
      a. Ls estimate of criminal activities ≡ Ls UEcr
      b. Ls cr x high ESR = Ms estimate for criminal activities ≡ (Ms UEcr)
      c. Ls cr x low ESR = Us estimate for criminal activities ≡ (Us UEcr)
   iii. Sum of TNC activities and cr activities ≡ UE consisting of the irregular and illegal economy.
      a. $\text{Ls UE}_{\text{Dtx}\underline{\text{ev}}} + \text{Ls UE}_{\text{inDtx}\underline{\text{ev}}} + \text{UE}_{\text{Dtx}\underline{\text{up}}} + \text{UE}_{\text{inDtx}\underline{\text{up}}} + \text{Ls cr} = \text{Ls UE}$
      b. $\text{Us UE}_{\text{Dtx}\underline{\text{ev}}} + \text{Us UE}_{\text{inDtx}\underline{\text{ev}}} + \text{UE}_{\text{Dtx}\underline{\text{up}}} + \text{UE}_{\text{inDtx}\underline{\text{up}}} + \text{Ms cr} = \text{Ms UE}$
      c. $\text{Us UE}_{\text{Dtx}\underline{\text{ev}}} + \text{Us UE}_{\text{inDtx}\underline{\text{ev}}} + \text{UE}_{\text{Dtx}\underline{\text{up}}} + \text{UE}_{\text{inDtx}\underline{\text{up}}} + \text{Us cr} = \text{Us UE}$

      Simplified equation:
      - $\text{Ls (cr} + \text{UE}_{\text{Dtx}\underline{\text{ev}}} + \text{UE}_{\text{inDtx}\underline{\text{ev}}}) + \text{UE}_{(\text{Dtx}\underline{\text{up}} + \text{inDtx}\underline{\text{up}})} = \text{Ls UE}$
      - $\text{Ms cr} + \text{US}\,(\text{UE}_{\text{Dtx}\underline{\text{ev}}} + \text{UE}_{\text{inDtx}\underline{\text{ev}}}) + \text{UE}_{(\text{Dtx}\underline{\text{up}} + \text{inDtx}\underline{\text{up}})} = \text{Ms UE}$
      - $\text{Us (cr} + \text{UE}_{\text{Dtx}\underline{\text{ev}}} + \text{UE}_{\text{inDtx}\underline{\text{ev}}}) + \text{UE}_{(\text{Dtx}\underline{\text{up}} + \text{inDtx}\underline{\text{up}})} = \text{Us UE}$

4. Results and Interpretations

4.1 UE Size and Growth

As the ESR for tax non-compliance is between 38 and 63 per cent, we employed its average of 50 per cent in the computation. In the case of criminal activities, we computed two ESR, that is, based on the number of 'accused' over 'investigation' cases (about 7%) and the number of 'accused' over arrested cases (about 16%). For simplification, we rounded up the estimates to the nearest tenth; 50 per cent for legitimate activities; and10 and 20 per cent for criminal activities.

As illustrated in Figure 4, the size of the UE lies between 8.69 per cent (2007) and 39.87 per cent (1998) of the GDP. In normal times, it hovers around 20 per cent of GDP, but fluctuates in the opposite direction of GDP during good and bad times. Table 2 and Figure 5 show that UE growth increased substantially in 1989, 1998 and 2004 from 32.50 to 40.40 per cent, 36.46 to 125.18 per cent, and 77.98 to 111.92 per cent respectively. But for the same

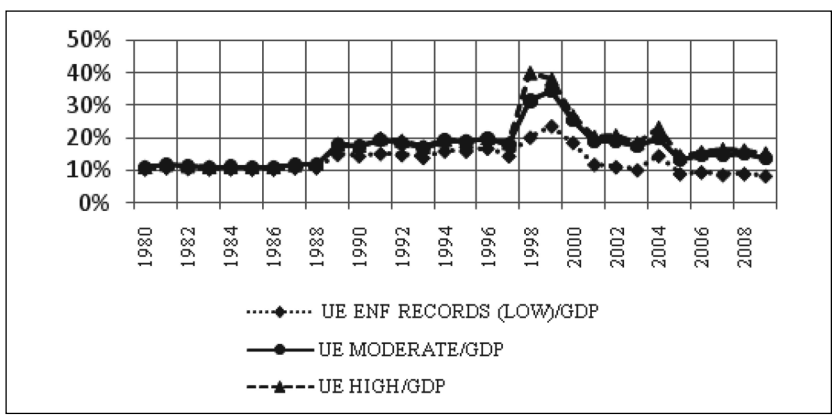

Figure 4. UE in three level series relative to GDP size

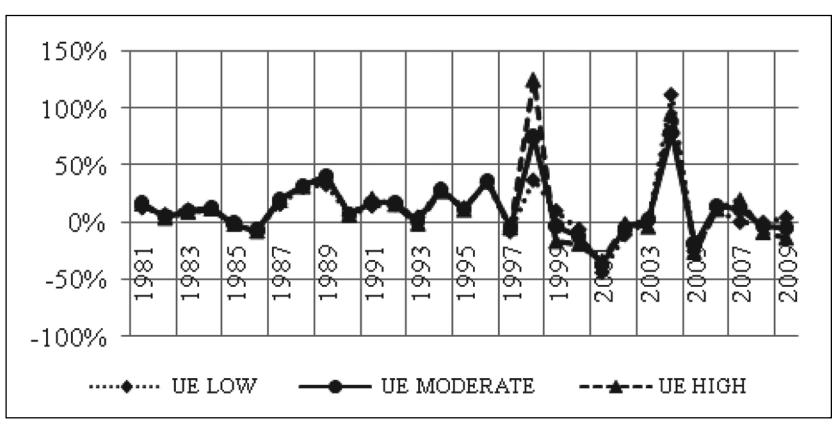

Figure 5. UE growth per annum

Table 2. UE growth in the recession years

UE in range estimates	UE low (%)	UE moderate (%)	UE upper (%)
1988-89	32.50	40.40	40.40
1998-99	36.46	74.32	125.18
2003-04	111.92	77.98	95.32

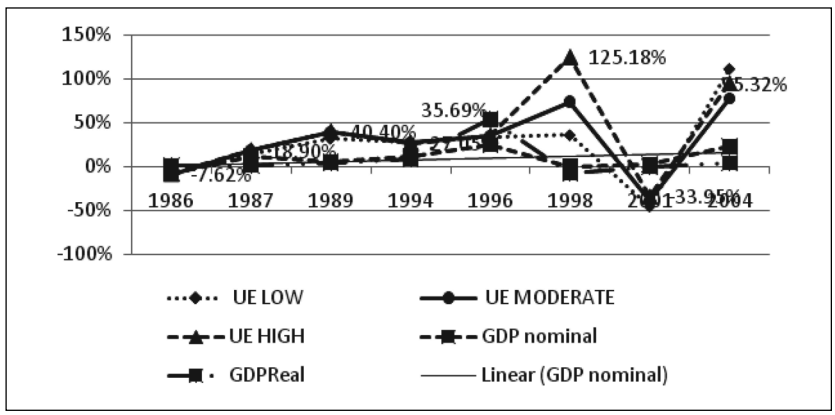

Figure 6. UE growth relative to GDP real and GDP nominal

Table 3. UE by size and growth examined over a 5-year period

5-year period	Size (RM million)			Growth		
	Lower bound	Moderate bound	Upper bound	Lower bound (%)	Moderate bound (%)	Upper bound (%)
1980-84	2,514	9,360	9,360	9.98	10.20	10.20
1985-89	6,205	12,970	12,970	13.86	16.27	16.27
1990-94	39,347	56,662	57,624	13.33	15.21	15.52
1995-99	98,520	169,211	202,242	16.76	22.35	30.06
2000-04	129,246	230,366	252,916	9.94	9.40	14.00
2005-09	150,328	281,545	314,730	-2.55	-0.85	-3.54
Total	426,161	760,113	849,843			

years, GDP real growth reduced to 4.70 per cent in 1989, -7.36 per cent in 1998 and 4.00 per cent in 2004. Meanwhile, the GDP nominal was reduced to 5.23 per cent in 1989, 0.51 per cent in 1998 and 6.55 per cent in 2004 (Figure 6).

Over the period 1990-2009, the UE increased about 3.82 to 5.46-fold, with the value ranging from RM 426 billion to RM850 billion indicating growth from 10.20 per cent in the 1980s to its peak of 30.06 per cent in the late 1990s, gradually declining in the recent years (Table 3). However, the gap between the lower and upper estimates is widening.

As summarised in Table 4, UE size relative to its growth ranged between 10.55 and 11.10 per cent (1980-84) of GDP, peaking in the range of 18.10 to 26.94 per cent (1995-99), and

Table 4. UE as a percentage of GDP examined over a 5-year period

5-year period	Low UE /GDP (%)	Moderate UE / GDP (%)	High UE /GDP (%)	UE /GDP (%)
1980-84	10.55	11.10	11.10	10.92
1985-89	11.45	12.56	12.56	12.19
1990-94	14.81	18.21	18.48	17.17
1995-99	18.10	24.52	26.94	23.19
2000-04	13.21	20.03	21.69	18.31
2005-09	8.92	14.16	15.40	12.83

gradually reducing in the range of 8.92 to15.40 per cent in the period 2005-09. Higher UE growth that doubled and tripled during the 'recession years' of 1989, 1998 and 2004 in the opposite direction to GDP growth implies a complementary association. It supports the contention that the potential economy consists of two economic components: the official economy and the 'second economy'. It suggests that during a recession phase, the UE as the thriving economy rises to fill the economic gap making it relatively large in size. The UE then reduces its role as the country recedes from the sluggish performance in the phase of economic recovery. This positive role has also a socio-economic explanation in that people would resort to underground activities as 'survival lines'. This 'social shock absorber'event allows the institution to reduce production costs by employing informal workers who are desperate for jobs in bad times.

This phenomenon suggests that the UE could reduce some recession impacts and supports the contention that it forms part of the solution to urban decay and unemployment. It could also mean that a rise in GDP in good times may not reflect a true increase in production, but actually constitute a shift in the production from UE to OE (unrecorded to recorded form). Nevertheless, a substantial shift of UE to OE is important as this will generate more tax revenue.

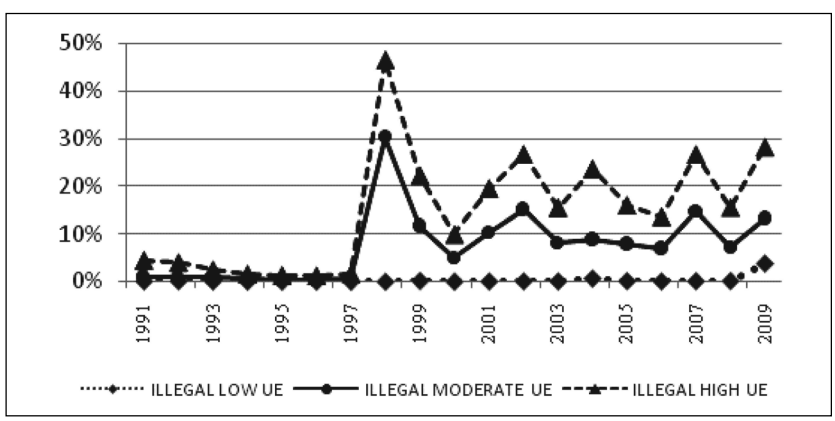

Figure 7. UE by proportion of illegal economy

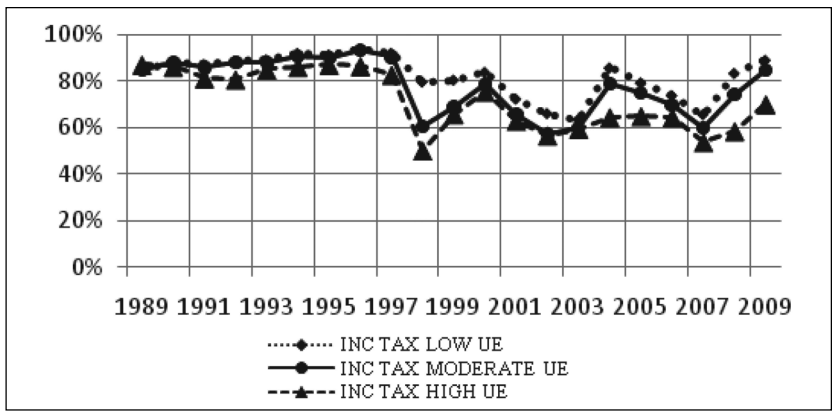

Figure 8. UE by proportion of direct tax non-compliance

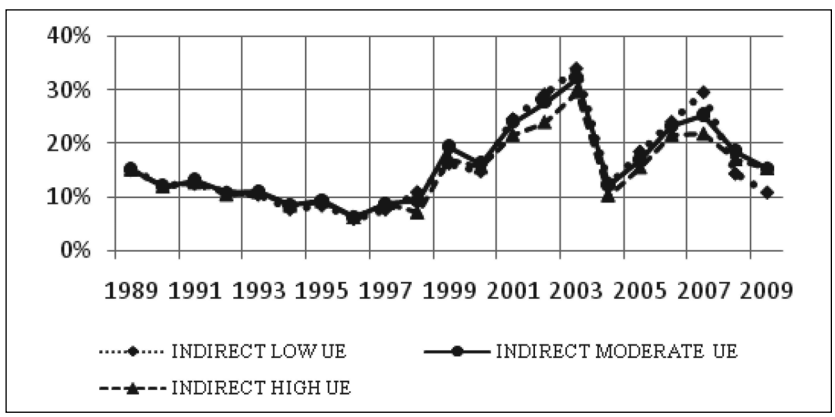

Figure 9. UE by tproportion of indirect tax non-compliance

4.2 UE by Components of Irregular and Illegal Economy

The proportion of the UE components is illustrated in Figures 7 to 9. Comparison is made between two conflicting economies: 1998 (recession year) and 2006 (good time). The UE is about 33.37 per cent (1998) and 9.77 per cent (2006) of GDP size. By component, the irregular economy constitutes about 19.02 per cent (1998) and 8.4 per cent (2006), while the illegal economy constitutes 8.4 per cent (1998) and 1.37 per cent (2006) of the GDP. In normal times, the proportion of the irregular economy and illegal economy hover around 80 and 20 per cent respectively. But during an economic downturn the portion of illegal economy increased by up to 40 per cent while the irregular economy reduced by 60 per cent.

The proportion of the illegal economy was 42.62 per cent for 1998 and 13.54 per cent for 2006. The irregular economy mix shows direct tax non-compliance of 50.23 per cent for 1998 and 64.63 per cent for 2006 and indirect tax non-compliance of 7.15 per cent for 1998 and 21.83 per cent for 2006. The proportion mix indicates that the irregular economy in Malaysia

is about 4 times larger than the illegal economy in normal times, 6 times larger than the illegal economy in good times, but only 1.5 times larger than the illegal economy in bad times. The composition of the UE is comparable to the economists' general estimates of the 'irregular economy' being about 3 to 4 times larger than the illegal economy.

A higher proportion of the illegal economy during the economic downturn is likely due to the economic pressures that cause people to opt for UE as life line survival, contributing to more unreported income for tax leading to an erosion of the tax base.

Although the proportion of direct tax non-compliance in the irregular economy is larger (50% to 76%) than the indirect tax non-compliance (7% to 30%), it is seen to be gradually displaced over the years. The proportion of the former has been reduced by 50 per cent while the latter increased by 33 per cent. The shift of tax non-compliance mix is consistent with the tax reform to a 'lower direct tax burden' and to a 'higher indirect tax burden'. A higher direct tax burden prior to the 1990s reflects that hiding incomes to avoid taxation was more profitable while the lower direct tax burden in the 1990s created lower incentives for evasion as the 'profits' of reporting one's true income was reduced. Hence, apart from government policy to promote economic growth, reforms towards a lower direct tax burden have a negative association with the UE.

Meanwhile, the higher indirect tax burden reform (additional taxes and higher tax rates) coupled with other rigid regulations to encourage local production, discourage health hazard consumption and reduce social problems, would have instead encouraged people to smuggle goods.This suggests that a rigid policy, if not countered by efficient and effective law enforcement, would lead to policy failure as well as revenue loss.This phenomenon is consistent with the experience of other countries where the increase in tax rates and tariff on imports of traded goods has been shown to induce smuggling activities (Morgensen *et al.* 1995; Farnazegan 2008).

The shift in tax non-compliance mix conforms to the economic theory of tax burden that encourages people to evade income tax. Nevertheless, despite the shift, the UE continues to rise in its absolute value, signifying that a further reduction of direct tax burden would not likely reduce UE further. A further reduction in tax burden must be weighed against the benefits of public goods and services financed by tax revenue. Intuitively, it is unwise to further reduce the tax burden as taxes are an important fiscal and social policy instrument.

Schneider (2002) who did a study on Australia in the period 1988-89, pointed out that the hidden economy did not decrease despite the reduction in all the marginal tax rates on income and a general simplification of the tax system. The limitation is partly due to the positive effects of the changes in the tax system as well as the larger negative effects of other voluminous regulations or determinants.

4.3 UE by Components of Tax Non-compliance

As shown in Tables 5 to 8, because of the activities of tax non-compliance, the UE indicates a trend of a reduction in unpaid taxes and rising tax evasion. Indirect tax non-compliance consists of about 30 per cent unpaid tax and 70 per cent tax evasion while direct tax compliance consists of about 60 per cent unpaid tax and 40 per cent tax evasion. It signifies that the share of unpaid indirect tax is about half of indirect tax evasion, while the share of unpaid direct tax is double that of direct tax evasion. The opposite proportion mix between unpaid tax and tax evasion implies that the burden of direct tax is to part with the payment of tax

Table 5. Components of indirect tax non-compliance

5 year time income)	UE in the low series		UE in the upper series	
	*Tax evasion (unreported income)(%)	Unpaid tax (%)	*Tax evasion (unreported income)(%)	Unpaid tax (%)
1990-94	54.58	45.42	70.62	29.38
1995-99	72.75	27.25	84.23	15.77
2000-04	75.60	24.40	86.10	13.90
2005-09	66.17	33.83	79.64	20.36

* Tax evasion in range estimates based on enforcement success rate.

Table 6. Components of tax non-compliance by criminal activities over a 5-year period

5-year period	Bribery (%)	Drug trafficking (%)	Other commercial crimes* (%)	Total (%)
1995-99	4.04	42.86	53.10	100.00
2000-04	2.98	4.76	92.26	100.00
2005-09	1.60	8.82	89.58	100.00
Average	3	19	78	

* Breaches of trust/swindle/cheating offences constitute 75% of commercial crimes.

Table 7. Direct tax gap with unreported income constituting criminal activities

5-year period	Tax evasion (under reported income) (%)	Unpaid tax (%)	Tax evasion (non filing) (%)	Total (%)
1980-84	16.67	83.33	0.00	100.00
1985-89	16.67	83.33	0.00	100.00
1990-94	16.43	83.30	0.27	100.00
1995-99	15.18	81.58	3.25	100.00
2000-04	26.98	69.38	3.64	100.00
2005-09	34.87	61.24	3.89	100.00

Table 8. Direct tax gap with unreported income constituting criminal activities and indirect tax non-compliance

5-year period	Tax evasion (under reported income)(%)	Unpaid tax (%)	Tax evasion (non filing) (%)	Total (%)
1990-94	9.97 – 16.98	68.11 – 78.26	11.77 – 14.91	100.00
1995-99	12.05 – 19.68	58.50 – 72.61	15.35 – 21.82	100.00
2000-04	11.92 – 15.79	37.22 – 55.71	32.37 – 46.99	100.00
2005-09	17.94 – 21.78	25.69 – 42.24	39.82 – 52.35	100.00

liability whereas the burden of indirect tax is to consume 'official' goods at a higher cost compared to 'smuggled' goods.

Tax non-compliance of the illegal economy shows that fraud/breach of trust/swindle/ cheating activities constitute the most (53.10% to 92.26%) (and is rising) followed by a reduction in drug trafficking (4.76% to 2.86%) and bribery (1.60% to 4.04%) (Table 6).

The direct tax non-compliance or direct tax gap is presented in two scenarios. Assuming that the income from indirect (income tax office) tax, non-compliance and criminal activities is not reported direct to the tax authority (income tax office) to avoid being traced and caught, it would constitute tax evasion of the non-filing group who are outside the 'captured' tax base. In the first scenario (Table 7), we considered only the incomes from criminal activities as unreported income from the non-filing group; the components mix are 64 per cent (unpaid tax), 32 per cent (under-reporting) and 4 per cent (non-filing). In the second scenario (Table 8), we considered the incomes from both criminal and indirect tax non-compliant activities as unreported income from the non-filing group; the components mix

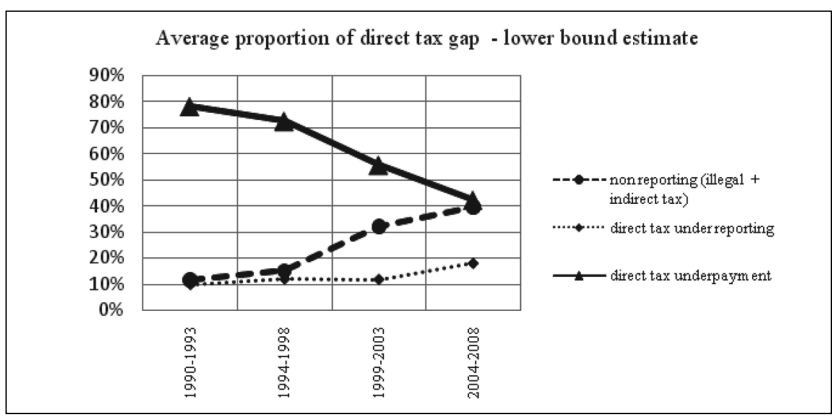

Figure 10. UE in lower series by direct tax gap mix

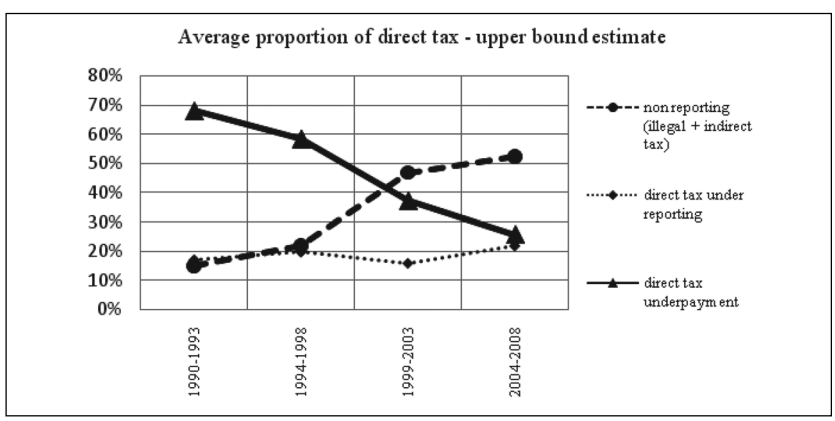

Figure 11. UE in upper series by direct tax gap mix

are 62.21 per cent (unpaid tax), 12.97 per cent (under- reporting) and 24.83 per cent (non-filing).

In both scenarios, although the unpaid tax forms the largest component of direct tax gap, its declining trend is an indication of an improving tax collection system. Tax evasion due to under-reporting of legal income in the existing tax base is almost consistent, reflecting considerable monitoring. However, the rising tax evasion outside the existing tax base (Figures10 and 11) highlight a positive trend of potential tax loss in the future.

The extent of tax loss is shown as percentage size relative to tax revenue, federal revenue and federal deficit in the last two decades in three probable tax rates at 10.22 and 27 per cent. For the period 1990-1999, the direct tax loss is between 6.61 and 33.68 per cent of direct tax revenue, 13.85 and 14.49 per cent of federal revenue, and 60.38 and 307.28 per

Table 9. Direct tax loss relative to federal account at plausible tax rates (1990-1999)

Period 1990-1999 (RM million): Federal deficit Federal deficit: RM 22,834 Federal revenue: RM 484,317 Direct tax revenue: RM 208,495	UE level	Direct tax loss			
		Amount (RM)	As % of federal deficit	As % of federal revenue	As % of direct tax revenue
10% (effective tax rate)	Low series	13,787	60.38	2.85	6.61
	Moderate series	22,587	98.92	4.66	10.83
	Upper series	25,987	113.81	5.37	12.46
22% (average tax rate)	Low series	30,331	132.83	6.26	14.55
	Moderate series	49,692	217.62	10.26	23.83
	Upper series	57,171	250.37	11.80	27.42
27% (marginal tax rate)	Low series	37,224	163.02	7.69	17.85
	Moderate series	60,986	267.08	12.59	29.25
	Upper series	70,164	307.28	14.49	33.65

Table 10. Direct tax loss relative to federal account at plausible tax rates (2000-2009)

Period 2000-2009 (RM million): Federal deficit: RM 452,397 Federal revenue: RM 1,106,504 Direct tax revenue: RM 583,070	UE level	Direct tax loss			
		Amount (RM)	As % of federal deficit	As % of federal revenue	As % of direct tax revenue
10% (effective tax rate)	Low series	27,957	6.18	2.53	4.79
	Moderate series	51,191	11.32	4.63	8.78
	Upper series	56,765	12.55	5.13	9.74
22% (average tax rate)	Low series	61,506	13.60	5.56	10.55
	Moderate series	112,620	24.89	10.18	19.32
	Upper series	124,882	27.60	11.29	21.42
27% (marginal tax rate)	Low series	75,485	16.69	6.82	12.95
	Moderate series	138,216	30.55	12.49	23.70
	Upper series	153,264	33.88	13.85	26.29

cent of federal deficit. Meanwhile, for the period 2000-2009, the direct tax loss is between 4.79 and 26.29 per cent of direct tax revenue, 2.53 and 13.85 per cent of federal revenue, and 6.18 and 33.88 per cent of federal deficit. For these two periods, the proportion of tax loss relative to direct tax revenue is about the same, but the proportion range is relatively large by federal revenue and larger by federal deficit. This is partly due to faster UE growth in the earlier period but a faster growth of the federal expenditure in the later period.

5. Concluding Remarks

Measuring a hidden variable is often arbitrary. Yet without any guesstimates, judgment and development of the area of the 'second economy' is not possible. To reduce skeptical views, this study has considered employing enforcement data that captures true events over which the researcher had no control to reduce bias estimates. Therefore several assumptions had to be made about the data coverage, and amplifying techniques applied in order to rectify the under coverage and over counting income mix. Considering the proxy indicators, findings should at best be acceptable as conservative and reasonable estimates to provide some baseline data and guidance for appropriate formulation or adjustment of government policies and strategic planning. The tax gap is a negative indicator of an effective tax system and denotes the benchmark for potential tax revenue while substantial tax loss is an indication of weak enforcement and dissatisfaction of the citizens.

Irregular economic conditions rather than the size of the illegal economy would explain a larger component of the UE. The reducing growth of UE recently and its smaller size relative to GDP is a good sign. However, although accounting for a smaller component of the UE, the increasing size of the illegal economy does not augur well. Its opposite growth relative to GDP implies that UE forms an economy in 'transition' to stabilise the economic downturn, supporting the existence of an economic gap in a country. Although direct tax non-compliance constitutes a larger portion of the irregular economy, its share of indirect tax non-compliance is reducing. The displacement is partly due to the lower direct tax burden reform and higher indirect tax burden reform. Despite a large share of direct tax non-compliance in the irregular economy, the lower direct tax burden is only adequate for shifting the tax non-compliance mix and reducing the growth of the UE recently, but not in its absolute value. Studying the UE by the direct tax gap method shows that unpaid tax constitutes the most, followed by tax evasion due to income under-reporting and non-filing. There is a trend towards reducing unpaid tax, a consistent tax evasion within the existing tax base, and rising tax evasion outside the captured tax base. A tax loss of about 15 per cent federal revenue or about 33 per cent of the federal deficit is no doubt a sizeable budgetary implications. The UE partly explains the more than 10 years of federal deficit while the rising tax evasion denotes a continuation. Its long-run consequence would force the government to adopt an austerity drive of either reducing the federal expenditure or withdrawing subsidies, or increasing borrowings. Limiting public benefits and acquiring more debt would lead to further erosion of the federal account and eventually drive away public or investor trust and confidence.

The substantial UE that is not inconsistent to GDP size and the wider gap between the lower and upper range estimates signify that enforcement is required. It is proposed that tax, police and anti-corruption agencies gear up for more effective and efficient law enforcement to curb non-compliance. A study on how to shift the UE to OE would be useful

so that income per capita could be computed based on a higher GDP value, *inter alia* achieving the country's vision of 'high income economy'. According to Bicanic and Ott (1997), research on the UE would lead not only to a more comprehensive awareness but also to better efficacy of economic policy. Hence, a continuous assessment and review of the UE as an enduring institution in the Malaysian society is essential.

References

Abdul, M. 2001. Personal Income Tax Non-Compliance in Malaysia. Doctor of Doctor Business Administration Dissertation, Victoria University, Melbourne, Australia.

Aziz, F.M. (2004). Measurement of informal economy in Malaysia. Presented at the *Experts Group Meeting on Informal Sector Statistics* (Delhi Group), 2-4 February 2004, New Delhi, India.

Bhattacharyya, D. K. 1990. An econometric model of estimating the 'hidden economy', United Kingdom (1960-1984): Estimates and tests. *The Economic Journal* **100**: 703-717.

Bhattacharyya, D. K. 1999. On the economic rationale of estimating the hidden economy, The *Economic Journal* **109(456)**: 348-359.

Biæaniæ, I. and K. Ott. (1997). The Unofficial Economy in Croatia: Causes, size and consequences [online]. *Occasional Paper,* No. 3. *http://www.ijf.hr/eng /ops/ijf-ocp3.pdf*

Burrow J. L., K. Biad, E. Kenneth and S. Thomson. 2004. *Business Principle & Management*,12th ed. USA: Thomson South-Western.

Carter, M. 1984. Issues in the hidden economy – A survey. *Economic Record* **60(170)**: 209-221.

Farnazegan, M. R. (2008). Illegal Trade in the Iranian Economy: Evidence from a Structural Model. 409 p. Cairo, Egypt.

Feige, Edgar L.1989. *The Underground Economies: Tax Evasion and Information Distortion*. Cambridge: Cambridge University Press.

Frey, B.S and W. Pommerehne. 1984. The hidden economy: state and prospect for measurement. *Review of Income and Wealth* **30(1)**: 1-23.

Hesam, N. 2003. Measuring the size of the underground economy in Iran with emphasis on the incentives for evasion of insurance premium payment (1961-2002). *http://mpra.ub.uni-muenchen.de/13176/.*

Inland Revenue Service (IRS) (1979). Estimates of Income Unreported on Individual Tax Reforms, Washington D.C: IRS. U.S Department of the Treasury.

Kadokura, Takashi. 2000. 2002-2005 Japan Review. Translated by Yuki Allyson Honjo MPRA Paper 13176. *http://www.japanreview.net/interview_Takashi_kadokura*.

Kanbur, M.G., R. Majid and B. Muhamad. 1993. Does the hidden economy exist in Malaysia? Paper presented at the *First Malaysian Econometric Conference*, Kuala Lumpur, 6-7 April, 1993

Kasipillai, J. 1997. Aspects of the Hidden Economy and Tax Non-compliance in Malaysia. Doctoral Dissertation, The University of New England, Australia.

Kelchev, A. 2006. Tax and Social Security Contribution Evasion in Bulgaria. Working Paper, Department of Economics, Stanford University.

Kesner-Skreb, M. 1997. The unofficial economy and development. Paper presented at the International Workshop on *The Importance of Unofficial Economy in Economic Transition*, May 16-17, Zagreb, Croatia.

Kinsey, K.A. 1987. The Social Dynamics of Tax Encounters: Perspectives of Practitioners & Officials. Mimeo, American Bar Association, Washington, D.C.

Mahfar, M.S. 1994. An Investigation of a Taxpayer Education Program for Developing Countries: A Malaysian Example. Ph. D. Dissertation, Golden Gate University, San Francisco, U.S.A.

McKinsey Consulting, 2004. *Eliminando as barreiras ao crescimento econômico e à economia formal Brazil*. Research Report. Available at *http://www.etco.org.br.*

Mike R.(1985). An alternative of the underground economy. *Journal of Economic Issues* **19 (2)**: 567-573.

Morgensen *et al.* (1995). The Informal Economy in Denmark 1994: Measurement and Results, Study No.3. Copenhagen: The Rockwool Foundation Research Unit.

OECD. 2003. *Measuring the Non-Observed Economy*. A Handbook. Paris: OECD.

O'Higgins, M. (1989). Measuring the Hidden Economy: A Review of Evidence and Methodologies. Mimeograph, Outer Circle Policy Unit, London.

Schlosser, C.E. (2003). *Reefer Madness: Sex, Drugs, and Cheap Labor in the American Black Market* (1st ed). USA: Houghton Mifflin Harcourt.

Schneider, F. and D.H. Enste. 2000. Shadow economies: size, causes, and consequences. *Journal of Economic Literature* **38(1)**: 77-114

Schneider, F. 2002. Size and Measurement of the Informal Economy in 110 Countries around the World, Rapid Response Unit, World Bank.

Sithamparan, S. 2005. E-commerce, e-trading and Internet money transaction. *http://www.webmasterdigest.com/news/295.html*

Slemrod, J. 2007. Cheating ourselves: The economics of tax evasion. *Journal of Economic Perspectives* **21(1)**: 25-48.

Tanzi, V. 1982. Underground economy and tax evasion in the United States: Estimates and implications. In: *The Underground Economy in the United States and Abroad,* ed. V. Tanzi. Lexington: Lexington Books.

Tucker, M. 1982. The underground economy in Australia. In *The Underground Economy in the United States and Abroad*, ed V. Tanzi, pp. 315-322. Lexington: Lexingtons Books.

Vaknin. S. 2000. The blessings of the informal economy. Part III: More ways to kick the habit. *Central Europe Review* **2(40)**.