



PIDE WORKING PAPERS

2007:13

**A Fresh Assessment of the Underground
Economy and Tax Evasion in Pakistan:
Causes, Consequences, and Linkages
with the Formal Economy**

M. Ali Kemal

PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS

PIDE Working Papers
2007:13

**A Fresh Assessment of the Underground
Economy and Tax Evasion in Pakistan:
Causes, Consequences, and Linkages
with the Formal Economy**

M. Ali Kemal

Pakistan Institute of Development Economics, Islamabad



**PAKISTAN INSTITUTE OF DEVELOPMENT ECONOMICS
ISLAMABAD**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means—electronic, mechanical, photocopying, recording or otherwise—without prior permission of the author(s) and or the Pakistan Institute of Development Economics, P. O. Box 1091, Islamabad 44000.

© **Pakistan Institute of Development
Economics, 2007.**

C O N T E N T S

	<i>Page</i>
<i>Abstract</i>	<i>v</i>
1. Introduction	1
2. Main Causes of Increase in the Underground Economy	2
2.1. The Burden of Tax and Social Security Contributions	3
2.2. Intensity of Regulations	4
2.3. Social Transfers	5
3. Overview of Literature: Evidence from the Past	5
4. Data and Methodology	8
4.1. Construction of Variables	8
4.2. Model	8
4.3. Methodology	10
5. Empirical Findings and Results	10
5.1. Estimates of the Underground Economy	13
5.2. Estimates of the Tax Evasion	16
5.3. Measuring the Size of the Underground Economy and Tax Evasion	17
6. Consequences of the Underground Economy and Tax Evasion	22
7. Formal Economy and the Underground Economy	23
8. Summary and Conclusions	27
References	29

List of Tables

Table 1. Results of Estimates of Regression Equation Kemal (2003), Y-R (2003), and Khalid (2002)	7
Table 2. Results of Estimates of Regression Equation	11
Table 3. Trend Estimates of Underground Economy and Tax Evasion	14
Table 4. Projected Estimates of Underground Economy and Tax Evasion	20
Table 5. Budget Deficit and Tax Evasion as Percentage of GDP	23
Table 6. Results of Stationarity	25
Table 7. Trace and Eigenvalues Test	26
Table 8. Results of Cointegration and Error Correction	26
Table 9. VAR Results of GDP and Underground Economy	27

List of Graphs

Graph 1. Underground Economy Estimates by Khalid (2002), Kemal (2003), and Y-R (2003)	6
Graph 2 (Equation 1). Underground Economy as Percentage of GDP	17
Graph 3 (Equation 2). Underground Economy as Percentage of GDP	18
Graph 4 (Equation 3). Underground Economy as Percentage of GDP	18
Graph 5 (Equation 1). Tax Evasion as Percentage of GDP	18
Graph 6 (Equation 2). Tax Evasion as Percentage of GDP	19
Graph 7 (Equation 3). Tax Evasion as Percentage of GDP	19

ABSTRACT

Rise in the underground economy creates problems for the policy-makers to formulate economic policies, especially the monetary and fiscal policies. It is found that if there was no tax evasion, budgets balance might have been zero and positive for some years and we would not have needed to borrow as much as we had borrowed. It is concluded that the impact of the underground economy is significant to the movements of the formal economy, but the impact of formal economy is insignificant in explaining the movements in the underground economy. In the long run, underground economy and official economy are positively associated. It is estimated that the underground economy ranges between Rs 2.91 trillion and Rs 3.34 trillion (54.6 percent of GDP to 62.8 percent of GDP respectively) in 2005 and tax evasion ranges between Rs 302 billion and Rs 347 billion (5.7 percent of GDP to 6.5 percent of GDP respectively) in 2005. Underground economy and tax evasion were increasing very rapidly in the early 1980s but the rate of increase accelerated in the 1990s. It declined in 1999, but reverted to an increasing trend until 2003. It declined again in 2004 and 2005.

JEL classification: E26, H26

Keywords: Underground Economy, Tax Evasion

1. INTRODUCTION

Illegal activities such as smuggling, corruption, black-marketing, narcotics, informal legal jobs etc. constitute the underground economy. These activities are not in the tax net and have significant negative impact on social welfare of the country. Almost all the transactions made in the underground economy are through cash, e.g., payments to the contractual workers, transactions in illegal sales, transactions involved in smuggling and drug trafficking, cash payments to the shopkeepers who do not provide valid cash memos¹ etc. In general, self-employed persons are involved in tax evasion and underground economic activities because there is no formal system of documentation of self-employed persons and their activities.

Underground economy generally exists in every country, however, the policy-makers are especially concerned about the rise of the underground economy. It creates difficulties for the policy-makers to formulate the policy especially the monetary policy. On the other hand, increase in tax evasion is mostly associated with the fiscal policy, i.e., increase in tax rates erodes the tax base, which eventually reduces the willingness to pay taxes even when the Government reduces the tax rates. Government thus fails to impose progressive taxation and in order to get revenues they impose different taxes or increase the tax rates or increase the price of those commodities whose demand is inelastic to its price, e.g., wheat flour (this is known as inflation tax). As a result, fiscal deficit and inflation increases in the country. This problem results in gradual weakening of the economic and social basis of collective arrangements [Schneider and Enste (2000)]. Furthermore, the statistics on unemployment, labour force, income, consumption and other welfare indicators are unreliable, which is the major hurdle in the path of policy-making.

Contrary to the above, increase in the underground economy affects positively to the formal economy. Empirical findings of Schneider (1998) show that at least two-third of the income earned in the shadow economy is immediately spent in the official economy. However, some studies show opposite results, e.g., Yasmin and Rauf (2003) conclude that the underground economy and tax evasion affects formal GDP² negatively in Pakistan.

Acknowledgements: I am thankful to Dr Nadeem Ul Haque, Dr A. R. Kemal, Dr Faiz Bilquees, and Mr Mahmood Khalid for sending me useful comments on this paper. All errors of course should be attributed to the author.

¹Although they accept credit cards, the shops even in Islamabad prefer taking cash because use of credit cards forces them to pay taxes.

²There are certain econometric problems with their regression approach.

Tax system should be simple and easy to understand because loopholes in the complex tax system tempt people to evade taxes which they might pay otherwise. Until the agriculture tax was not imposed industrialists and traders showed their income as income from agriculture and were exempted from taxation. Even now the tax on agriculture sector is significantly lower and this practice of tax evasion still continues. In the public sector government employees are not allowed to work anywhere besides their main office. However, there are many persons who work at more than one place³ and do not report their income from the second job, which remains out of the tax net.

It is difficult to estimate the exact amount of tax evasion and the size of the underground economy. A number of researchers [Shabsigh (1995); Ahmad and Ahmad (1995); Iqbal, Qureshi, and Mahmood (1998); Aslam (1998); Khalid (2002); Kemal (2003) and Yasmin and Rauf (2003)] have tried to estimate it using Tanzi's (1980, 1983) monetary approach. However, this is an indirect approach to estimate the underground economy, which can show the trend in underground economy but fails to provide the exact numbers [for more details see Kemal (2003)].

The primary objective of this paper is the fresh assessment of the underground economy and tax evasion. We also checked the long run relationship between the underground economy and formal economy and the short run causality between the two variables. The paper also explores the consequences of the underground economy and tax evasion.

The plan of the paper is as follows: Section 2 describes the possible causes of the underground economy; Section 3 gives overview of the past studies; Section 4 describes the data and methodology; Empirical results are presented in Section 5; Consequences of the underground economy and tax evasion are described in Section 6; Section 7 explores the linkages between the formal and the underground economy; and Concluding points are drawn in Section 8.

2. MAIN CAUSES OF INCREASE IN THE UNDERGROUND ECONOMY

The growth of the underground economy is associated with various factors, such as rise in taxes and social security burdens, intensity of regulations in the official economy, especially the labour markets including forced reduction of weekly working time, early retirement, prohibition of not working at more than one office etc. Apart from economic factors certain non-economic factors also lead to the expansion of the underground economy such as unwillingness to show the accurate income etc. According to Schneider and Enste (2000) micro-

³At high rates of inflation, while income levels remain the same, people need to earn more to maintain the same living standard if not better.

sociological and psychological approaches can provide interesting additional insights in the decision-making process of individuals choosing to work underground. For example, the decline of civic virtue and loyalty towards public institutions and decline in tax morale of the people.⁴

2.1. The Burden of Tax and Social Security Contributions

The most important determinant of the increase of the underground economy is the rise in tax and social security burdens [see Tanzi (1982, 1999); Frey and Pommerehne (1984); Feige (1989); Pozo (1996) and Johnson, Kaufmann, and Zoido-Lobaton (1998)]. As a result of increase in tax rates people generally get involved in those activities where they can earn more and pay as less taxes as possible. Schneider and Enste (2000) state that bigger the difference between the total cost of labour in the official economy and after tax earnings (from work), greater the incentive to avoid this difference and work in the underground economy. Since this difference depends broadly on the social security system and the overall tax burden, therefore, these are the key features of the existence and rise of the underground economy (Ibid).

Loayza (1996) estimates the size of the informal sector in fourteen Latin American countries and finds that tax burden and labour market restrictions increases the underground economy activity, while the strength and efficiency of government institutions reduces the underground economy. Neck, Hofreither, and Schneider (1989) investigated the determinants of a household's supply of underground labour and its demand for underground goods. They concluded that higher marginal income tax rates imply a higher supply of underground labour, and higher wage rates in the official economy imply a lower supply of underground labour. On the other hand, they showed that the firms' demand for underground labour and supply of underground goods depend positively on the indirect tax and wage rates in the official economy, i.e., higher the tax rates higher would be the underground economy.

Schneider and Neck (1993) emphasise the complexity of taxation system. A complex tax schedule allows more legal tax avoidance by providing various tax exemptions and reductions. However, exemptions and reductions in taxes always lead to better welfare of the people at least in the short run.

The main problem with the underground economy activity and tax evasion is that once an individual gets involved it becomes almost impossible to come out of it for various reasons, such as (i) their informal income, if not declared, cannot be taxed since there is no proper documentation for the informal sector in Pakistan. On the other hand, everything is taxed in the formal sector, (ii) Even when the policy of taxation is relieved (either reduction in tax rates or amnesty schemes) tax evaders have fear that government is trying to

⁴For further details see Frank (1988).

cheat them; once they are registered with the tax network the tax rates will be raised once again and they will be picked up very easily because then the government will have full information about their informal activities and incomes. Spiro (1993) finds for Canada that people once working in the underground economy prefer the high profiles from irregular activities, develop social networks and personal relationships and hence will not return to the official economy even in the long run.

2.2. Intensity of Regulations

Regulatory frameworks are generally designed to get control over certain things. For example, the role of monopoly control authority (MCA) is to protect consumer rights by creating competition among different firms so that consumers can buy same products at competitive prices from different producers. It prohibits the monopoly situation in the country, which improves efficiency as well. Increasing the number of regulations for any market is not a good policy to adopt; more regulations mean more restrictions which lead to increased labour costs in the official economy. Since most of these costs can be shifted onto employees, it reduces individuals' choices to work in the official economy. As a result, they would work in the informal/unofficial sector, which thus leads to more tax evasion and increase in the underground economy. Intensity of regulation is often measured by the number of laws and requirements such as licenses, and various other labour laws, e.g., labour restrictions for foreigners, price controls and trade barriers.

Johnson, Kaufmann, and Shleifer (1997) predict, *inter alia*, that countries with more regulations tend to have a higher share of unofficial economy in total GDP. They estimated that one point increase of the regulation index (ranging from 1 to 5, with 5 = the most regulation in a country) leads to 8.1 percentage point increase in the share of the underground economy. They conclude that the enforcement of regulation is the key factor for the burden levied on firms and individuals that drives them into the underground economy. Friedman, *et al.* (1999) show that more regulations are correlated with larger underground economy. They estimated that one point increase in an index of regulation (ranging from 1–5) leads to 10 percent increase in the underground economy.^{5, 6}

Johnson, Kaufmann, and Zoido-Lobaton (1998) find that countries with a better rule of law have smaller underground economy. Transition countries have higher levels of regulation leading to a significantly higher incidence of bribery, higher effective taxes on official activities, and a large discretionary framework of regulations and consequently, larger underground economies.

⁵Both studies are based on cross country analysis.

⁶To read more about cost of regulation see De Soto (1989).

These findings demonstrate that government should put more emphasis on reducing the intensity of regulations or at least improve the enforcement of laws and regulations instead of increasing the number of regulations [Schneider and Enste (2000)].

2.3. Social Transfers

Social transfers such as zakat and subsidies⁷ discourage people to work especially in the official economy because their overall income is higher if they receive these transfers while working in the underground economy. However, this does not contribute significantly to the underground economy as far as Pakistan's is concerned. Pensions which have a major proportion in social transfers in Pakistan may contribute but very little to the underground economy.

3. OVERVIEW OF LITERATURE: EVIDENCE FROM THE PAST

Kemal (2003) comprehensively reviews the past studies including Shabsigh (1995), Ahmad and Ahmad (1995), Iqbal, Qureshi, and Mahmood (1998), and Aslam (1998). All these studies used Tanzi's (1980, 1983) monetary approach to estimate the size of the underground economy and tax evasion. There are several shortcomings of this approach, which lead to incomparable estimates of the underground economy and tax evasion (in figures).⁸ These problems were also comprehensively discussed in my previous paper, i.e., Kemal (2003). Let's look at the other studies which were not discussed in my previous paper.

Khalid (2002) and Yasmin and Rauf (Y-R) (2003) estimated the underground economy and tax evasion using monetary approach but got different estimates from Kemal (2003). However, the trend of the underground as percentage of GDP is the same in all the three studies (see Graph 1 below), which shows that the underground economy as percentage of GDP started increasing at a rapid rate after 1991 and in 1998 it was maximum and then started declining.

Time period and benchmark period is the same in Y-R (2003) compared to Kemal (2003) but the definition of dependent variable⁹ is different. Moreover, interest rate is used by Y-R (2003) as an explanatory variable which was absent

⁷In Pakistan there is not social security system which says that if you are unemployed and permanent resident of that country you will get minimum amount to maintain your subsistence level. This system is applied in UK and some other countries.

⁸All the indirect approaches have several shortcomings and monetary approach is the best among those approaches [see Kemal (2003)].

⁹Y-R (2003) used ratio of currency in circulation to M2 as dependant variable, while Kemal (2003) used ratio of foreign currency accounts in conjunction with currency in circulation to M2 as dependant variable.

in Kemal (2003) due to insignificant impact on the dependent variable. Dummy variable is not used by Y-R (2003), which was used by Kemal (2003) to capture the impact of hundi after liberalisation of foreign currency accounts. Similar to Iqbal, Qureshi, and Mahmood (1998), Y-R (2003) used lagged value of tax to GDP ratio as an explanatory variable, while Kemal (2003) used the current period tax to GDP ratio. The results of the estimated equation of both the studies are given in Table 1.

Khalid (2002) and Kemal (2003) used same methodology, same dependant variable but different benchmark periods, i.e. former used 1975 as benchmark year while later used 1973 as benchmark year. Moreover, real interest rate and GDP per capita is used by Khalid (2002) which are insignificant in Kemal (2003) and were not used in the final equation. Instead of using per capita growth Kemal (2003) used GDP growth as a proxy to economic development.

The estimates of underground differs due to different dependent variables used by different authors, different benchmark periods taken in each study, different explanatory variables chosen, different time period etc. The estimates of the underground economy calculated from this approach are good in examining the trend but not the exact size of the underground economy.

Graph 1. Underground Economy Estimates by Khalid (2002), Kemal (2003), and Y-R (2003)

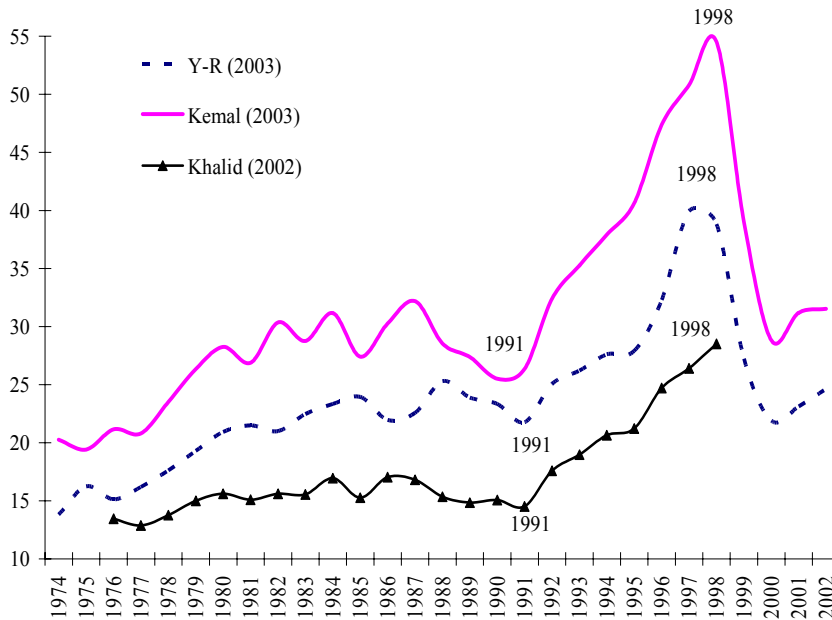


Table 1

*Results of Estimates of Regression Equation
Kemal (2003), Y-R (2003), and Khalid (2002)*

Variable	Kemal (2003)		Y-R (2003)		Khalid (2002)	
	Coefficient	<i>t</i> -values	Coefficient	<i>t</i> -values	Coefficient	<i>t</i> -values
Constant	0.114	1.87***	0.151	2.78*	0.1604	
Tax to GDP Ratio	1.067	2.22**			0.667	
One-period Lag of Tax to GDP Ratio			0.848	3.04*		
Banking Services	-1.34E-05	-2.08**	-2.166	-3.32*	2.37E-05	
Growth Rate of GDP	-0.506	-1.58	-0.094	-1.01		
Growth Rate of Per Capita GDP					-0.2061	
Real Rate of Interest					-0.0084	
One-period Lag of Interest Rate			-0.006	-1.47		
DUM 91	0.060	2.92*			0.0164	
Lag Dependent Variable	0.327	1.92***	0.401	2.44**	0.3537	
	R ² = 0.75, F = 14.67, h = -1.36		R ² = 0.82, F = 21.9, h = 0.34		R ² = 0.95, DW = 2.23	

4. DATA AND METHODOLOGY

Annual data on currency in circulation, M1, M2, total number of bank deposits, total number of bank accounts, interest rate, and resident foreign currency accounts are taken from various issues of the Annual Report of The State Bank of Pakistan and Hand Book of Statistics on Pakistan Economy 2005 by the State Bank of Pakistan. Data on GDP, GNP, inflation, and real per capita income are taken from various issues of the Economic Survey, and the data on, sales tax on imports, custom duties, and total tax revenues are taken from various issues of the CBR Annual Report. Data are collected from 1973 to 2005 because disaggregated data of money supply, GDP, and GNP are not available for Pakistan for the pre 1973 period.

4.1. Construction of Variables

Real interest rate is computed by subtracting inflation rate from nominal interest rate. Variable of banking services (BS) is obtained by dividing total number of bank deposits by total number of bank accounts. Growth rate of GDP is calculated by the following formula applied on GDP at constant factor cost.

$$\text{Growth rate of GDP} = \frac{GDP_t - GDP_{t-1}}{GDP_{t-1}}$$

4.2. Model

The size of the underground economy can be estimated by direct as well as indirect methods. Direct methods are micro approaches that rely upon either survey and samples based on voluntary replies, or tax auditing [for details see Kemal (2003); Schneider and Enste (2000) and Pyle (1989)]. Indirect methods rely on discovering the traces which the black economy leaves in its wake. There are different types of indirect approaches such as monetary approach, income and expenditure approach, labour market approach and physical input method (electricity consumption approach). The details of these approaches described in Kemal (2003), Schneider and Enste (2000) and Pyle (1989) show that every approach has its shortcomings but monetary approach is the best and most commonly and easily applied approach among these to estimate the size of the underground economy and tax evasion.

Kemal (2003) concluded from replicating different studies using Tanzi's monetary approach that choosing a functional form is a major concern because using equation in double log form, semi log form or simple linear form fundamentally changes the results; choosing a meaningful benchmark is also a major obstacle, which should be resolved at the outset; changing the time period changes the results drastically, also evident from Tanzi (1983); inclusion and exclusion of variables from the model results in significant difference in the

estimates, therefore, inclusion of relevant variables is very important. Definition of dependent variable is also vital and should be defined with great care.

According to Tanzi (1980), the estimates of the underground economy computed from indirect approach (monetary approach) should not be taken as precise measures, it could be taken as broad indications of trends and of orders of magnitude because they are sensitive to the assumptions. Therefore, whatever results are obtained from the estimation should not be taken as the exact size of the underground economy and tax evasion. Similar to Kemal (2003) in this paper we have formulated the Tanzi specification according to the macro economic situation in Pakistan and to check the robustness of the estimates we estimated three models, described below.

$$\left(\frac{CC+FCA}{M2}\right)_t = \alpha + \beta\left(\frac{T}{Y}\right)_t + \gamma BS_t + \phi G_t + \lambda D + \delta\left(\frac{CC+FCA}{M2}\right)_{t-1} + \varepsilon_t \quad \dots \quad \dots \quad \dots \quad (1)$$

$$\left(\frac{CC+FCA}{M2}\right)_t = \alpha + \beta\left(\frac{T}{Y}\right)_t + \gamma BS_t + \phi G_t + \lambda D + \phi inf_t + \varepsilon_t \quad \dots \quad (2)$$

$$\left(\frac{CC+FCA}{M2}\right)_t = \alpha + \beta\left(\frac{T}{Y}\right)_t + \phi inf_t + \lambda D + \delta\left(\frac{CC+FCA}{M2}\right)_{t-1} + \varepsilon_t \quad (3)$$

CC = Currency in Circulation

DD = Demand Deposits

FCA = Foreign Currency Accounts

M2 = Money Supply

T = Total Tax Revenues

Y = GDP at current market prices

BS = Banking Services

G = Growth Rate of Real GDP

Inf = Rate of Inflation

D = Dummy variable defines 1 for 1990 to 2005 and zero otherwise

ε = Error Term

Subscript *t* shows time period.

Year 1973 has been chosen a benchmark because reliable statistics for Pakistan in the pre-1973 period are not available and the severity of the problem of the underground economy also started after nationalisation. Significance of using foreign currency accounts in conjunction with the currency in circulation as the dependent variable arises from the fact that foreign currency accounts served as a powerful source of financing the transactions in the underground

economy because the accounts are completely confidential, easily transferable and can be used as liquid money. Significance of using demand deposits in conjunction with currency in circulation and foreign currency accounts as dependent variable is that demand deposits can be treated as liquid money because we can draw as much money as we want from these accounts.¹⁰ Dummy variable is used to capture the impact of foreign currency accounts after 1990.

4.3. Methodology

For each year predicted values of currency ratio including tax variables $\left(\frac{CC + FCA}{M2}\right)_t$ and without tax variables $\left(\frac{CC + FCA}{M2}\right)_{wt}$ are calculated by estimated regression equation. The difference between the two terms gives us an indication that how much currency holding is tax induced. This difference is then multiplied with M2 to get illegal money. Subtracting illegal money from M1 gives legal money in the economy. Velocity of money in the underground economy is calculated by dividing national income with legal money. Assuming velocity of the money is the same for both legal and illegal money, multiplying velocity of money with illegal money gives the underground economy. Tax evasion is calculated by multiplying underground economy with total tax to GDP ratio. Mathematically we can write it as,

$$Illegal\ Money\ (IM) = \left(\left(\frac{CC + FCA}{M2} \right)_t - \left(\frac{CC + FCA}{M2} \right)_{wt} \right) * M2 \quad \dots \quad (4)$$

$$Legal\ Money\ (LM) = M1 - IM \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

$$Velocity\ (V) = \frac{GNP}{LM} \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (6)$$

$$Underground\ Economy\ (UE) = IM * V \quad \dots \quad \dots \quad \dots \quad (7)$$

$$Tax\ Evasion\ (TE) = UE * \left(\frac{Total\ Taxes}{GNP} \right) \quad \dots \quad \dots \quad \dots \quad (8)$$

5. EMPIRICAL FINDINGS AND RESULTS

Dependent variable is the same in all the three models as was in Kemal (2003) and the results are reported in Table 2. The results turned out to be different from my previous estimated equation in (Ibid). The significance level of the lagged dependent variable increases from 7 percent to 25 percent level of significance.

¹⁰If the amount is too big, one can draw from his/her account on only one-day notice.

Table 2

Results of Estimates of Regression Equation

Variables	Equation 1		Equation 2		Equation 3	
	Coefficient	<i>t</i> -values	Coefficient	<i>t</i> -values	Coefficient	<i>t</i> -values
Constant	0.116	1.92***	0.118	1.81***	0.015	0.21
Tax to GDP ratio	0.889	1.90***	1.745	3.53*	1.159	2.42**
Banking Services	-1.14E-06	-3.12*	-1.43E-06	-4.33*		
Growth Rate of GDP	-0.348	-1.25	-0.597	-2.20**		
DUM 91	0.061	3.05*	0.091	6.10*	4.12E-02	-2.77*
Lag Dependent Variable	0.358	2.19**			0.42	2.64**
Inflation Rate			0.152	1.75***	0.194	2.38**
	R ² = 0.75		R ² = 0.73		R ² = 0.75	
	F = 15.84		F = 14.66		F = 19.22	
	h-test = -0.10		DW = 1.77		h-test = -0.93	

Note: *, **, ***Indicate significant at 1, 5 and 10 percent level of significance respectively.

Equation 1

It can be seen from Table 2 that the coefficient of the tax to GDP ratio is positive and significant at 6 percent level. This implies that higher the tax rate, higher will be the currency holdings. Negative and significant association between the banking services and currency ratio implies that the improvement in banking services significantly lowers the demand for currency holding. Coefficient of growth shows that higher level of economic growth is expected to decrease the demand for currency holdings but its impact is insignificant. Since its t -value is greater than one and the signs of the coefficient is also correct, therefore, we can use it for predicting (estimating) the size of the underground economy. Dummy variable, which shows that impact of *hundi* and other transactions through foreign currency accounts, turns out to be a highly significant variable. Coefficient of the lagged dependent variable is positive and significant. R^2 is 0.75 and the F -statistic is also significant which implies that the explanatory variables are significantly explaining the dependent variable. h -test shows that there is no serious problem of autocorrelation in the regression estimates.

Equation 2

In Equation 2 the insignificant lagged dependant variable is replaced with the inflation rate. It is expected to have positive association between inflation and currency holdings because due to rise in inflation people tend to hold more money to maintain the same living standards they were living before. Coefficient of the tax to GDP ratio is positive and significant at 1 percent level, which implies that higher the tax rate, higher will be the currency holdings. Value of coefficient exceeds unity, i.e., 1.745,¹¹ which shows that one percent change in the tax to GDP ratio leads to change in currency ratio by 1.745. Similar to Equation 1, negative and significant association between the banking services and currency ratio implies that the improvement in banking services lower the demand for currency holding. Coefficient of growth shows that higher level of economic growth is expected to decrease the demand for currency holdings significantly.¹² Similar to Equation 1, dummy variable is highly significant, which supports the impact of *hundi* and other illegal transactions through foreign currency accounts. Coefficient of the inflation shows significant positive association between the currency holdings and the inflation rate. R^2 is 0.73 and the F -statistic is also significant which implies that the explanatory variables are significantly explaining the dependent variable. DW shows no serious problem of autocorrelation.

¹¹The coefficient of tax to GDP ratio is different from Kemal (2003) and Equation 1.

¹²Coefficient of growth was insignificant in Kemal (2003) but it is significant in the present study in both Equation 1 and Equation 2. However, the value of the coefficient is higher in Equation 2 than in Equation 1 and in Kemal (2003).

Equation 3

In Equation 3 the coefficient of the tax to GDP ratio is positive and significant at 5 percent level, which implies that increase in taxes forces the consumers to hold more currency to maintain the same level of living standards as he/she was enjoying before the change in tax rates. Similar to Equation 2, value of the coefficient exceeds unity, i.e., 1.159, which shows that one percent change in the tax to GDP ratio leads to change in currency ratio by 1.159. Similar to Equation 1 and 2, dummy variable is significantly affecting the currency ratio. Coefficients of the lagged dependent variable and inflation are positive and highly significant, which implies that both variables have significant impact on the behaviour of people to hold more currency. R^2 is 0.75 and the F -statistic is also significant which implies that the explanatory variables are significantly explaining the dependent variable. Value of h-test shows no serious problem of autocorrelation.

5.1. Estimates of the Underground Economy

The estimates of the underground economy and tax evasion are reported in Table 3. The size of the underground economy and tax evasion differs for each estimated equation because these values are very sensitive to the values of estimated coefficient. These estimates should not be taken as exact measures but it can be used as overall trend.

Equation 1

The estimates of the underground economy from Equation 1 show that the underground economy was 16.3 percent of the GDP in the base year (1974). It increased to 24.8 percent in 1984 but in 1991 it declined to 19.7 percent. However, between 1991 and 1998 the underground economy increased rapidly; it was 38.7 percent in 1998 but declined to 28.5 percent of GDP in 1999. In the next four years it increased to 35.7 percent and again declined to 31.4 percent in 2005.

Equation 2

The estimates of the underground economy from Equation 2 show that the underground economy was 38.02 percent of the GDP in the base year (1974). It increased to 49.29 percent in 1984 but in 1991 it declined to 36.09 percent. However, between 1991 and 1997 the underground economy increased rapidly; it was 74.92 percent in 1997 but declined to 46.1 percent of GDP by 1999. In 2003 it again increased to 68.2 percent and again declined to 64.8 percent in 2005.

Equation 3

The estimates of the underground economy from Equation 3 show that the underground economy was 22.4 percent of the GDP in the base year (1974).

Table 3

Trend Estimates of Underground Economy and Tax Evasion

Years	Equation 1				Equation 2				Equation 3			
	UGE	TE	(As % of GDP)		UGE	TE	(As % of GDP)		UGE	TE	(As % of GDP)	
			UGE	TE			UGE	TE			UGE	TE
1974	14530	1543	16.34	1.74	33806	3591	38.02	4.04	19914	2115	22.40	2.38
1975	17569	1792	15.68	1.60	37139	3788	33.14	3.38	24024	2450	21.44	2.19
1976	22381	2371	17.04	1.81	41449	4392	31.56	3.34	30716	3255	23.39	2.48
1977	25331	2702	16.77	1.79	46692	4981	30.91	3.30	34712	3703	22.98	2.45
1978	33642	3735	18.91	2.10	62080	6892	34.90	3.87	46295	5140	26.02	2.89
1979	41452	4953	21.10	2.52	77086	9210	39.24	4.69	57437	6863	29.23	3.49
1980	53033	6923	22.55	2.94	107247	14000	45.60	5.95	73787	9632	31.38	4.10
1981	59845	7854	21.51	2.82	119484	15680	42.95	5.64	82987	10891	29.83	3.91
1982	78334	11205	24.17	3.46	155035	22176	47.83	6.84	109518	15666	33.79	4.83
1983	83686	10674	22.97	2.93	153022	19517	41.99	5.36	116362	14841	31.93	4.07
1984	104065	13697	24.79	3.26	206933	27236	49.29	6.49	145606	19165	34.68	4.57
1985	103502	12696	21.92	2.69	185689	22777	39.33	4.82	143706	17627	30.44	3.73
1986	123954	16235	24.09	3.16	230102	30138	44.72	5.86	173234	22690	33.67	4.41
1987	146222	21181	25.54	3.70	289190	41891	50.52	7.32	205503	29768	35.90	5.20
1988	153631	21259	22.75	3.15	307593	42563	45.54	6.30	214368	29663	31.74	4.39
1989	168020	24114	21.85	3.14	328327	47121	42.71	6.13	233897	33568	30.42	4.37
1990	181658	24359	20.40	2.73	348745	46765	39.16	5.25	252318	33835	28.33	3.80
1991	201370	24227	19.73	2.37	368362	44318	36.09	4.34	278692	33530	27.31	3.29

Continued—

Table 3—(Continued)

1992	286244	36714	23.75	3.05	535393	68669	44.42	5.70	401622	51512	33.32	4.27
1993	336609	41778	25.25	3.13	606545	75281	45.50	5.65	474701	58917	35.61	4.42
1994	447323	57043	28.65	3.65	882804	112576	56.55	7.21	638199	81384	40.88	5.21
1995	560450	74276	30.04	3.98	1129781	149728	60.55	8.02	802876	106404	43.03	5.70
1996	732255	101166	34.54	4.77	1457027	201298	68.72	9.49	1066202	147303	50.29	6.95
1997	886426	112944	36.50	4.65	1819343	231812	74.92	9.55	1300117	165655	53.54	6.82
1998	1035081	130094	38.66	4.86	1847640	232221	69.00	8.67	1529705	192261	57.13	7.18
1999	836950	105513	28.48	3.59	1355833	170927	46.14	5.82	1194686	150612	40.66	5.13
2000	975737	119679	31.00	3.80	1776518	217899	56.45	6.92	1380499	169325	43.86	5.38
2001	1158142	142938	33.83	4.18	2249573	277643	65.72	8.11	1650193	203667	48.21	5.95
2002	1291169	163294	35.58	4.50	2331414	294853	64.25	8.13	1845766	233433	50.87	6.43
2003	1421173	189027	35.74	4.75	2712954	360843	68.23	9.08	2027512	269674	50.99	6.78
2004	1483904	191320	32.82	4.23	3009671	388037	66.57	8.58	2100710	270845	46.46	5.99
2005	1675617	207165	31.42	3.88	3453420	426963	64.75	8.01	2363399	292199	44.32	5.48

It increased to 34.7 percent in 1984 but in 1991 it declined to 27.3 percent. However, between 1991 and 1998 the underground economy increased rapidly; it was 57.1 percent in 1998 but declined to 40.7 percent of GDP in 1999. In 2003 it again increased to 51 percent and then declined to 44.3 percent in 2005.

5.2. Estimates of the Tax Evasion

Estimates of tax evasion¹³ follow the trends similar to the estimates of the underground economy. Similar to the estimates of the underground economy, these estimates should not be taken as exact measures of tax evasion rather these estimates can be used as over all trend.

Equation 1

The estimates of tax evasion from Equation 1 show that tax evasion was 1.74 percent of the GDP in the base year (1974). It increased to 3.46 percent in 1982 and 3.7 percent in 1987 but declined to 2.4 percent in 1991. However, between 1991 and 1998 tax evasion increased rapidly; it was 4.86 percent in 1998 but declined to 3.59 percent in 1999. In 2003 it increased to 4.75 percent and then declined to 3.88 percent in 2005.

Equation 2

The estimates of tax evasion from Equation 2 show that tax evasion was 4.04 percent of GDP in the base year (1974). It increased to 6.84 percent in 1982 and 7.32 percent in 1987 but declined to 4.34 percent in 1991. However, between 1991 and 1997 tax evasion increased rapidly; it was 9.6 percent in 1997 but declined to 5.82 percent in 1999. In 2003 it again increased to 9.1 percent and then declined to 8 percent in 2005.

Equation 3

The estimates of tax evasion from Equation 2 show that tax evasion was 2.38 percent of the GDP in the base year (1974). It increased to 4.83 percent in 1982 and 5.2 percent in 1987 but decline to 3.29 percent in 1991. However, between 1991 and 1998 tax evasion increased rapidly; it was 7.2 percent in 1998 but declined to 5.13 percent in 1999. In 2003 it again increased to 6.78 percent and then declined to 5.48 percent in 2005.

These trends show that estimates of the underground economy and tax evasion change with the change in specification of the model. The main significant variable in all the three equations is tax to GDP ratio; the entire estimates of the underground economy and the tax evasion are based on this

¹³The estimates of tax evasion are derived as based on a strong assumption that incomes in the underground economy would have been taxed at the same rate as incomes in the formal economy.

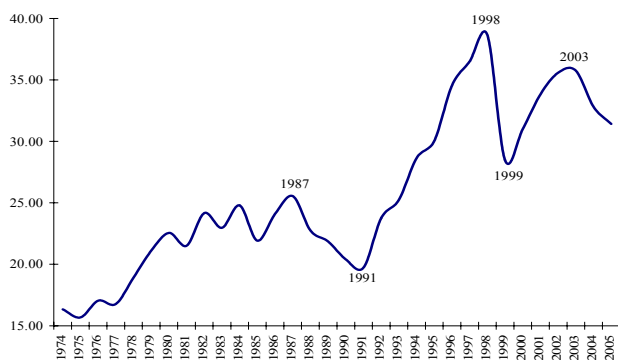
single variable. Now we will check that whether trend of the underground economy and tax evasion is the same using the three equations. For this purpose we plot graphs of underground economy and tax evasion. All the three graphs (Graph 2, Graph 3, and Graph 4) show similar trend that the underground economy increased rapidly from 1991 to 1998 and then declined in 1999. It increased again between 1999 and 2003 and declined in 2005. Similarly, the graphs of tax evasion (Graph 5, Graph 6, and Graph 7) show that tax evasion increased rapidly from 1991 to 1998 and then declined in 1999. It increased again between 1999 and 2003 and declined in 2005.

Kemal (2003) attributed the rapid increases in the underground economy and tax evasion during 1991 and 1998 to rise in private investment level which increases the overall economic activity (formal and informal) and increase in smuggling. On the other hand increase in private sector credit and increase in the growth rate of formal GDP in the last three years did not increase in the underground economy, which may imply the better governance policies of the Government.

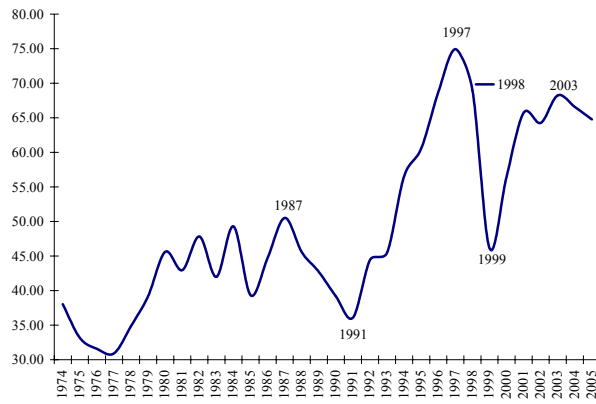
5.3. Measuring the Size of the Underground Economy and Tax Evasion

The National Tax Reform Commission, NTRC, (1986, p103 – p104) estimated the underground economy and tax evasion for the year 1984 – 85, based on a rigorous methodology, which are the best estimates available till now. To estimate the exact amount of the underground economy and tax evasion in Pakistan we used the ratio of these estimates to the estimated values we have obtained for the same year (i.e., 1984 – 85) to project the estimates of the underground economy and tax evasion. The results are reported in Table 4, which show that the size of the underground economy ranges between Rs. 2.91 trillion – Rs. 3.34 trillion (54.6 percent of GDP to 62.8 percent of GDP respectively) in 2005 and tax evasion ranges between Rs. 302 billion – Rs. 347 billion (5.7 percent of GDP to 6.5 percent of GDP respectively) in 2005.

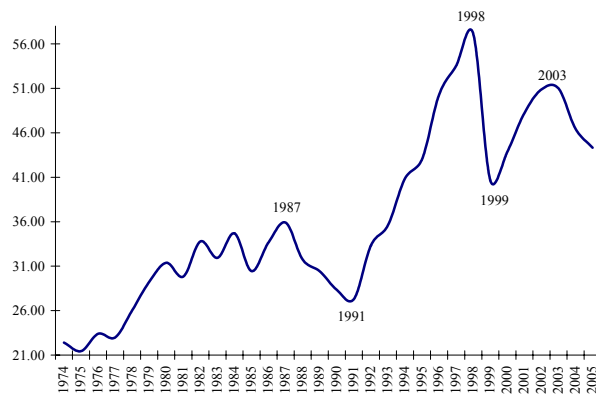
Graph 2 (Equation 1). Underground Economy as Percentage of GDP



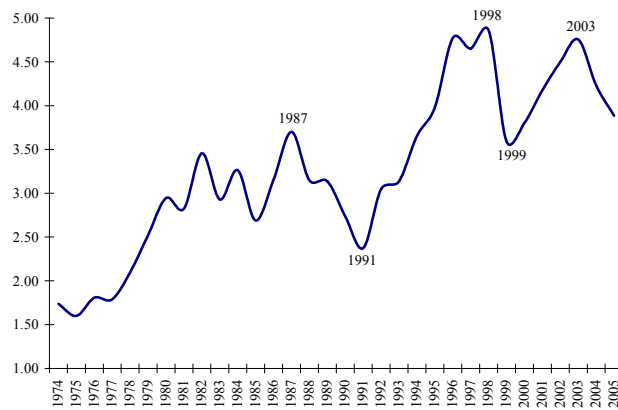
Graph 3 (Equation 2). Underground Economy as Percentage of GDP



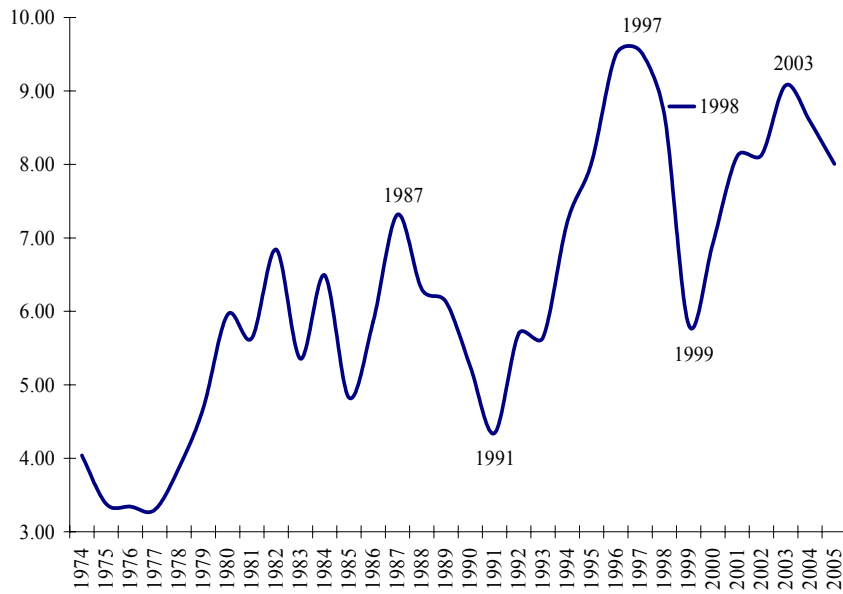
Graph 4 (Equation 3). Underground Economy as Percentage of GDP



Graph 5 (Equation 1). Tax Evasion as Percentage of GDP



Graph 6 (Equation 2). Tax Evasion as Percentage of GDP



Graph 7 (Equation 3). Tax Evasion as Percentage of GDP

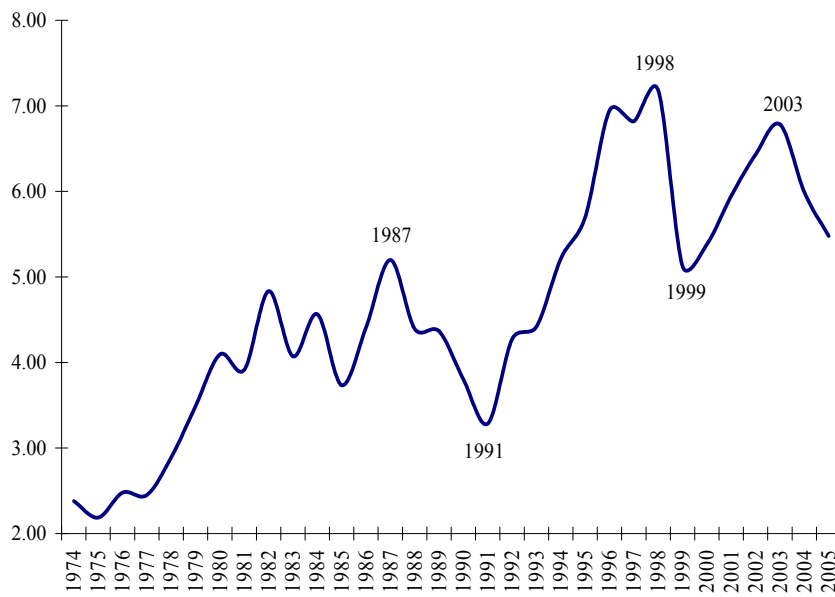


Table 4

Projected Estimates of Underground Economy and Tax Evasion

Years	Equation 1				Equation 2				Equation 3			
	UGE	TE	(As % of GDP)		UGE	TE	(As % of GDP)		UGE	TE	(As % of GDP)	
			UGE	TE			UGE	TE			UGE	TE
1974	25269	2252	28.42	2.53	32770	2921	36.86	3.29	24943	2223	28.05	2.50
1975	30554	2615	27.27	2.33	36001	3081	32.13	2.75	30091	2575	26.85	2.30
1976	38923	3460	29.64	2.63	40179	3573	30.59	2.72	38474	3421	29.30	2.61
1977	44053	3943	29.17	2.61	45261	4052	29.97	2.68	43479	3892	28.79	2.58
1978	58507	5451	32.89	3.06	60178	5606	33.83	3.15	57987	5403	32.59	3.04
1979	72089	7228	36.69	3.68	74724	7492	38.03	3.81	71943	7214	36.62	3.67
1980	92230	10103	39.22	4.30	103961	11388	44.21	4.84	92422	10124	39.30	4.31
1981	104076	11462	37.41	4.12	115823	12755	41.63	4.58	103946	11448	37.36	4.11
1982	136230	16352	42.03	5.04	150285	18039	46.36	5.56	137178	16467	42.32	5.08
1983	145538	15577	39.94	4.27	148334	15876	40.71	4.36	145750	15600	40.00	4.28
1984	180979	19989	43.11	4.76	200593	22155	47.78	5.28	182380	20145	43.44	4.80
1985	180000	18528	38.12	3.92	180000	18528	38.12	3.92	180000	18528	38.12	3.92
1986	215568	23693	41.90	4.60	223052	24516	43.35	4.76	216986	23850	42.17	4.64
1987	254294	30911	44.42	5.40	280330	34076	48.97	5.95	257404	31290	44.96	5.47
1988	267179	31024	39.56	4.59	298169	34623	44.15	5.13	268508	31179	39.76	4.62
1989	292203	35191	38.01	4.58	318268	38331	41.40	4.99	292969	35284	38.11	4.59
1990	315921	35548	35.47	3.99	338060	38041	37.96	4.27	316043	35564	35.48	3.99
1991	350202	35356	34.31	3.46	357076	36051	34.99	3.53	349078	35244	34.20	3.45

Continued—

Table 4—(Continued)

1992	497806	53579	41.30	4.45	518990	55859	43.06	4.63	503055	54145	41.74	4.49
1993	585396	60969	43.91	4.57	587962	61237	44.11	4.59	594590	61929	44.60	4.65
1994	777938	83246	49.83	5.33	855757	91575	54.82	5.87	799381	85544	51.21	5.48
1995	974677	108395	52.24	5.81	1095168	121797	58.69	6.53	1005648	111843	53.90	5.99
1996	1273462	147637	60.06	6.96	1412388	163746	66.62	7.72	1335479	154832	62.99	7.30
1997	1541581	164826	63.48	6.79	1763603	188568	72.63	7.77	1628471	174122	67.06	7.17
1998	1800106	189854	67.23	7.09	1791033	188901	66.89	7.05	1916043	202088	71.56	7.55
1999	1455537	153981	49.54	5.24	1314294	139041	44.73	4.73	1496413	158310	50.93	5.39
2000	1696901	174654	53.92	5.55	1722090	177250	54.72	5.63	1729154	177980	54.94	5.66
2001	2014121	208598	58.84	6.09	2180652	225849	63.70	6.60	2066961	214077	60.38	6.25
2002	2245468	238304	61.88	6.57	2259986	239849	62.28	6.61	2311928	245365	63.71	6.76
2003	2471557	275858	62.16	6.94	2629837	293529	66.14	7.38	2539575	283458	63.87	7.13
2004	2580653	279204	57.08	6.18	2917463	315650	64.53	6.98	2631260	284689	58.20	6.30
2005	2914060	302328	54.64	5.67	3347617	347314	62.77	6.51	2960293	307135	55.51	5.76

6. CONSEQUENCES OF THE UNDERGROUND ECONOMY AND TAX EVASION

Rise in the underground economy decreases the state revenues, which in turn reduces the quality and quantity of publicly provided goods and services [Schneider and Enste (2000)]. The loss of revenues is then either filled through increase in tax rates or by increase in price of inelastic goods, i.e., inflation tax. To reduce the prices in the country Government then reduces the money supply and increases the interest rate, which reduces the credit creation and the level of investment. Consequently, the overall economic activity declines.

As discussed earlier that increase in the underground economy creates problems for the policymakers especially to formulate monetary and fiscal policies. The public sector faces the challenge of substantially reforming the social security and tax systems to reduce the budget deficit at the minimum possible level without compromising at the welfare of the people of the country. High tax rates and regulatory burdens cause an increase in the underground economy, which puts additional pressure on public finance, resulting in even higher tax rates and people start evading taxes more than they were evading before. Moreover, even if government reduces the tax rates, people will be reluctant to report their income earned from informal activities. This could be due to two factors (i) unwillingness to pay,¹⁴ and (ii) fear or lack of trust.¹⁵

In the absence of tax evasion our budget balance could have been surplus for many years. Table 5 shows budget deficit and tax evasion (computed using Equation 1) since 1976. It shows that in certain years, i.e., 1995–97 and 2000–2005, if tax evasion was zero the budget balance could have been surplus. However, it is straight forward that even if the budget balance could not be surplus, the burden of the budget deficit would be lessened and we would need to borrow less.

The role of monetary policy is to enhance growth through increase in investment. In the presence of high and increasing underground economy it is a big question mark that how much money supply is needed to get better GDP growth. For instance, if 30 percent of the money supply goes to the activities in the underground economy, and the government increases money supply by 5 percent then 1.5 percent goes into the underground economic activities. However, there might not be any difficulty in monetary policy formulation if the underground economy is growing at a constant rate, i.e., ratio of underground economy to formal GDP is constant. But at the increasing rate of the expansion of the underground economy it is difficult, which thus creates problems for the authorities to achieve their desired objectives, i.e., to increase GDP growth at a certain level though increase in money supply.

¹⁴They can save the amount of money that they are supposed to pay in the forms of taxes.

¹⁵They do not trust the government and think that they might increase the tax rates again in the following years, and by paying taxes they will be registered in the tax net and can be penalised afterwards if they evade taxes.

Table 5

Budget Deficit and Tax Evasion as Percentage of GDP

Years	Budget Deficit	Tax Evasion	Years	Budget Deficit	Tax Evasion
1976	9.6	2.6	1991	8.8	3.5
1977	8.6	2.6	1992	7.5	4.5
1978	7.9	3.0	1993	8.1	4.6
1979	8.9	3.7	1994	5.9	5.5
1980	6.3	4.3	1995	5.6	6.0
1981	5.3	4.1	1996	6.5	7.3
1982	5.3	5.1	1997	6.4	7.2
1983	7.1	4.3	1998	7.7	7.5
1984	6.0	4.8	1999	6.1	5.4
1985	7.8	3.9	2000	5.4	5.7
1986	8.1	4.6	2001	4.3	6.3
1987	8.2	5.5	2002	4.3	6.8
1988	8.5	4.6	2003	3.7	7.1
1989	7.4	4.6	2004	2.4	6.3
1990	6.5	4.0	2005	3.3	5.8

It is straight forward that these activities should be cut down because they weaken the system. There could be various possibilities such as increase the number of legal documentation, strengthening the institutions, better governance, improvement in tax payer records, prohibit smuggling through tariff rationalisation or free trade is even better, and efficiency wages could be good to prohibit people both from shirking on the jobs and taking bribe.

7. FORMAL ECONOMY AND THE UNDERGROUND ECONOMY

Kemal (2003) stated that when formal activities are increasing underground economic activities are also increasing, which implies that these two move parallel. It associates increase in the underground economy and tax evasion during 1991 and 1998 with increase in the formal economy and decline in the underground economy after 1998 to decline in smuggling and more importantly low level of economic activity, i.e., decline in the formal economy. This argument was strongly supported by the 97.35 percent correlation found between the underground economy and the formal economy. In the present study the correlation between the formal and the underground economy is also significantly high; more than 94 percent.

Theoretically we can say that when formal economy increases the underground economy also increases, therefore, there is a positive relationship between these two. For example, when an industrialist hires some permanent and contractual labour he is liable to pay taxes on the number of permanent employees only. So he can evade/avoid taxes on contractual or piece rate workers.¹⁶ Therefore, when there is low level of economic activity he/she hires

¹⁶This is one of the reasons that employers avoid giving exact figures of their employees as observed during various field works for different surveys/projects.

less contractual or piece rate workers and hence there will be less evasion of taxes and lesser underground economy. But when there is an increase in the economic activity he/she hires more contractual or piece rate workers. He has the opportunity then to show even his permanent employees as contractual labour and evade taxes easily which contributes to the growth of the underground economy.

Substantial reduction of the underground economy leads to a significant increase in tax revenues and therefore to greater quantity and quality of public goods and services, which ultimately can stimulate economic growth [Schneider and Enste (2000)]. However, it is not true that sometimes when decrease in the underground economy is accompanied by decline in overall economic activity then both tax evasion and tax collected from legal activities will go down and total tax revenues will go down as well. In this case, to increase tax revenues Governments take measures to increase the tax base by including more people in the tax net. Proper auditing of the taxpayers is also an important part of it.

Loayza (1996) concludes that in economies where (i) the statutory tax burden is larger than optimal, and (ii) enforcement of compliance is too weak, the increase in the relative size of the underground economy generates a reduction in economic growth. On the other hand, Schneider (1998) shows that over 66 percent of earnings in the underground economy are immediately spent in the official sector, with positive effects on economic growth and indirect tax revenues.

Corruption is one of its own kind of the underground economic activity. Is it good or bad for the GDP growth is certainly a question of concern. There are certain economies/people/researchers who want corruption free society. However, researchers also argue that it smoothens the process of growth and development. Romer (1994) suggested that corruption, as a tax on ex post profits, may in general stimulate the entry of new goods or technology which requires an initial fixed cost investment.

Mauro (1995) finds a significant negative correlation between a corruption index and the investment rate or rate of GDP growth.¹⁷ Johnson, Kaufmann, and Lobatón (1998) find a significant negative relationship between corruption and GDP growth but the relationship becomes insignificant if the underground economy is used as an independent variable. Adam and Ginsburgh (1985) find positive relationship between the growth of the underground economy and the official economy.

Aman (2006) concluded that the growth maximising level of corruption is not necessarily equal to zero and that corruption leads to better income distribution.¹⁸ He calculated the threshold level of corruption as 8.3 (index

¹⁷Negative correlation implies that increase in corruption leads to higher GDP growth.

¹⁸Though there are several other ways of improving income distribution and this could be a good finding but it cannot be adopted as a policy to improve income distribution.

ranges from 0 – 12; 0 means no corruption) and Pakistan’s corruption index was 3 in 2003 and it was maximum during 1997 and 1998 at 6. However, this does not imply that we still have space to increase our level of corruption.

Y-R (2003) using simple OLS regression concluded that both tax evasion and the underground economy have significant negative impact on the formal economy. It may be noted that their results could be spurious and one really needs to take care of this problem.

The evidence shows that the relationship between the underground economy and the formal economy shows ambiguous results. In the short run the underground economy may have positive impact on formal economy but in the long run, because it weakens the system, it may affect the formal economy adversely. Long run relationship is checked using Johansen cointegration analysis.¹⁹

Table 6 shows the results of stationarity test (both the variables are taken in log form). Philip-Perron test is applied on log of the underground economy because of structural break in 1998 when underground economy declined to very low level. KPSS²⁰ test is also used for further confirmation of the unit root process in the variables. ADF and KPSS tests are applied on log of the nominal GDP. The results show that both the variables are non-stationary but integrated of orders one, which implies that there may exist long run relationship between the two variables.

Table 6

<i>Results of Stationarity</i>			
	ADF	PP	KPSS
<i>ue</i>		-1.79	0.75*
Δue		-5.10*	0.27
<i>Y</i>	-1.24		0.70**
Δy	-3.35*** (-3.31**)		0.44

Note: *, **, *** Represent 1, 5, and 10 percent level of significance respectively.

Value in parenthesis show ADF value with constant but no trend.

Johansen test is applied at different lags and lags selection is based on minimum value of AIC.²¹ It is found that AIC is minimum at 5 lags when we use both constant and trend in cointegrating and VEC equation. The trace and maximum eigenvalues test show that rank is equal to one (Table 7), which implies that both variables are linearly dependant on each other.

¹⁹See Enders (2004) for the detailed methodology.

²⁰Significant KPSS value shows unit root (non-stationary) and insignificant shows stationary variables.

²¹For more details on AIC and lags selection criteria, see Enders (2004).

Table 7

Trace and Eigenvalues Test

No. of Cointegrating Vectors	Unrestricted Cointegration Rank Test (Trace)			
	Eigenvalues	Trace Statistic	Critical Value (5%)	Probability**
None *	0.78	40.37	18.40	0.00
At most 1	0.06	1.58	3.84	0.21

No. of Cointegrating Vectors	Maximum Eigenvalues			
	Eigenvalues	Trace Statistic	Critical Value (5%)	Probability**
None *	0.78	38.79	17.15	0.00
At most 1	0.06	1.58	3.84	0.21

* Denotes rejection of the hypothesis at the 5 percent level of significance.

**MacKinnon-Haug-Michelis (1999) *p*-values.

Table 8 shows significant positive long run association between the underground economy and the nominal formal GDP, which rejects our null hypothesis. This implies that even in the long run the formal economy and the underground economy moves together and have positive association.

Table 8

Results of Cointegration and Error Correction

Variables	Coefficients
y_{t-1}	1.00
ue_{t-1}	-1.22
	[-9.33]*
Trend	0.05
Constant	0.90

Coefficient	Error Correction Mechanism	
	Δy	Δue
	0.34	1.02
<i>t</i> -values	[4.82] *	[2.80] *

Note: *, **, *** indicate level of significance at 1, 5, and 10 percent level respectively.

Values in parenthesis are *t*-values.

VAR results (Table 9) show that in the short run, nominal formal GDP is significantly affected by the movements in the underground economy but the underground economy is not significantly affected by the movements in the nominal formal GDP. Positive coefficients of the underground economy in the nominal GDP imply positive significant impact of the underground economy on

Table 9

VAR Results for GDP and Underground Economy

Variables	Δy	Δue
Δy_{t-1}	-0.70 [-3.10]*	-1.69 [-1.47]
Δy_{t-2}	-0.62 [-2.94] *	-0.56 [-0.52]
Δy_{t-3}	-0.50 [-2.80] *	-0.72 [-0.79]
Δy_{t-4}	-0.21 [-1.23]	0.17 [0.20]
Δy_{t-5}	-0.53 [-3.41] *	-0.49 [-0.62]
Δue_{t-1}	0.36 [4.72] *	0.77 [1.97] **
Δue_{t-2}	0.33 [4.67] *	0.76 [2.11] **
Δue_{t-3}	0.35 [4.96] *	0.53 [1.47]
Δue_{t-4}	0.24 [3.50] *	0.54 [1.52]
Δue_{t-5}	0.13 [2.17] **	0.38 [1.25]
Constant	0.31 [5.56] *	0.12 [0.44]
Trend	-0.003 [-4.01] *	-0.001 [-0.24]
R^2	0.82	0.53
Adjusted R^2	0.64	0.10
F -statistic	4.78**	1.23

Note: *, **, *** Indicate level of significance at 1, 5, and 10 percent level respectively.

Values in parenthesis are t -values.

the formal economy in the short run. It is also shown that the underground economy is positive and significantly affected by its own lags (1 and 2), which implies that if the underground economy starts increasing, it continuously increases for at least 2 years and vice versa.

8. SUMMARY AND CONCLUSIONS

The main objective of the paper is to estimate the size of the underground economy and tax evasion using fresh data and explore the impact of the underground economy on formal GDP. The study also describes the consequences of the underground economy.

Using the NTRC (1986) estimates of the underground economy and tax evasion for the year 1984-85, estimates of the size of the underground economy and tax evasion have been computed. The underground economy ranges between Rs 2.91 trillion—Rs 3.34 trillion (54.6 percent of GDP to 62.8 percent of GDP respectively) in 2005 and tax evasion ranges between Rs 302 billion—Rs 347 billion (5.7 percent of GDP to 6.5 percent of GDP respectively) in 2005.

Underground economy and tax evasion was increasing very rapidly in the early eighties but the rate of increase was more in the nineties and was maximum in 1998. However, in 1999 it declined but then again started rising till 2003. However, it started decreasing after 2003.

Univariate causality has been found between the underground economy and the formal economy. It shows that the underground economy is causing the formal economy but formal economy is insignificant in explaining the movements in the underground economy. It is also concluded that in the long run underground economy and formal economy are positively associated.

Rise in the underground economy creates problems for the policymakers to formulate the policies especially the monetary and fiscal policies. It is concluded that if there was no tax evasion budget balance for certain years might be positive and we would not need to borrow as much as we had borrowed. There could be various possible ways to cut down these activities which must need strict measures such as: increase the number of legal documentation, strengthening the institutions, better governance, decrease the number of regulations which prohibit people to work in the formal economy, improvement in tax payer records, restrict smuggling through tariff rationalisation or free trade is even better, and efficiency wages could be good to prevent people both from shirking on the jobs and taking bribe. In the long run we can bring awareness to the people on the benefits of paying taxes which improves the tax morale of the people.

Increase in the underground economy is mostly associated with the tax burdens and intensity of regulations. It is difficult for the authorities to broaden the tax base in a very short period of time but it is the most necessary thing to do, which should have been done many years ago. It would be good to impose tax by analysing the tax Laffer curve, i.e., the optimal tax rate. Government should ensure that regulatory laws are implemented properly as they were made and reduce the number of regulations which prohibit people to work in the official economy.

Future research may include strength of institutions and other relevant variables in explaining that what mainly causes the underground economy. One can also check the association between the underground economy and different sectors of GDP.

REFERENCES

- Adam, M. C., and V. Ginsburgh (1985) The Effects of Irregular Markets on Macroeconomic Policy: Some Estimates for Belgium. *European Economic Review* 29: 1, 15–33.
- Ahmed, M., and Q. M. Ahmed (1995) Estimation of the Black Economy of Pakistan through the Monetary Approach. *The Pakistan Development Review* 34: 4, 791–807.
- Aman, M. (2006) Corruption, Income Inequality and Economic Growth. M. Phil Thesis, Department of Economics, Quaid-i-Azam University, Islamabad.
- Aslam, S. (1998) The Underground Economy and Tax Evasion in Pakistan: Annual Estimates (1960-1998) and the Impact of Dollarisation of the Economy. *The Pakistan Development Review* 37:4, 621–631.
- De Soto, H. (1989) *The Other Path. (El Otro Sendero)*. Translated by June Abbott, NY: Harper and Row.
- Enders, W. (2004) *Applied Econometric Time Series*. (2nd Edition.) John Wiley and Sons.
- Feige, E. L. (ed.) (1989) *The Underground Economies. Tax Evasion and Information Distortion*. Cambridge University Press.
- Frank, R. H. (1988) *Passion within Reason, The Strategic Role of the Emotions*. NY: Norton.
- Frey, B. S., and W. Pommerehne (1984) The Hidden Economy: State and Prospect for Measurement. *Review Income Wealth* 30: 1, 1–23.
- Friedman, E., S. Johnson, D. Kaufmann, and P. Zoido-Lobaton (1999) Dodging the Grabbing Hand: The Determinants of Unofficial Activity in 69 Countries. *World Bank Discussion Paper*.
- Iqbal, Z., S. K. Qureshi, and R. Mahmood (1998) The Underground Economy and tax Evasion in Pakistan. Pakistan Institute of Development Economics. (Research Report No. 158.)
- Johnson, S., D. Kaufmann, and P. Zoido-Lobaton (1998) Corruption, Public Finances and the Unofficial Economy. *World Bank Discussion Paper*.
- Johnson, S., D. Kaufmann, and A. Shleifer (1997) The Unofficial Economy in Transition. *Brookings Papers Economic Activity* 0:2, 159–221.
- Kemal, M. A. (2003) Underground Economy and Tax Evasion in Pakistan: A Critical Evaluation. Pakistan Institute of Development Economics. (Research Report No. 184.)
- Khalid, M. (2002) Estimation of Underground Economy, Causality and Business Cycle Analysis of Pakistan. M.Phil Thesis, Department of Economics, Quaid-i-Azam University, Islamabad.
- Loayza, N. V. (1996) The Economics of the Informal Sector: A Simple Model and Some Empirical Evidence from Latin America. *Carnegie-Rochester Conf. Series Public Policy* 45, 129–62.
- Mauro, Paolo (1995) Corruption and Growth. *Quarterly Journal of Economics* 110: 681–712.

- MacKinnon, J. G., A. A. Haug, and L. Michelis (1999) Numerical Distribution Functions of Likelihood Ratio Tests for Cointegration 14:5, 563–578.
- Neck, R., M. Hofreither, and F. Schneider (1989) The Consequences of Progressive Income Taxation for the Shadow Economy: Some Theoretical Considerations. In Dieter Boes and Bernhard Felderer (eds.) *The Political Economy of Progressive Taxation*. Berlin: Springer, pp. 149–76.
- Norris, E. D., and A. Feldstein (2003) An analysis of the Underground Economy and Its Macroeconomic Consequences. International Monetary Fund. (Working Paper 03/23).
- NTRC (1986) *Final Report of the National Taxation Reform Commission*. National Taxation Reform Commission.
- Pozo, Susan (ed.) (1996) *Exploring the Underground Economy: Studies of Illegal and Unreported Activity*. Michigan: W.E. Upjohn Institute for Employment Research.
- Pyle, D. J. (1989) *Tax Evasion and Black Economy*. Macmillan, London.
- Romer, Paul (1994) New Goods, Old Theory, and the Welfare Costs of Trade Restrictions. *Journal Development Economics* 43:1, 5–38.
- Schneider, F., and D. H. Enste (2000) Shadow Economies: Size, Causes and Consequences. *Journal of Economic Literature* 38, 77–114.
- Schneider, F., and R. Neck (1993) The Development of the Shadow Economy under Changing Tax Systems and Structures. *Finanzarchiv N.F.*, 50:3, 344–69.
- Schneider, F. (1998) Stellt das Anwachsen der Schwarzarbeit eine wirtschaftspolitische Herausforderung dar Einige Gedanken aus volkswirtschaftlicher Sicht. *itteilungen des Instituts für angewandte Wirtschaftsforschung* (IAW), Linz, 98:1, S. 4–13.
- Shabsigh, G. 1995) The Underground Economy: Estimation, and Economic and Policy Implications—the Case of Pakistan. (IMF Working Papers, WP/95/101.)
- Spiro, P. S. (1993) Evidence of a Post-GST Increase in the Underground Economy. *Canadian Tax J./Revue Fiscale Canadienne*, Vol. 41 (2): 247–58.
- Tanzi, V, (ed.) (1982) *The Underground Economy in the United States and Abroad*. Lexington: D.C. Heath.
- Tanzi, V. (1980) The Underground Economy in the United States: Estimates and Implications. *Banca Nazionale Del Lavoro – Rome*.
- Tanzi, V. (1983) The Underground Economy in United States: Annual Estimates, 1930-80. *IMF Staff Papers* 30:2., 283–305.
- Tanzi, V. (1999) Uses and Abuses of Estimates of the Underground Economy. *Economic Journal* 109, 338–40.
- Yasmin, B., and H. Rauf (2003) Measuring the underground Economy and its Impact on the Economy of Pakistan. *The Lahore Journal of Economics*. 9:2, 93–103.