Measuring the Underground Economy and its Impact on the Economy of Pakistan

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Abstract

This study focuses on the measurement of the underground economy (UGE) through tax evasion in Pakistan over the time period 1974-2002. The monetary approach is applied in order to estimate the underground economy. First, the currency demand equation is estimated and then an attempt is made to deduce the size of the underground economy and tax evasion. Finally, an Ordinary Least Square (OLS) Model is applied in order to estimate the impact of the underground economy on Gross Domestic Product of Pakistan for a selected time period. The results demonstrated that the underground economy has increased enormously from Rs. 12 billion in 1974 to Rs. 1085 billion in 2002. The findings suggest that the existence of such a large UGE can decrease tax revenues, depress GDP, and raise socio-economic problems. Frequent tax audits and heavier penalties for tax evasion may minimise the size of the underground economy with its ill effects.

Introduction

The Under Ground Economy (UGE) and tax evasion has remained a hotly debated issue in Pakistan. The underground economy has been variously defined as irregular, black, parallel, unofficial, hidden, secondary, subterranean, submerged, and shadow economy in the literature. In this study UGE is used to define only those economic activities that generate income, concealed from tax authorities in order to evade various taxes and remains unrecorded in official statistics. This excludes the illegal economy and the informal economy. The illegal economy consists of income produced by unlawful activities such as smuggling, gambling, prostitution, drug trafficking and so on whereas the informal economy includes those activities that entail a cost but which are excluded from the rights and benefits of the

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formal economy.[1] UGE has an extremely negative impact on economic, social and cultural development of any society. It hampers equitable and efficient resource allocation among different sectors of the economy that leads to increase in tax burden of the members of the formal economy.

The underground economy and tax evasion has been a focus of research in Pakistan for many years. The researchers have made a variety of efforts to quantify the underground economy through tax evasion. The growing interest in this area is due to the continuous suffering of the country from low tax revenue collection and increasing budget deficit. The major contribution at the national level is by Ahmed and Qazi (1995), Azar (1996), Iqbal and Qureshi (1998), and Aslam (1998). These studies demonstrate that the underground economy has been growing rapidly for a long time and has reached an alarming rate in Pakistan. A large underground economy reflects a direct loss in public tax revenues and depresses the growth of Gross Domestic Product. Moreover, a growing underground economy may provide strong incentives for domestic and foreign workers to move away from the official economy. It is also pointed out that, "the effect of UGE is much more destructive in a country such as Pakistan – whose subsistence and economic development are already precarious".

The income tax evaded during 1957-58 amounted to Rs. 147 million and increased enormously to Rs. 18.5 billion in 1984-85 and then to Rs. 152 billion in 1996. The underground economy grew about Rs15 billion in 1973 to Rs. 1,115 billion in 1996 and this depicts increasing trends both in the growth rate of UGE and tax evasion.[2] Reducing the underground economy can increase tax revenues, stimulate public spending and hence can enhance overall economic growth.

At the international level, in a study conducted by Johnson & Kaufmann (1998) it was found that the countries with relatively low tax rates, higher income level and a well established rule of law tend to have a smaller underground economy. Another study by Freidrich & Enste (2002) proved that the underground economy depresses the growth of Gross Domestic Product.

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[1] Here we are measuring the underground economy indirectly through tax evasion that cannot capture the illegal and informal economy. Lack of information available for these two lead to its exclusion from measurement of UGE.

[2] c.f. Iqbal, 1998

This paper is an attempt to estimate the size of the underground economy in Pakistan through income tax evasion capturing information for an extended time period of 1974-2002 along with its impact on the economy of Pakistan. So, it is expected to present a recent picture of the phenomena.

The rest of the paper is organised as follows. Section 2 provides data description and methodology. Section 3 discusses the empirical results. Section 4 concludes the paper.

Data and Methodology

The measurement of the underground economy has been the subject of intense debate in the literature. Some authors have used the direct method to assess the underground economy while some others have attempted an indirect method, known as the non-monetary approach and monetary approach, respectively.[3] This study follows the monetary approach based on a monetary indicator and in particular the amount of currency in circulation. This approach basically originates from the model of Tanzi (1983).

The approach is applied with three main assumptions. First, the underground economy is generated through tax evasion. Second, currency alone is used as a medium to carry out transactions in the underground economy. Third, velocity of illegal money is same as that of legal money.

In the estimation procedure, first the currency demand equation is estimated with the justification that most of the transactions are carried out in the form of cash in the underground economy in order to reduce the chances of detection. The demand for currency is measured by the ratio of currency in circulation (CC) to M_2 definition of money supply. The following is the model applied to estimate the currency demand equation.

$$(CC/M_2)_t = \beta_1 + \beta_2 (T/Y)_{t-1} + \beta_3 (BS) + \beta_4 (INT)_{t-1} + \beta_5 (Y_g) + \beta_6 (CC/M_2)_{t-1} + \in \quad \ldots \text{I}$$

Table 1 provides the details about the variables, definition and its resources, used in equation I.

[3] Monetary approach refers to the currency ratio, the modified currency ratio, transaction method and big bill phenomenon while non-monetary approach depends on labour market studies, difference between income and expenditure and the soft modeling approach.

Table-1: Definition of Variables

Variables	Definitions	Sources
CC	Currency in circulation equals currency issued, currency held by the State Bank of Pakistan and currency in tills of scheduled banks measured in million rupees.	Pakistan, State Bank of (2002).
M_2	Money supply is measured as currency in circulation, banks demand deposits, scheduled banks time deposits & other deposits with State Bank of Pakistan measured in million rupees.	Pakistan, State Bank of (2002).
T	Total taxes is measured by adding up the direct taxes that includes taxes on income, wealth tax, workers welfare tax and indirect tax that includes custom duties, federal excise duties and sales tax, measured in million rupees.	Pakistan, Government of (2002).
INT	Interest rate on time deposits taken as weighted average rates pertain to other than PLS deposits.	Pakistan, State Bank of (2002).
	These rates are percentage per annum.	
Y	Gross Domestic Product is defined as the value of all goods and services produced in the economy, measured in million rupees.	Pakistan, Government of (2002).
BS	Banking services defined as ratio of bank deposits to total number of bank accounts measured in million rupees.	Pakistan, State Bank of (2002).
Y_g	Growth rates in real per capita GDP measured in million rupees.	Pakistan, Government of (2002).

The data used for estimating the underground economy covers the period 1974-2002. The justification of variables along with their expected signs in the currency demand equation is given below.

Regarding the sign of the tax variable it is hypothesised that as the level of taxation rises people engage more and more in tax evading activities

that are facilitated by the use of currency. Hence, the ratio of currency holding to money CC/M_2 is expected to rise. The relationship between the interest rate on time deposits and currency ratio is expected to be negative as a high interest rate on time deposits may serve as an incentive for investment and people prefer to purchase time deposits rather than holding their money in cash. The hypothesised sign for the growth rate in real per capita GDP is expected to be negative as the fall is expected to occur in CC/M_2 with the expansion of the economy through rapid economic growth. The lagged currency money ratio $(CC/M_2)_{t-1}$ is included to capture the lag effect that shows the sluggishness of the money market. The sign of the lagged currency money ratio is expected to be positive. Moreover, improvement in banking services lowers the demand for currency holding. Thus, the sign of banking services is expected to be negative in the currency demand equation.

After estimating the currency demand equation, the size of the UGE through tax evasion is gauged. The procedure for estimating the size is as follows;

Illegal Money $(IM) = [(CC/M_2)_t - (CC/M_2)_{wt}] * M_2$

Legal money $(LM) = M_1 - IM$

Velocity of money $(IV) = GDP/LM$

Underground Economy (UGE) $= IM * IV$

Tax evasion $(TE) = UGE * (T/GDP)$

First, the values of the currency ratio for each year with and without tax variables are predicted by using the preceding regression equation. The difference between the two is multiplied by the total value of M_2 for the respective years in order to find out the level of illegal money as given in the above notations. Following Tanzi (1983), the difference between total money supply (M_2) and the estimated illegal money gives legal money (LM). Dividing the Gross Domestic National Product (GDP) by legal money gives an estimate of the income velocity of legal money. Further, illegal money is multiplied with velocity of money to get an estimate of the underground economy. Finally, the level of tax evasion is calculated by multiplying estimates of the underground economy with the ratio of overall taxes to *GDP.*

After measuring the size of the underground economy and tax evasion, an Ordinary Least Square model is applied to find out the impact of UGE and TE on GDP. Following are the equations used for estimation.

$$GDP_t = \alpha_0 + \alpha_1\ TE_t + \alpha_2\ GDP_{t-1} + \varepsilon \qquad \ldots \text{ II}$$

$$GDP_t = \alpha_3 + \alpha_4\ UGE_t + \alpha_5\ GDP_{t-1} + \varepsilon \qquad \ldots \text{ III}$$

Where, *GDP* stands for real gross domestic product, *TE* for tax evasion, *UGE* for underground economy and GDP_{t-1} for one year lagged *GDP*, all measured in million rupees.[4]

Empirical Results and Interpretation

Table 2 provides the results of estimated currency demand equation.

Table-2: Estimates of OLS Model (Currency Demand Equation)

Variables	Coefficients	t-values
C	0.151	(2.78)*
$(T/Y)_{t-1}$	0.848	(3.04)*
(BS)	-2.166	(-3.32)*
$(INT)_{t-1}$	-0.006	(-1.47)*
Y_g	-0.094	(-1.01)
$(CC/M_2)_{t-1}$	0.401	(2.44)*
R-Square	0.82	
Adjusted R^2	0.78	
F-Statistic	21.9	
Durbin-h	0.34	

Note: The * indicates that parameters are statistically significant at least at the 10 % level of significance.

The results are overall satisfactory as the coefficients of all variables except per capita real GDP growth rate, are statistically significant and the signs are as expected. The R^2 is reasonably high i.e. 0.78, indicating that

[4] Since tax evasion is measured from the underground economy, both yield similar results.

most of the variation in the demand for currency is explained by the estimated equation. Moreover, the value for the Durbin-h test indicates that no autocorrelation exists in the model.

The coefficient of lagged total taxes $(T/Y)_{t-1}$ is statistically positively significant as expected. This finding confirms the hypothesis that as the level of taxation rises, people are motivated to indulge in tax evading activities and the demand for currency holding increases. The result is in line with that of Ahmed (1995), Aslam (1998), and Iqbal (1998).

The coefficient of banking services (BS) has a negative sign as expected and is statistically significant. It shows that an improvement in banking services lowers the demand for currency for transaction purposes because with credit cards, demand deposits, and travellers cheques for transactions becoming available, people prefer not to hold money in cash form. The coefficient of interest rate on time deposits $(INT)_{t-1}$ has a negative sign as expected, and it implies that higher interest rate increases the opportunity cost for holding money. So people prefer to purchase time deposits rather than holding money in cash to gain from the high interest rate.

Finally, the lagged currency money ratio possesses the expected positive sign and is statistically significant, indicating the strong relation of current demand for holding currency with its previous year's demand.

After estimating the currency demand equation for each year, the predicted level of the currency ratio with tax variables $(CC/M_2)_t$ and with out tax variables $(CC/M_2)_{wt}$ are calculated by using the preceding regression equation. The difference between $(CC/M_2)_t$ and $(CC/M_2)_{wt}$ multiplied by the total value of M_2 for the respective years shows how much taxes cause people to hold currency that gives the estimates of illegal money.

Table 3 shows the estimates of the underground economy and tax evasion for the years 1974-2002. The estimates confirm the presence of a large underground economy and tax evasion in Pakistan.

Table-3: Estimates of Underground Economy in Pakistan (Million Rupees)

Years	Illegal Money	Legal Money	Velocity of money	Under-ground Economy (UGE)	Tax Evasion (TE)	Growth rate of GDP %[5]	Growth rate of UGE %	Growth rate of TE %
1974	2978	19663	4.1	12276	1562	-	-	-
1975	3598	20918	5.0	18196	2093	4.6	48.2	33.9
1976	4112	25752	4.8	19868	2296	3.7	9.18	9.69
1977	5205	30048	4.6	24455	2859	8.0	23.0	24.5
1978	6572	35519	4.7	31331	3766	4.7	28.1	31.7
1979	8491	43278	4.4	37930	4697	8.7	21.1	24.7
1980	10550	49721	4.6	49221	6633	6.8	29.8	41.2
1981	13182	60377	4.5	59793	8220	6.8	21.5	23.9
1982	14264	66661	4.7	68062	8794	6.7	13.8	6.98
1983	17576	78965	4.6	81866	10371	5.0	20.3	17.9
1984	19797	83647	4.9	97973	13183	7.5	19.7	27.1
1985	23326	95641	4.8	113017	14198	5.5	15.3	7.69
1986	24541	110289	4.6	112969	15425	6.4	-0.04	8.64
1987	30287	129337	4.2	129219	20831	7.6	14.4	35.0
1988	39457	145512	4.3	170866	28612	4.9	32.2	37.3
1989	41969	162563	4.3	183599	30404	4.4	7.45	6.26
1990	49934	190222	4.1	207802	29926	5.4	13.2	-1.57
1991	51022	214118	4.3	222155	29622	7.8	6.91	-1.01
1992	65697	237211	4.5	302015	43372	1.8	35.9	46.4
1993	73431	254390	4.7	349298	49353	4.0	15.6	13.8
1994	83849	274918	5.1	430913	60716	5.3	23.4	23.0
1995	99124	324014	5.2	520738	75627	5.1	20.8	24.5
1996	116678	331330	5.8	684734	103149	1.1	31.5	36.4
1997	134182	309368	7.2	969949	134207	1.2	41.6	30.1
1998	140463	339867	7.4	1039626	141973	3.6	7.18	5.78
1999	146995	497939	5.4	800127	112525	4.2	-23.0	-20.7
2000	165636	573396	5.0	831101	117230	2.5	3.87	4.18
2001	179904	581527	5.3	962463	137605	2.7	15.8	17.4
2002	209185	665791	5.1	1085286	152728	5.9	12.7	10.9

[5] The growth rate of GDP is calculated by the authors using data on real GDP measured in million rupees, taken from the *Economic Survey* (2002).

Table 3 shows that from 1974-2002 the underground economy has increased from Rs. 12 billion in 1974 to Rs. 1085 billion in 2002 and tax evasion has also increased from Rs. 1562 million to Rs. 152 billion. This shows that since 1974 there has been a remarkable upward trend in the underground economy as well as in tax evasion that further proves the linkage between the two.

The estimates show that the underground economy has enormously increased in the 90s. This can be attributed to high taxes and regulation imposed by the government. The estimates of illegal money show an upward trend from 1974 to 2002. While legal money has also increased with the passage of time except for the year 1997. The rate of growth of the underground economy and growth rate of GDP suggests that the rate of growth of the underground economy has been higher than the growth rate of the formal economy.

Table 4 finally provides the estimates based on equations II and III.

Table-4: Estimates of OLS Model (Impact of UGE & TE on GDP)

Variables	Equation I	Equation II
C	-44.65 (-0.35	-47.55 (-0.401)
TE	-0.005 (-3.39)*	–
UGE	–	-0.0007 (-3.373)*
GDP_{t-1}	1.078 (50.86)*	1.079 (55.12)*
Adjusted R^2	0.99	0.99
F-Statistic	8782	9384
Durbin-h	-1.07	-1.235

Note: The * indicates that parameters are statistically significant at the 1 % level of significance.

The results of the OLS model are quite satisfactory for both equation one, with TE as independent and the other one with UGE. All the variables bear the expected signs. The value of adjusted R^2 is 0.99 indicating 99 % of variation being explained by selected variables. The Durbin-h test

shows no sign of autocorrelation in the model. Tax evasion and the underground economy both have a significantly negative effect on GDP. As tax evasion increases by 1%, this decreases the tax revenue, GDP tends to fall by 0.005 % that depends on tax revenue. The same is the case with UGE that puts a negatively significant effect on GDP. The lagged value of GDP has a positive effect on current values for GDP showing a significant role of the multiplier.

Conclusion

This study confirms the existence of a large underground economy and tax evasion in Pakistan over the period 1974-2002. The results are closer to the ones found by Iqbal and Qureshi (1998). However, this study provides up-to-date information on the size of the UGE and tax evasion. The size of the underground economy has been growing at a rapid pace and is faster than the growth of the formal economy. This expansion of the underground economy may be due to changes in the economic and political scenario of the country.

The existence of the underground economy is a matter of serious concern for the government and policy makers. The presence of such a large underground economy is itself an indicator of the prevailing corruption on the part of the public in Pakistan. This not only causes large fiscal losses to the economy but also causes inefficiencies in public administration. Tax evasion has a negative impact on Pakistan's fiscal and monetary sectors. In order to compensate for this loss, the government imposes more taxes and that further raises the problem of tax evasion. Some of the suggestions arising from the results are given below.

- The government should improve the ways of detecting tax evasion.
- The Income tax department must be well equipped with efficient staff required for proper documentation.
- Tax collection system should be simple and comprehensive for the masses.
- Reducing the size of the underground economy can enhance the economic growth of Pakistan through increased tax revenues.

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