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Abstract

This study purposes to estimate Pakistan's informal economy by monetary methods. Ordinary least square is used for estimation. From the monetary approach, we conclude that the informal economy is increasing. In our study, particular implications of the informal economy are identified and conferred to accomplish and achieve the goal of continuous growth and progression of a country. The informal economy plays a main role in income inequality and reducing poverty. It limits the implementation of the operative public policy. The government should make such policies to control the informal economy and increase tax evasion.

Keywords: Informal Economy, Indirect and Direct Approaches, Monetary Approach and Underground Economy

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Title

Estimation of Informal Economy in Pakistan through Monetary Approach

Abstract

This study purposes to estimate Pakistan's informal economy by monetary methods. Ordinary least square is used for estimation. From the monetary approach, we conclude that the informal economy is increasing. In our study, particular implications of the informal economy are identified and conferred to accomplish and achieve the goal of continuous growth and progression of a country. The informal economy plays a main role in income inequality and reducing poverty. It limits the implementation of the operative public policy. The government should make such policies to control the informal economy and increase tax evasion.

Keywords:

Informal Economy, Indirect and Direct Approaches, Monetary approach, and Underground Economy

Contents

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Introduction

An informal economy constitutes a varied group of activities, businesses, employment, and workforces that are not regulated or sheltered by the law. Such self-employment in unregistered ventures is usually related to the informal economy. Initially, Keith Hart introduced the term informal economy in 1970. He described the informal economy as an occupation outside of government and categorized it into legitimate and illegitimate activities. Feige (1990) classified the underground economy as, an unrecorded economy, an unreported economy, an informal economy, and an illegal economy. Moreover, the precise estimation of the informal economy shows that it is significant for the growth of the economy of Pakistan. Like the informal economy, tax evasion has also been a major problem in Pakistan resulting from continually low tax flexibility and low tax reforms. Economists, political leaders, policy-makers, and nongovernment administrations around the world are concerned about the expanding informal sector and increasing

number of tax-evaded individuals in their countries. The monetary approaches are used to measure the extent of the informal economy. The monetary approach was founded by Cagan in 1958. During World War II, he estimated unreported income. Then it followed by Gutmann (1985), Feige (1979) and Tanzi (1983). The monetary approach is divided into three methods viz. the simple currency ratio method, the transaction method, and the currency demand method. Gutmann (1985) measured the USA's subterranean economy in 1976 and found approximately 10 percent of recorded GNP. Ogunc and Yılmaz (2000) estimate the underground economy as 16 percent in Turkey According to Davidescu (2013), the simple currency ratio method has been the most popular method to estimate the shadow economy. The simple currency method argues by Feige (1979) that the irregular economy is more desegregated than the formal economy so it is probable that income velocity is high. Feige (1979) built the transaction method which was based on Fisher's equation of exchange. He distillates on the volume of payments instead of changes in demand for currency. According to Schneider (2000), this method links total nominal GDP to total transactions, and then the official GDP is subtracted from total nominal GDP to estimate the informal economy. Ahumada et al. (2009) examined the size of the informal economy as a discrepancy between estimated total nominal income and observed nominal income. Feige's method is critiqued by Tanzi (1983 & 1999). He claims that the estimates of Feige are sensitive to the selection of the initial period. Further, claims that the velocity of income depends on the opportunity cost of holding cash too along with other variables that encourage economic agents to make informal transactions. The currency demand approach is based on the assumption that transaction is mostly done in cash form Cagan (1958). It is the most emerging and developing method to measure the informal economy. It is based on the assumption that income in the informal economy is generated by avoiding tax Schneider and Enste (2000). The average value of the underground economy is 15 percent. Kemal (2003) measures the underground economy by the currency demand method but he uses currency in circulation (CC) with foreign currency accounts (FCA) to M2. Also, create dummy variables to analyze the impact of hundi after the liberalization of FCA. According to Yasmin and Rauf (2004), the rise in the shadow economy is due to taxation. Their result shows that the shadow economy grew from Rs. 12 billion in 1974 to Rs. 1085 billion in 2002. Ahmed and Hussain (2008) used the currency demand equation to measure the shadow economy and reported taxation as a major reason for the increase in the shadow economy. The main criticism is given by Feige (1996), who argues that the reason behind the increase in the informal economy was a decrease in demand deposits rather than an increase in currency demand deposits. With the growth in the informal economy, the socio-economic problems are rising especially, the increase in the fiscal deficit. It resulted in a loss in tax revenues. Government expenditures rise with the official economy as well as the informal economy whereas public revenues rise with the official economy. However, this study estimates the informal economy through different monetary approaches and analyzes the trends of the informal economy and tax evasion.

Theoretical Framework

In Lima, Hernando De Soto a president of the Institute for Liberty and Democracy (ILD) guided the Institute for Liberty and Demo (ILD) regarding the term informal sector. Hernando De Soto suggests that the informal sector is the sector, which works beyond the laws and regulations of government. He collected data on the housing, transportation, and trade sectors of the informal economy. Further, they calculated the income generated by these three sectors of the informal economy and found a huge size of informal activity. He claims that the government should remove regulations on housing, transportation, and trade sectors of the informal economy and should be allowed in the way of free market activity and capitalism. The government introduces programs planned to control the overpopulation problem, as it is the main cause of the housing. As informal housing, informal trade is considered another alternative for Peru's people to protect their private property rights. He divides informal trade into two parts i.e. informal markets and street vendors. De Soto expanded informal housing and informal trade through informal transportation. Similarly, to other informal sectors, informal transportation is divided into collective transport and minibus. In the second part of the book "The Other Path", De Soto compares the cost of the formal and informal

sectors. And also estimate the role of the law in both sectors. He says "law is good", if it assures that they raise economic efficiency and "law is bad", if it delays or slows economic efficiency. Further, He concluded his study by saying that the economic indicators of Peru show a bleak image. According to him, the informal sector is only a path to attain the goals. Marquez (1990).

Econometric Methodology

There are two approaches to measure informal economy i.e. direct approach and indirect approach. The direct approach is through conducting the samples and surveys but this approach is not reliable. Therefore, in our study, we use indirect approaches and through those approaches, we estimate the informal economy. The indirect approach is beneficial as compared to the direct approach because, in the direct approach, respondent does not want to recognize their informal activities. There are four types of indirect approach i.e. discrepancy approach, monetary approach, physical input approach, and model approach (Misra, Kumari, & Sajid, 2024; Kishwar, Bashir, Hussain & Alam, 2023).

Monetary Approach

The monetary approach is mostly commonly utilized to assess the extent of the informal economy. The monetary approach implies that the informal economy can be determined in the form of the demand for holding currency through which the extent of the informal economy and tax evasion is estimated. This approach comprises the simple currency method, the transaction method, and the currency demand method. All these methods are based on Cagan (1958).

Simple Currency Ratio Method

The simple currency ratio method is the proportion between currency and demand deposits. This method indicates a rise in currency stocks and transaction payments that are unregistered by the government. Cagan's method was followed by Gutmann (1985) in finding the subterranean economy of the USA in 1976. Gutmann supposed that the increase in using the credit cards and checks is due to a comparative decrease in the currency demand over time. To this extent and growth of the informal economy can estimated. Guttmann indicates that the ratio increases because people are forced to withdraw their money by holding more currency and from demand deposits. But this is not necessarily in every case due to the transformation of money to time deposits from demand deposits. The mathematical equation of simple currency ratio can be given as

$$Yu = Yr\ (C - KrD)/(Kr + 1)D \quad \ldots\ldots (1)$$

According to this equation (1), if the formal economy improves, it will raise the growth of the informal economy rather than decrease it or it may remain unchanged if any improvement occurs. The simple currency ratio method is based on various assumptions. Firstly, all the informal transactions are done through using currency. Secondly, the currency to demand deposit remains unchanged excluding changes by the growing rate of unreported income. Thirdly the income velocity of money is the same for both the official and informal sectors. Fourthly there is a base year where there exists no informal economy.

Transaction Method

Feige (1979) developed the transaction method. Transaction method is the relation among the volume of transactions and the GNP throughout the constant time. To assess the informal economy size, he uses the quantity theory of money which is eminent by the Fisherman equation of exchange. The equation is given as follows.

$$MV = PT \quad \ldots\ldots (1)$$

According to this equation (1), Where M is known as the money supply, V is the velocity of money, P is the price of transactions and T is the volume of transactions. However, according to Feige, M is the currency in circulation plus total deposit. V is the velocity of money and PT is the nominal gross national product (GNP) minus real gross national product (GNP). The transaction method has various assumptions like the relation among the total transactions value and estimated GNP was normal as the informal economy was zero. If any increase occurs in the ratio of transactions it is because of the increase in the magnitude of the informal economy. There is the base year where the informal economy does not exist which further creates problems.

Currency Demand Method

The currency demand method was originally presented by Cagan (1958) and then followed by Gutmann (1985) and Tanzi (1980). The currency demand method supposes that informal transactions are mostly done in the cash payments form so due to this demand for money is increasing. The increase in currency signifies the informal growth of the economy. Their result shows that tax evasion is the cause of the informal economy. This method involves the estimation of a currency demand equation. It was developed by Tanzi (1980). The major assumption of the currency demand method is that the informal sector grows by evading tax. Moreover, cash is used as a means of exchange for all informal economic activities and there exists a base year where there is no informal economy. Further, assume that the velocity of money is the same in formal economies as well as in informal economies. This method can be done in two steps, at first in the current state it is estimated through a currency demand equation, and secondly the tax rate zero. The discrepancy among these estimates indicates the currency in circulation used in the informal economy. And then by multiplying this discrepancy with the income velocity of money, the informal economy can be estimated. To estimate the informal economy, the econometric model used as follows

$$(CC/M2)t = \beta o + \beta_1 (DT/Y)t_{-1} + \beta_2 (TT/Y)t_{-1} + \beta_3 BSt + \beta_4 IRRt + \beta_5 YGt + \beta_6 (CC/M2)t_{-1} + \mu \quad \text{..... (1)}$$

Where, βo, β_1, β_2, β_3, β_4, β_5, and β_6 are the parameters and μ is an error term.

In Equation (1), the ratio of currency in circulation to the money supply (CC/M2) is used as the dependent variable. The other independent variables are lagged value of the ratio of domestic tax to GDP $(DT/Y)_{t-1}$, lagged value of the ratio of international trade tax to GDP $(TT/Y)_{t-1}$, banking services(BS), real interest rate(IRR), GDP per capita growth (YG) and lagged value of the ratio of currency in circulation to money supply $(CC/M2)_{t-1}$. The theoretical justification for the several explanatory variables is given below. After estimating the currency demand equation, the informal economy and tax evasion are estimated. The predicted levels of currency ratio with taxes $(CC/M2)_t$ and without taxes $(CC/M2)_{wt}$ are estimated by utilizing an estimated regression equation. The discrepancy between $(CC/M2)_t$ and $(CC/M2)_{wt}$ indicates how much tax is induced by holding currency. Also shows that high amounts of direct and indirect taxes encourage people to hold high amounts of currency. The high level of currency demand indicates the size of tax evasion, which can be delineated as illegal money (IM). IM is illegal Money. It is the proportion of currency circulation to money supply with taxes minus the proportion of currency circulation to money supply without taxes multiplied by M2.

Mathematically it can be written as follows:

$$IM = (CC/M2)t - (CC/M2)wt * M2 \quad \text{..... (2)}$$

The estimated illegal money yields legal money (LM). The illegal money is subtracted from narrow money (M1) we get legal money (LM). The legal money can be mathematically written as follows:

$$LM = M1 - IM \quad \text{..... (3)}$$

The gross national product (GNP) divided by legal money (LM) gives the income velocity of legal money (IV). It can be mathematically written as:

$$IV = GNP/LM \quad \text{..... (4)}$$

The illegal money (IM) is multiplied by the income velocity of money (IV), and the informal economy (IE) can be estimated. And can be mathematically written as follows:

$$IE = IM * IV \quad \text{..... (5)}$$

The estimates of the informal economy are multiplied by the ratio of overall taxes (T) to GNP, and tax evasion (TE) can be estimated. The tax evasion can be mathematically written as follows:

$$TE = IE * (T/GNP) \quad \text{..... (6)}$$

Data Source and Construction of Variable

From the above literature, the informal economy can estimated through direct or indirect approaches. These methods use the following variables. Total deposits are used as all types of deposits by overall banks. The gross national product is the aggregate of all final newly, produced goods and services within a country and net factor income from abroad. It was taken with base year 2005-2006. The income velocity of money is the quarterly average of monetary assets (M2) or as a GDP at current factor cost. Money supply comprises M1 and further types of deposits like savings deposits. A domestic direct tax is directly imposed upon the taxpayer. Domestic

Indirect Tax is a tax which indirectly imposed on consumers by paying higher prices International trade taxes tax contains exchange profits, exchange taxes, import duties, export duties, import monopolies, or profits of export. Gross domestic product is the total aggregate market value of all final newly produced goods and services within a country in a given time period. It was used with the base year 2005-2006. Banking services that are an aggregate of total deposits to overall bank accounts. The real interest rate is different between the discount rate and expected inflation for a year. GDP per capita growth which obtained by dividing gross domestic product by midyear population. The narrow money includes all coins, currency used by the public, other deposits with the State Bank of Pakistan excludes IMF and SAF accounts, deposits with international government, organizations, and central banks plus scheduled time deposits exclude other deposits with interbank, international constituents, central and provisional government and plus resident foreign currency deposits. Data for all variables was taken in terms of Rupee units excluding real interest rate which was taken in percentage units. The analysis of this research is the major macro indicator of the economy in Pakistan. Secondary data was used. Data is collected through the State Bank of Pakistan, Labour Force Statistic, UN data, and World Bank. In simple currency method and transaction method, data was used from 1981 to 2017. For the currency demand method use data for the 1977 to 2017 time period.

Result and Discussion

The monetary approach is divided into three methods i.e. simple currency ratio method, transaction method, and currency demand method.

Simple Currency Ratio Method

This method indicates a rise in currency stocks and transaction payments that are unregistered by the government. For the simple currency ratio method, the 1981 to 2017 time period is used to measure the informal economy. First, we find currency in circulation and total deposits of the informal economy. The currency in circulation of the informal economy is estimated by multiplying the forecasted value of the proportion of currency in circulation to total deposit by total deposit. For a total deposit of the informal economy multiply the forecasted value of the proportion of currency in circulation by total deposit by currency in circulation. After that, we can estimate the informal economy. For 2012 we assume that there is no informal economy or less that can be snubbed. It can choose where the proportion of currency in circulation to deposits (C/D) is minimal, so we chose 2012 as the base year. The estimated result shows that the informal economy is increasing in the overall time period in 2016 it decreased by 8736356 million. The informal economy as a percent of GNP also increased except from 2000 to 2006 and after 2016, the informal economy decreased as shown in Table A.1. The informal economy estimated by the simple currency method can also be shown in the graph in Figure 1. The graph illustrates the increasing trend of the informal economy but in 2016 it fell but overall informal economy shows an upward trend. The informal economy as a percent of GNP shows an upward trend but from 2000 to 2006 it falls and becomes downward in Figure 2. After 2006 it rose again and moved upward in 2016 and then again fell in 2017.

Figure 1

Simple Currency Method

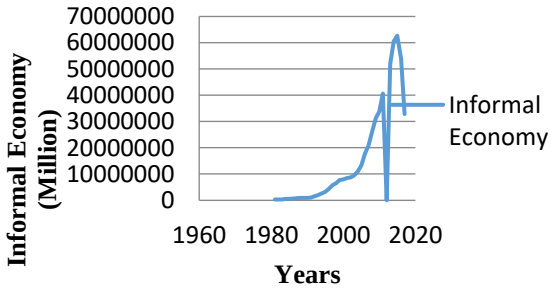
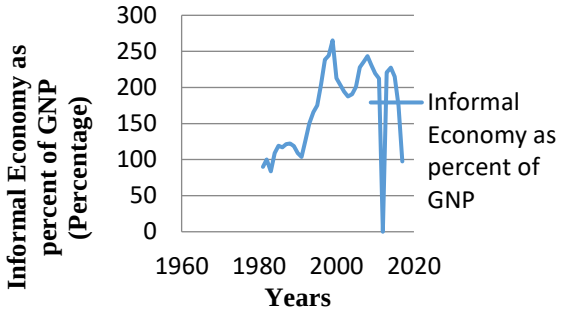


Figure 2

Simple Currency Method

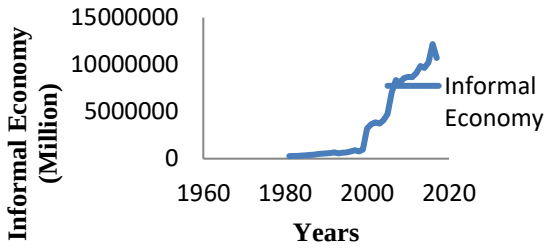


Transaction Method

The size of the informal economy can be indicated by the discrepancy between MV and PT. For this method, we use data from 1981 to 2017. The estimated result shows 272056.49 million in 1981 and then increased to 963820.92 million in 1999. From 2000, it further increased by 3231274.1 million to 10684178 million in 2017 which is reported in Table A.2. The informal economy shows stagnant growth from 1981 to 1999 but after 2000 it shows an upward trend with the increasing rate in Figure 3. The monetary sector is influenced by informal income that varies the economy's liquidity position. Such as income from the informal economy is often used as an alternate source of finance, and the credit rationing policies of the monitory authority are established as incompetent.

Figure 3

Transaction Method



Currency Demand Method

Through the estimation of a currency demand equation, the informal economy can be estimated. The currency demand equation estimated by regression and unit root test and lag selection criteria is also done. The stationarity can be tested through the Augmented Dickey-Fuller (ADF) test, Ng-Perron test, and Phillips-Perron (PP) test. The most frequently used test among all tests is the ADF test. The ADF test shows all variables stationary at 1st difference except real interest rate and per capita economic growth which are stationary at level. There are various criteria for the lag length selection, the Akaike Information Criterion (AIC) and Schwarz Information criterion (SC) are the most important criteria among them. The optimal lag is selected on the basis of the minimum value of lags. According to the lag selection criteria, lag 3 is selected as it gives a minimum value. The regression model is run through the ordinary least squares (OLS) technique to estimate the currency demand equation. The results are acceptable as the coefficient signs are according to our expectations. As hypothesized coefficient signs of lagged domestic taxes $(DT/Y)_{t-1}$ and international trade taxes $(TT/Y)_{t-1}$ are supposed to be positive signs and both $(DT/Y)_{t-1}$ and $(TT/Y)_{t-1}$ are statistically significant positive which indicates that if the levels of domestic taxes and international

trade taxes increase, individuals participate in tax evading activities. The coefficients of banking services (BS) and annual growth in real per capita GDP (Yg) are negative as assumed. It indicates that improvement in banking services and an increasing level of economic development may decrease the demand for holding currency. The coefficient of real interest rate (IRR) also results in a negative sign as expected, indicating that a high real interest rate may increase the opportunity cost of holding currency, and due to this demand for holding currency decreases. The coefficient of lagged currency-money ratio $(CC/M2)_{t-1}$ is a positive sign as assumed showing the strong significance of current demand for holding currency with its lagged demand for holding currency. The R square is high i.e. 0.91 which is 91%, so our model is a good fit. The Durbin-Watson statistic is 1.54 indicating autocorrelation. The F-statistic probability is 0.00 which shows the overall model is significant. The explanatory variables' parameter estimates will be jointly statistically significant. The result is reported in Table A.3 in the appendix.

The Size of the Informal Economy and Tax Evasion

The size of the informal economy and tax evasion is estimated for the time period of 1977-2017. The estimated result shows that the informal economy grew rapidly to 13541414.31 million in 2017. On the other side, tax evasion grew rapidly from 2005 to 76184.06 million and increased to 4623503.14 million. The result shows the remarkable size of Pakistan's informal economy and tax evasion in Table A.4. The result is also portrayed in the figures. Between 1980-1986, it shows a downward trend in the informal economy. But from 1987-1998, it shows an upward trend and from 1999-2006, it increases at a decreasing rate. Then from 2007-2017, it shows an upward trend with an increasing rate as also shown in Figure 4. The informal economy was increasing in the period of 1990s because of the majority of tenuous and feeble political regimes. While the formal economy rose with a moderate growth rate, the informal economy can decrease the attributable involvement by the tax reforms for political stability, documentation, and developed governance. The rising public sector deficit is relatively due to the high growth of the informal economy considered an important factor because government expenses are rising with the formal and informal economy while government revenues rise with the formal economy at a slower rate. Figure 5 indicates tax evasion which shows stagnant growth from 1977-2004 but after 2004 it shows an upward trend with an increasing trend. The estimation of tax evasion is based on a pungent assumption that the informal incomes will be taxed at the same rate as the formal incomes.

Figure 4

Currency Demand Method

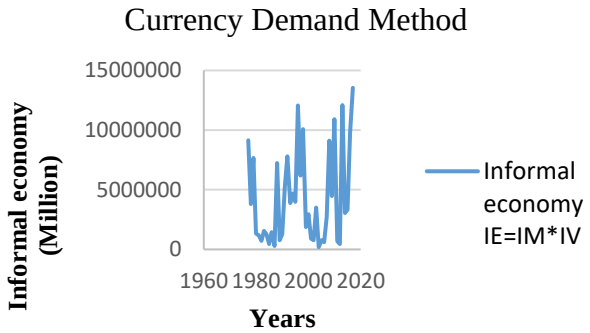
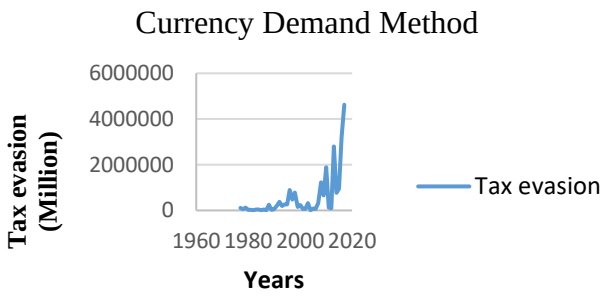


Figure 5

Currency Demand Method



Conclusions

The purpose of this paper is to estimate the informal economy by different monetary approaches, thus different methods yield different results but all of them show an increasing trend of the informal economy in Pakistan. All these methods give an accurate and reliable result but the currency demand method gives a more appropriate result. The estimated result explains the significant size of the informal economy. The monetary approach highlights the high influence of the informal economy with the increasing trend. There are several reasons behind the informal economy but according to estimated results, tax evasion was found the main factor affecting the informal economy. The estimated result of our study is different from previous studies done in Pakistan due to using different variables and different methods of monetary approach. The study provides an essential result for policymakers. Good governance may help to decrease the informal economy and tax evasion. The easy and simple taxation registration process can reduce tax evasion and the informal economy. Economic reforms should create political stability and a struggle against corruption and tax evasion. The government should make such policies to control the informal economy and increase tax evasion and corruption. If the government formalizes the informal economy by registering them at a low cost, making the registration process easier, and lowering the amount of taxes imposed on them, the country's growth will be doubled as compared to eliminating the informal economy. As we already know the current situation of Pakistan is suffering from socio-economic problems like unemployment, poverty, inflation illiteracy, etc.

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Appendix

Table 1

Simple Currency Ratio Method

Years	C=Cr+Cu (Million) (Pak Rupees)	D=Dr+Du (Million) (Pak Rupees)	Kr=Cr/Dr (Million) (Pak Rupees)	(Kr+1)D (Million) (Pak Rupees)	(C-KrD)/(Kr+1)D (Million) (Pak Rupees)	Informal Economy (Yu=Yr(C-KrD)/(Kr+1)D)(Million)(Pak Rupees)	Informal Economy as percent of GNP
1981	44292.26	23303.35	0.526127	35563.87	0.90	271004.4	90.06
1982	49534.43	24751.11	0.499675	37118.62	1.00	349962.9	100.13
1983	54016.76	29409.87	0.544458	45422.32	0.83	337839.6	83.66
1984	68180.06	32649.27	0.478868	48283.97	1.08	499941.9	108.82
1985	75862.04	34630.23	0.45649	50438.58	1.19	607778.6	119.06
1986	82515.64	38035.2	0.460945	55567.35	1.16	650089.2	116.94
1987	97133.82	43828.25	0.451215	63604.22	1.21	740514.8	121.62
1988	109386.5	49212.27	0.449894	71352.56	1.22	861406.1	122.27
1989	114272.5	52186.28	0.456683	76018.86	1.18	949085.9	118.97
1990	122489.3	58603.62	0.478439	86641.85	1.09	973317.4	109.01
1991	130663.1	64086.86	0.490474	95519.8	1.03	1085081	103.88
1992	144122.7	63627.34	0.44148	91717.56	1.26	1548392	126.51
1993	160138.6	64125.84	0.40044	89804.36	1.49	2023675	149.72
1994	158429.6	59623.74	0.376342	82062.68	1.65	2613475	165.71
1995	142527.2	51803.63	0.363465	70632.44	1.75	3292377	175.12
1996	125926	41367.24	0.328504	54956.56	2.04	4319257	204.40
1997	79460.59	23461.95	0.295265	30389.45	2.38	5749676	238.67
1998	27715.5	8051.199	0.290494	10390.03	2.44	6480418	244.24
1999	43255.86	11842.39	0.273775	15084.55	2.65	7726663	265.26
2000	308314.6	98515.42	0.319529	129993.9	2.12	8045987	212.96
2001	433076.1	142597.9	0.329267	189550.7	2.03	8464718	203.70
2002	596256	202700.5	0.339956	271609.7	1.94	8691048	194.15
2003	877532.5	305376.6	0.347995	411646	1.87	9419488	187.36
2004	1376264	473164.8	0.343804	635840.7	1.90	11003389	190.86
2005	2113095	702755.9	0.332572	936472.6	2.00	13314063	200.68
2006	3316321	1011152	0.304902	1319454	2.27	17720703	227.97
2007	4659616	1389575	0.298217	1803970	2.35	20780842	235.32
2008	7430810	2164376	0.291271	2794795	2.43	26392529	243.32
2009	11203750	3386179	0.302236	4409605	2.30	31273224	230.86
2010	14288263	4473314	0.313076	5873802	2.19	33862251	219.41
2011	20892068	6683732	0.319917	8821973	2.12	40595854	212.58
2012	27406724	8356579	0.30491	10904581	2.27	0	0
2013	35229887	10979136	0.311643	14400703	2.20	52011351	220.88
2014	46342619	14146701	0.305263	18465169	2.27	60531063	227.58
2015	57831412	18349817	0.317298	24172185	2.15	62650064	215.16
2016	70155068	25552454	0.364228	34859379	1.74	53913708	174.55
2017	856634.4	32985488	38.50591	1.3E+09	0.97	32876139	97.53

Table 2

Transaction Method

Years	M=C+Dr (Million) (Pak Rupees)	M*V (Million) (Pak Rupees)	P*T (Million) (Pak Rupees)	Informal Economy (Million) (Pak Rupees)
1981	100798.7	272156.49	100	272056.49
1982	112999	305097.3	30343	274754.3
1983	129826.7	350532.09	54409	296123.09

Years	M=C+Dr (Million) (Pak Rupees)	M*V (Million) (Pak Rupees)	P*T (Million) (Pak Rupees)	Informal Economy (Million) (Pak Rupees)
1984	160709.8	433916.46	95364	338552.46
1985	180101.5	486274.05	124007	362267.05
1986	200550.4	521431.04	147280	374151.04
1987	240262.6	600656.5	180600	420056.5
1988	282908.9	735563.14	255065	480498.14
1989	311021.6	839758.32	329051	510707.32
1990	355572.3	960045.21	401678	558367.21
1991	416221.3	1123797.51	535191	588606.51
1992	495705.3	1338404.31	679942	658462.31
1993	583566.1	1342202.03	798500	543702.03
1994	675505.9	1621214.16	1005007	616207.16
1995	808700.9	1940882.16	1281615	659267.16
1996	946764	2272233.6	1491765	780468.6
1997	1070994.2	2677485.5	1783874	893611.5
1998	1212430.5	2788590.15	2013358	775232.15
1999	1338635.8	3212725.92	2248899	963826.92
2000	1468806.4	3231374.08	100	3231274.1
2001	1515769.1	3940999.66	300815	3640184.7
2002	1709912.4	4274781	426048	3848733
2003	1915797.3	4406333.79	677534	3728799.8
2004	2259644.2	5197181.66	1140314	4056867.7
2005	2668218.8	6403725.12	1663797	4739928.1
2006	3168685	7604844	592955	8197799
2007	3657531.6	8412322.68	70895	8341427.7
2008	4354876.5	10016215.95	1934794	8081422
2009	4964333.9	12907268.14	4336579	8570689.1
2010	5432988.7	14669069.49	5970196	8698873.5
2011	6194526.09	17964125.65	9319835	8644290.7
2012	7163061.2	20056571.36	10961741	9094830.4
2013	8157594.9	22841265.72	12985157	9856108.7
2014	9312281.2	25143159.24	15482300	9660859.2
2015	10606314	27576416.4	17336778	10239638
2016	12486793	29968303.25	17791170	12177133
2017	4012892	9229651.6	19913830	10684178

Table 3

Regression Model Result

Dependent variable: D(CC/M2)			
Independent Variables	**Coefficient**	**Std.Error**	**P-values**
D((DT/Y(-1)	0.48	0.26	0.01
D((IT/Y(-1)	0.58	1.17	0.03
D(BS)	-0.13	0.66	0.04
IRR	-0.08	0.04	0.01
YG	-0.03	0.13	0.08
D((CC/M2(-1)	0.99	0.16	0.00
R-square 0.91	Prob(F-statistic) 0.00	Durbin Watson-stat 1.54	

Table 4

The Size of the Informal Economy and Tax Evasion

Years	Illegal money (Million) (Pak Rupees)	Legal money (Million) (Pak Rupees)	Income velocity of money (Million) (Pak Rupees)	Informal economy (Million) (Pak Rupees)	The growth rate of the informal economy (Percentage)	Informal economy (% of GDP) (Percentage)	Tax evasion (Million) (Pak Rupees)	Gross domestic product (GDP) (Million) (Pak Rupees)	Growth rate of GDP (Percentage)
	IM=(CC/M2)t-(CC/M2)wt*M2	LM=M1-IM	IV=GNP/LM	IE=IM*IV			TE=IE*(T/GNP)	at factor cost (2005-06)	
1977	29137.84	6116.15	313.27	9128296		549.39	115814.7	1661514	
1978	26934.12	15254.88	141.63	3814815	58.20	213.12	53471.42	1789965	7.73
1979	40846.8	12145.2	187.83	7672535	101.12	406.18	120009.2	1888909	5.52
1980	21876.76	40112.24	61.41	1343647	82.48	66.27	24878.99	2027312	7.32
1981	23058.47	50501.53	51.35	1184191	11.86	54.89	24777.29	2157096	6.40
1982	16859	64067	42.95	724168.3	38.84	31.21	15473.79	2320207	7.56
1983	32855.63	63686.37	47.29	1554060	114.59	62.72	35044.38	2477712	6.78
1984	29730.92	73714.08	42.57	1265927	18.54	49.14	32403.74	2576153	3.97
1985	14013.56	104954.4	31.74	444894.1	64.85	15.88	11334.28	2800488	8.70
1986	39329.98	95501.02	36.88	1450851	226.11	48.70	41995.32	2978683	6.36
1987	11953.2	147672.8	25.00	298868.6	79.40	9.48	10642.25	3151768	5.81
1988	120472.8	64607.24	59.97	7225129	2317.49	215.37	245125.3	3354621	6.43
1989	33228.28	173130.7	23.34	775552.7	89.26	22.05	29306.71	3515922	4.80
1990	55658.04	184499	22.95	1277440	64.71	34.73	51315.79	3677257	4.58
1991	143991.5	121149.5	36.11	5199837	307.05	133.94	214139.8	3881982	5.56
1992	189436.7	113471.3	41.12	7791296	49.83	186.32	377511.8	4181465	7.71
1993	147537.6	180284.4	26.27	3877205	50.23	90.66	197733.1	4276442	2.27
1994	175357.4	183410.6	26.67	4677985	20.65	104.63	260678.4	4470626	4.54
1995	184822.7	238316.3	21.64	4000554	14.48	85.93	260224.6	4655375	4.13
1996	310233.7	137775.3	38.87	12060362	201.46	243.02	888288	4962588	6.59
1997	408022.9	35528.15	151.68	6188899	48.68	122.62	471703.8	5047085	1.70
1998	310506.8	169824.2	32.48	10087077	62.98	193.11	784848.4	5223426	3.49
1999	159171.9	483871.1	11.82	1882856	81.33	34.59	150008.8	5441964	4.18
2000	243990.1	495042.9	12.01	2930775	55.65	51.83	230296.8	5654539	3.90
2001	161913.3	1113697	5.53	895848.7	69.43	15.53	73658.61	5765774	1.96
2002	159227.8	1334912	4.82	768062	14.26	12.91	62731.55	5945199	3.11
2003	599498.5	1197861	5.84	3502502	356.01	56.25	312996.4	6226156	4.72
2004	54455.58	2120284	3.51	191208.8	94.54	2.85	17916.56	6692038	7.48
2005	224416.9	2287793	3.46	776527.5	306.11	10.64	76184.06	7291537	8.95
2006	186017	2534663	3.30	613978.9	20.93	7.95	68686.47	7715777	5.81
2007	746769	2408861	3.63	2715601	342.29	33.34	316799.9	8142969	5.53
2008	2194519	2144981	4.15	9117712	235.75	106.65	1228989	8549148	4.98
2009	1184643	2436577	3.77	4477535	50.89	52.18	656197.8	8579987	0.36
2010	2211525	1919681	4.92	10901691	143.47	123.86	1886700	8801394	2.58
2011	315343.6	4537158	2.15	679513.7	93.76	7.45	130152.7	9120336	3.623
2012	236895.6	5289532	1.91	453252.6	33.29	4.78	101569	9470255	3.83
2013	3530147	3086628	3.42	12083071	2565.85	123.09	2798304	9816212	3.65
2014	5582283	2034372	5.46	3048812	74.76	29.85	769827.1	10211456	4.02
2015	6575234	2308738	5.06	3329012	9.19	31.31	946592.3	10631649	4.11
2016	9146685	1163617	10.68	9771405	193.52	87.89	3196576	11116802	4.56
2017	6049608	5842563	2.23	13541414	38.58	115.76	4623503	11696934	5.21