



**Exploring the Determinants of
Underground Economy of Pakistan**

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Exploring the Determinants of Underground Economy of Pakistan

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ABSTRACT

Presence of underground economy distorts the statistical information of economy leading to incompetent policies that lead to unexpected results. This thesis attempts to identify the determinants of underground economy for Pakistan. Political Rights, Political Terror, capital control, black market exchange rate, capital control and movement of people, urban population, rural population and age dependency ratio of young explain the movement in underground economy significantly in case of Pakistan, and also explain hike of underground economy in 1998 when it reached 102 percent of GDP for Pakistan. Pakistan needs to control volatility of political situation, bring reforms to reduce friction in capital and labour movement nationally and internationally and spread awareness to control population growth to counter the increase in underground economy.

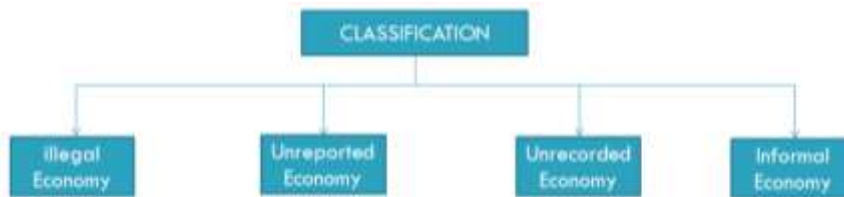
Keywords: Underground Economy Determinants of Pakistan, Monetary Approach

1. INTRODUCTION

Recording all the activities in the economy is a cumbersome task. Some activities are recorded officially, while others are not. Either they are deliberately not reported or otherwise missed out and become part of underground economy. Thus part of the economy that is not recorded is the underground economy.

The word “underground” at first builds up the image of dark dealing far detached from the everyday life of law abiding citizen, but this image is a mere distortion of reality; Underground economy does not only include illegal activities, it also includes all the legal activities, that are not recorded in the official statistics of an economy. Nevertheless, properly defining what constitutes underground economy is not an easy task. Researchers define it differently in their research, for instance, there is a wide debate on whether to include household activities such as gardening etc. as part of underground economy.

Similarly, different terminologies have been used to define the concept of underground economy in the literature, for example black, hidden, irregular, subterranean, invisible, unrecorded, shadow and moonlighting economy, these all basically aim at recording the same unreported activities with a little variation in what exactly they include in the unreported economy; However, the methodology used to measure is the same, where basic aim is to find the unreported incomes that escape tax regulations and underreported profits by firms which dodge regulations.



Underground activities can broadly be classified into four main categories, firstly illegal economy; this includes all the income produced through economic activities that are considered anti-social in nature, but we have to be particularly careful in following this aspect, as what is illegal in one

country may not be considered illegal in other countries, for example consumption of alcohol, which is prohibitive in Pakistan but is legally consumed in United kingdom. Secondly, unreported economy includes all the activities that are conducted to evade the payment of taxes, by not reporting to the fiscal authorities. Thirdly, unrecorded economy, which is similar to unreported but this is errors on the part of fiscal authorities, where their statistical data doesn't show the activity somehow. Lastly, informal economy includes all the activities that are not given the rights and the benefits of formal economy. So the defining what is underground economy differs with the objective of the study.

It is believed that underground economy fuels on cash transactions, because it is difficult to trace cash to a specific agent in economic system, Therefore preferred mode of transaction is cash in the underground economy, activities for example, smuggling, illegal sales, drug trafficking use a high volume of cash in their transactions compared to other mediums of exchange. Underground economy expands by the presence of higher tax rates policies pursued by the governments, high level of domestic unemployment, more regulations, presence of negative public sentiments towards the government in power, and in the time of economic recession. All these factors influence agents to indulge in tax avoidance and tax evasion, which are signs of presence of underground economy. Since these factors contribute to underground economy getting larger, this reciprocates in to higher tax rates set by the government on the formal economic sector, which has a negative impact on the potential of formal sector. This also reduces the provision of public services and the quality of public services, as government has lesser revenues in the form of tax collection to pay from. Underground economy also results in unfair competition plain for participants of formal sector of the economy, which hampers the legal business activities, with exception of illegal businesses that sprout up as facilitator to bigger legal businesses. (For example tea vender that begins operation near main construction sites act as a facilitator).

Presence of underground economy leaves the information system to become inappropriate and this produces misguided actions on the part of policy makers and citizens of an economy. Therefore it may give wrong signals of recession, shows bloated unemployment figures as labour force that is employed in underground economy is not reflected in the statistics, and show overstated price indices as prices in the official economy are higher than that of the underground economy. All these factors lead to government taking direct and indirect action to cure the problem. It may result in imposition of higher taxation, especially on the people who are already in the tax net. Higher taxation forces people to evade/avoid taxes [Feige (1989), p. 67] says that

“The feedback process has no invisible hand to wave it back to stability because the corrective mechanism is flawed”

The problem of growing the extent of underground economy can be controlled by looking at the factors which are positively associated with it. [Kanniainen, Paakkonen, and Schneider, (2004)] identified these variables are direct taxation, indirect taxation, social security contribution, burden of state regulation, tax morale, unemployment quota, employment quota, state transfer and GDP per Capita. Other factors which affect underground economy are quality of institution, deterrence [mentioned by, [Schneider and Buehn, (2013)] detection rates, types of penalties, risk-taking behaviour [mentioned by [Putnins and Sauka (2011)] influence of religion [mentioned by [Heinemann and Schneider (2011)]].

For an economy to grow to its full potential and exploit its resources fully, it is important to identify the main causes of emergence of underground economy and to work on curing the problem from the root cause, as [Tanzi (1999)] mentions that if the GNP was corrected for the discrepancy caused by underground economy, Italy would become one of the richest country in its community. Therefore, it is important to identify determinants of underground economy, so the policy makers can formulate policies that are more effective and can cure the problems an economy faces in a better way.

In consideration to above mentioned issues the main objective is to (i) find the estimates of underground economy using Monetary Approach and (ii) identify the determinants of underground economy. Organisation of the study is as follows; Section 2 contains literature review, Section 3 focuses on estimation of underground economy, Section 4 focuses on determinants of underground economy, Section 5 contains estimations of determinants of underground economy, and Section 6 presents conclusion.

2. ESTIMATING THE UNDERGROUND ECONOMY

Underground economy distorts the statistical data, and becomes a hindrance in designing successful policies. If underground economy can be calculated effectively it would help policy-makers design better policies enormously. There are different methods adopted to measure the underground economy, with each having its own restrictions and drawbacks, but, Monetary approach has been the most popular indirect methods of measuring the underground economy. Monetary method was further modified and developed by different economists, following are the different methods used, Gutmann (1977) used four basic assumptions to measure underground economy of United States by applying monetary approach

- (1) Medium of exchange for underground economy is majorly currency.
- (2) High taxes and high level of restrictions imposed by the government influence underground activity considerably, positively.
- (3) Only level of taxation or/and level of regulations has been changing currency to deposit ratio since benchmark period of 1937-41.

- (4) Benchmark period is 1937-41, which implied that there was no underground economy during that period.

His estimates of underground economy show \$200 billion in 1974. The method used was that, firstly, he calculated the currency to demand deposit level of benchmark period, 1937-41; secondly he calculated currency to demand deposit ratio for 1976, with the assumption that currency to demand deposit was not unusual, and it was normal throughout, he then took difference of the currency to deposit ratio of the two periods to find out the currency that was attributable to the underground economy. Further, to evaluate the extent of underground economy, the currency attributed to underground economy was multiplied by the ratio of GNP (gross national product) to Legal money.

Feige (1979) criticised Gutmann (1977) assumption that currency is the sole medium of exchange in the underground economic activities. He argues that illegal currency is sent abroad and then brought back in the country, in the form of loans, which uses demand deposits, so assuming that currency to demand deposit ratio stays normal is not very realistic, as sudden changes can occur. Moreover, Tanzi (1980) argues that as price changes, the currency to demand ratio also changes, as currency holding per individual declines, and if the benchmark period is changed, the results change as well, so the results become sensitive to choice of benchmark period. Interest rates have also played its part to shift individuals from keeping their money as demand deposits, or time deposits that earn interest. Lastly this assumption is also invalid on the ground that, U.S. Dollar is not only used within United States but also used out of United States as a major currency, for example, in Panama U.S. Dollar is traded as freely as the currency of Panama (Balboa).

These criticisms gave way to development of a better version of the model which answered few of the arguments if not all. Feige (1979) model was based on the Fisher (1912) equation of exchange; total volume of payments (MV) is equal to total volume of transaction (PT). He assumes that the total transactions of economy can be calculated by taking the volume of cheque transaction (the demand deposit multiplied by average turnover), this was calculated by taking the stock of demand deposit and estimates of average turnover of demand deposits and adding it with volume of currency transaction (currency in circulation multiplied by average turnover of currency) and this was calculated by the taking number of hands changed by an average unit of currency. The model was based on Irving Fisher's quantity theory money. Mathematically it can be written as;

$$M^C V^C + M^D V^D = MV$$

$$MV = PT$$

Where,

$$M^C = \text{Currency Notes}$$

$$M^D = \text{Demand Deposits}$$

V^C = Velocity/ Average turnover of Currency

V^D = Velocity/average turnover of Demand deposits

P = Price index

T = Physical volume of transaction

The procedure used was that, first, he calculated MV ($M^C V^C + M^D V^D$) and from that deduced PT. The deduced PT is then divided by GNP of observed income, and this ultimately gives estimate of underground economy. Feige (1979) took 1939 as a benchmark period and assumed that there was no underground economy at that time, so the nominal GNP computed for that year should in principle equal official measured GNP. He computed ratio of PT/GNP for 1939 and termed it as normal, which came out to be 10.3. He then indirectly computed GNP for 1976 and 1978 by dividing calculated GNP by PT/GNP of 1939, so the difference between calculated GNP indirectly and official GNP gave the estimate of underground economy.

This method also came under considerable criticism, firstly the assumption that velocity in underground and official economy is the same, can under or overstate the estimate of underground economy. Secondly, financial innovations have increased transactions between assets, if this is taken in to account, the estimates will be reduced. Thirdly, the barter transactions that happen in underground economy are not taken in to consideration. Tanzi (1983) also criticised the method adopted by Feige (1979), by arguing that if benchmark period was changed it would change that estimates as well.

Tanzi (1980) and Tanzi (1983) worked to refine the estimates of underground economy using the method of currency ratio, which was based on the work of Cagan (1958). Ibid aimed at checking the long-run behaviour of currency ratio, and a few factors that were likely to affect the ratio, for example, Expected Real Income per capita, Extent of Urbanisation, Opportunity cost of holding currency, Rate of tax on transaction, and Volume of retail trade.

Rate of tax on transaction provided a connection between currency ratio and tax evasion. As Ibid postulated that people make maximum transactions in currency to evade taxes, and postulated that currency ratio shares a positive relation with income tax. Tanzi (1980) uses the same idea and links tax rates to currency ratio, and used this relation to derive underground economy estimates. In his estimates two major assumptions are made,

- (1) Underground economy arises due to presence of high taxes.
- (2) Currency is used for transaction as well as storing wealth.

In his analysis he also took three types of tax rates,

- (i) Personal income tax to personal income net of transfer
- (ii) Top bracket statutory tax ratio
- (iii) Proxy for effective weighted average rate on interest incomes

The model that he came up with was as follows,

$$\text{Log}\left(\frac{C}{M_2}\right) = a_0 + a_1 \text{Log}(T) + a_2 \text{Log}\left(\frac{WS}{NI}\right) + a_3 \text{Log}(R) + a_4 \text{Log}(Y) + e \quad (a)$$

Where,

C/M_2 = Ratio of currency to holding of money

T = Tax Rate

WS/NI = Ratio of wages and salaries in national income

R = Interest rate

Y = per capita Income

e = error term

Ibid postulates that per capita income and interest rate were expected to share a negative relationship with C/M_2 , because as economic development takes place, currency is changed to cheques which change the C/M_2 , and in case of interest rate, M_2 has component of time deposits in it, so it shares a negative relationship.

To estimate underground economy, Ibid use equation (a) to predict currency ratio, then he keeps monetary base M_2 fixed, and calculates level of currency. The procedural steps taken use regression equation which are as follows,

$$Z_t = \text{Ln}(C/M_2) = \text{Ln}C_t - \text{Ln}M_2$$

$$\text{Where } Z_t = \text{Ln}C/M_2,$$

This can be simplified to,

$$Z_t = \text{Ln}C_t - \text{Ln}M_2$$

Rearranging the value in terms of C_t

$$C_t = \exp(Z_t - \text{Ln}M_2)$$

Now, he assumed that tax variable took a value of zero, and other variables remain unchanged, the resulting value of C_0 shows us initial currency without tax evasion, then C_t is calculated with tax variable non-zero, and this provides currency holding by people with tax. The difference between the two, C_0 and C_t , gives the influence of taxes to currency holding. Finally, the difference is multiplied by velocity to get estimate of underground economy.

$$\text{Underground Economy} = (C_t - C_0) \times V$$

To calculate velocity Tanzi (1983) uses the assumption that velocity in legal sector is same as velocity on illegal sector, so he calculates velocity of legal sector by, first, finding the difference between demand deposits in circulation and estimated illegal money, this provides, legal money, then, Gross National Product is divided by legal money to get velocity of legal sector, which is then considered to be the velocity of illegal sector as well.

This method got much appreciation, but like preceding methodologies faced a series of criticism. The assumption made by Ibid that currency is used as a major source of medium of exchange, and store of wealth, was attacked as in reality because cheques and even credit cards are used in the underground economy to make transactions. Another criticism put on Ibid methodology is the assumption of same velocity in both sectors, but there are considerable arguments that suggest that velocity is lower in informal than formal sector and vice versa. Another assumption that faces number of criticism is using tax as the only influence of shift from formal to informal sectors. It was argued that other factors such as fear of penalties, probability of detection, regulations level also have considerable influence on underground economy involvement.

Despite of all the criticism Ibid's method has been the most popular among researchers for calculating the underground economy, and is considered the most erudite work done on monetary analysis. The monetary method of calculating underground economy revolves around currency as the sole medium of exchange in the informal economy, and that some of the transactions escape tax authorities. This also implies that if currency holding is higher, higher will be tax evasion and ultimately higher will be the informal sector of the economy. Cagan (1958) and Tanzi (1980) focus on tax as being the core reason for indulging in the underground economy, so they regress currency ratio on tax variable, to get tax induced currency in circulation which becomes the legal currency and the remaining part becomes illegal currency. However, most of the important thing to mention here is that Tanzi (1980) highlighted the fact that estimates of monetary approach may not be accurate, as they are sensitive to assumptions, but they can serve as a broad indicator of trends over a period of time. This statement clears most of the objections raised in different papers that these estimates are not robust thus we should not estimate it.

3. MEASUREMENT OF UNDERGROUND ECONOMY OF PAKISTAN—PAST STUDIES

Estimation of underground economy in Pakistan gets serious attention in 1990s. Several studies have come up with several different estimates of underground economy based on their regression estimates by taking different time periods and different year of analysis. Few studies are selected and included in our paper. Almost all the papers use monetary approach and follows Tanzi (1983) methodology to estimate underground economy in Pakistan.

Ahmed and Ahmed (1995) uses log-linear model to estimate underground economy of Pakistan from 1973 to 2002. The estimates show that the underground economy was 0.68 percent of GDP in 1973, reaching highest in 1998 where it reached 102 percent of GDP and then declined to 0.98 in 2002. However, Kemal (2003) criticised the estimates by postulating that replicating

the procedure used by Ahmed and Ahmed (1995), give negative estimates of underground economy, declaring long model inappropriate to estimate underground economy.

Aslam (1998) uses data from 1960 to 1998, using log-log model with a structural reforms dummy variable. The results shows that underground economy was 29 percent of GDP in 1960, increasing to 42 percent of GDP reaching its peak in 1983 at 46.7 percent of GDP and falling to 35.5 percent of GDP in 1998. Likewise, Kemal (2003) replicates and suggests that results are not robust when reproduced as well as bench mark period has an impact on estimates. Therefore, its important to choose benchmark period.

Iqbal, Qureshi, and Mahmood (1998) estimate underground economy from 1974 to 1996. It explains that underground economy increased from 20 percent of GDP in 1973 to 51 percent of GDP in 1996. The replication of study by Kemal (2003) shows that results are positive, but with a lower magnitude compared to original estimates.

Kemal (2003) uses OLS estimation technique and introduces a structural adjustment dummy variable in the model as well to estimate underground economy of Pakistan from 1974 to 2002. The estimates show that it was 20.27 percent of GDP in 1974, reached its highest value in 1998 of 54.52 percent of GDP and then fell to 37.25 percent of GDP in 2002.

Yasmin and Rauf (2003) shows that underground economy increased substantially from Rs. 12 billion to Rs. 1085 billion in 2002. Like other studies underground economy rises considerably in 1998 to Rs. 1039 Billion, but unlike other studies states that underground economy reached its peak in 2002.

Gulzar, Junaid, and Haider (2010) finds that the underground economy was 36.197 percent of GDP in 1982 and came down to 32.464 percent of GDP in 1998 which contradicts with most of the previous studies, as they show a hike in the underground economy in 1998. This shows that monetary approach is sensitive to base year. However, in 2010 underground economy of Pakistan stood at 30.554 percent of the GDP.

Arby, Malik, and Hanif (2010) finds that in 1966 underground economy was 24.4 percent of GDP, rising to 36.4 percent of GDP in 1998, which is in line with the previous studies but the magnitude has dropped considerable, the underground economy falls in 2008 to 19.6 percent of GDP. This study estimates parameters of currency equation by ARDL equation and uses data before 1973.

As discussed at the end of previous section the estimates of Pakistan are not very different, i.e., the estimates are sensitive to the parameters and choice of base year. However these estimates can be taken as over trend of underground economy.

4. ESTIMATES OF UNDERGROUND ECONOMY

To estimate the underground economy one can choose two broader approaches, the first is the direct approach while the second is the indirect approach. Similar to previous studies we choose to use the indirect method of measuring the size of underground economy. Monetary model is the most appropriate model to estimate the underground economy, which has been used considerably to measure the underground economy in Pakistan [Kemal (2007)].

Model

The model we used is based on Tanzi (1980) and Kemal (2003) with few modifications.

$$\left(\frac{CC+FCA}{M2}\right)_t = \alpha + \beta_1 DTY_t + \beta_2 ITY_t + \beta_3 BS_t + \beta_4 R_t + \beta_5 G_t + \beta_6 \left(\frac{CC+FCA}{M2}\right)_{t-1} + \epsilon_t$$

Where,

CC = currency in circulation

FCA = Foreign Currency Accounts

M2 = Money supply

DTY= Direct taxes/GDP

ITY = Indirect taxes/GDP

BS = Banking Amount/Accounts

G = Growth rate of real GDP

R = Real Interest rate

ϵ_t = error term

Subscript, t-1 represents Lag, and t represents current period

α is intercept and β s are the coefficients.

Rationale and Expected Results

The inclusion of direct tax and indirect tax as percentage of GDP are a proxy to tax rate. It implies that higher tax rates increases the incentive for people to evade taxes. As opportunity cost of staying in the formal economy increases as compared to underground where taxes could be avoided people are more likely to enter into underground economy, and since currency and foreign currency accounts are the main medium of transactions in underground economy it is likely to have positive impact on currency demand deposit ratio.

Interest rate is proxy to opportunity cost of holding currency. Opportunity cost increases demand for holding currency and demand for FCA and other time deposits. Thus rise in interest rate is expected to have a negative impact on currency demand deposit ratio.

Growth rate of real GDP is included as the economic performance variables. It is expected that as GDP grows, it leads to a reduction in demand for currency, as currency is replaced with other financial institutions, But interestingly Shabsigh (1995) and Aslam (1998) argue that in the case of Pakistan as GDP grows the demand for currency also increases due to cash based transaction in the formal economy as well. Thus the expected sign could be positive.

Banking service ratio is a proxy to banking services. Better the service lower will be the currency holding. Therefore, it is expected that banking service ratio and currency to demand deposit have a negative relationship.

Lag of currency to demand deposit ratio is taken because currency to demand deposit ratio is non-stationary, so adding the lag to the equation makes it stationary, and it is expected to have a positive impact on currency to demand deposit ratio.

Data and Estimation Results

All the data used in the estimation is taken from various annual report of State Bank of Pakistan, and various issues of Economic survey of Pakistan. The estimation technique used is OLS, and the estimates are reported in Table 1.

The results are according to the hypothesis formulated above. Besides growth rate of GDP all the variables are significant at 5 percent level of significance. Although coefficient of the growth rate of GDP has opposite sign to what is predicted by Shabsigh (1995) and Aslam (1998) but it is in line with the theory which says that as GDP growth increases the demand for currency is reduced. The most important coefficient of tax variables are significant and has required signs therefore, we can estimate the size of underground economy using these estimates.

Table 1

<i>Parameter Estimates of Currency Demand Equation</i>				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.016	0.043	-0.37	0.7121
DTY(-1)	1.959	0.842	2.33	0.0262
ITY(-1)	1.334	0.394	3.39	0.0019
BS	-4.93E-07	1.63E-07	-3.02	0.0049
R	-0.0019	0.0008	-2.38	0.0232
G	-0.0027	0.002	-1.31	0.1992
CFM(-1)	0.619	0.115	5.37	0.0000

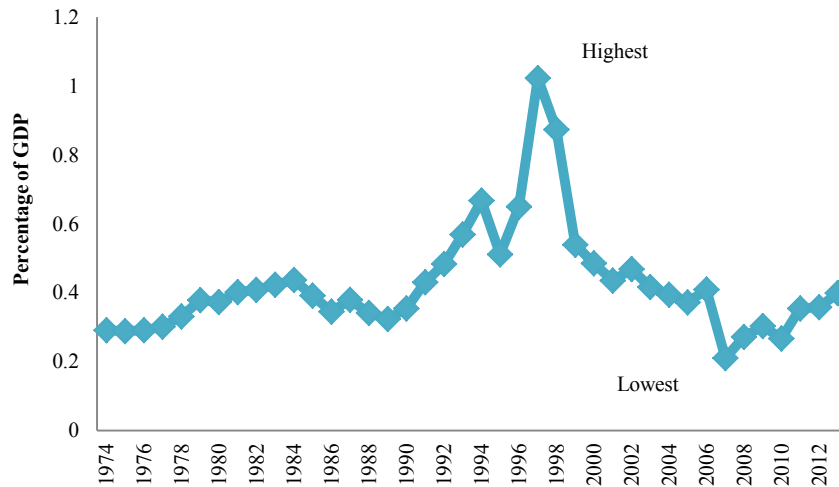
Using the parameter estimate reported in Table 1, estimates of underground economy are reported in Table 2. The estimates show that underground economy was 29 percent of GDP in 1973-74. During the 70s underground economy in Pakistan grew gradually from 29 percent to 39 percent in 1979, with a growth rate of

27 percent. During the 80s underground economy stayed relatively stable, hitting its highest in 1984 at 43 percent of GDP. The decade of 90s saw the highest amount of underground activity, with growth rate of 80 percent in 1997 (also shown in Figure 1). In 1997 general elections were held, which might be one of the reason as to why we see higher underground activity in 1997 and proved to be the largest peak for the underground economy. The 2000s has shown a gradual decrease in size of the underground economy, reaching its lowest of 21 percent of GDP in 2007. In 2013 it stood at 39 percent of GDP.

Table 2

Estimates of Underground Economy for the Year 1974–2013

Years	Estimates of Underground Economy		
	Rs. In Million	Percentage of GDP	Growth
1974	23818	29.16	
1975	29909	28.88	25.58
1976	34838	29.10	16.48
1977	41043	30.18	17.81
1978	52953	33.13	29.02
1979	67371	37.88	27.23
1980	78471	37.32	16.48
1981	99599	40.19	26.92
1982	119336	40.85	19.82
1983	138947	42.31	16.43
1984	163768	43.75	17.86
1985	166473	39.16	1.65
1986	160980	34.52	-3.30
1987	195770	37.98	21.61
1988	205026	34.11	4.73
1989	221482	32.42	8.03
1990	269371	35.45	21.62
1991	391358	43.08	45.29
1992	521325	48.36	33.21
1993	682580	56.88	30.93
1994	943507	66.78	38.23
1995	953509	51.10	1.06
1996	1378554	65.02	44.58
1997	2483178	102.26	80.13
1998	2340199	87.40	-5.76
1999	1583370	53.89	-32.34
2000	1857396	48.55	17.31
2001	1833138	43.54	-1.31
2002	2088384	46.90	13.92
2003	2029850	41.63	-2.80
2004	2223698	39.42	9.55
2005	2418636	37.21	8.77
2006	3118761	40.91	28.95
2007	1829218	21.09	-41.35
2008	2783824	27.18	52.19
2009	3855252	30.30	38.49
2010	3964512	26.72	2.83
2011	7575512	35.42	91.08
2012	8062174	35.81	6.42
2013	9139659	39.90	13.36

Fig. 1. Underground Economy as Ratio of GDP

Growth rate of underground economy is quite fluctuating throughout the period. The fluctuating movements are in coherence with the movements in growth rate of nominal GDP. This also confirms the Kemal (2007) results that underground economy is driven by the formal/recorded economy. Growth rate in underground economy has been fluctuating while increasing to over 80 percent in 1980 and then dipping lowest to – 41 percent in 2007 and then raised to 91 percent in 2012. Polynomial trend (Figure 3) shows clear long run cyclical association between recorded and underground economy.

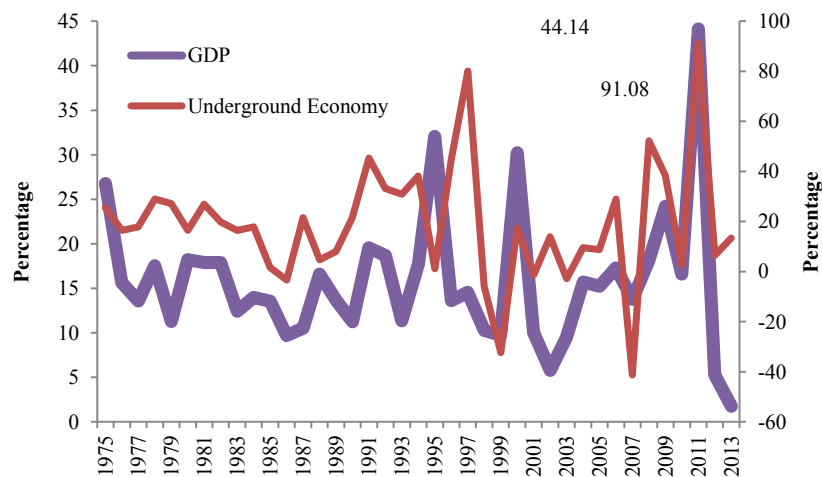
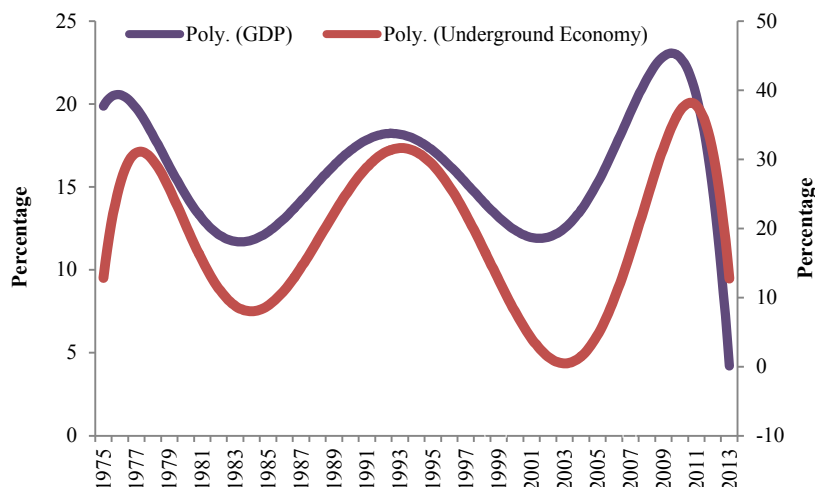
Fig. 2. Growth Rate of GDP and Underground Economy

Figure 1. Growth Rate of GDP and Underground Economy (Polynomial Trend Line)



5. DETERMINANTS OF UNDERGROUND ECONOMY

Underground is a mere reality that is often ignored. Sometimes it's a byproduct of an economic system or at times a product of circumstances. Soviet Union under Stalin had a network of underground activities that collectively formed an underground economy in Soviet Union, for example in agricultural sector second market developed due to considerable shortage in production from state and collective farms and situation was no different in other sectors like, housing, medical supplies and even information and cultural product industries.

There are several factors that have considerable impact on the growth of underground economy, few of the factors can be categorised in to economic factors, such as intensity of regulations, tax and social security burden, while other factors can be put under the heading of non-economic factors for example, unwillingness to show accurate income. Other social and psychological factors also influence the decision making process of an agent when considering to become part of the underground economy [Schneider and Enste (2000)]. Identify decline in civic virtue and decline in tax morale as factors influencing the indulgence in underground economy.

On the whole there are certain factors that have been cited by various researchers as the main influence of rising underground economies.

5.1. The Burden of Tax and Social Security Contribution

When taxes rise and social security burden is increased there is more incentive for people to deviate from the formal sector in to the informal sector to

avoid the increased burden. Schneider, Buehn, and Claudio (2010) postulates that higher tax burden has an effect on labour-leisure choice of an economic agent and may trigger supply of labour in underground economy. The bigger the difference between labour cost in official economy and after tax earnings, there will be a greater incentive to work in the underground economy in order to reduce the wedge that tax creates. Putnins and Sauka (2011) used survey technique to explore the reason for tax evasion in the Baltic states, and conducted a survey in which opinions of the entrepreneurs was taken on why do they evade taxes, and the result showed two main reasons, firstly taxes were too high, secondly, tax systems were inflexible. Teobaldell and Schneider (1993) identifies complex tax systems as influencing participation in underground economy, and argue that if more complex tax system allows tax avoidance then it would lead to an increase in the welfare of people and lower level of underground activity.

Kemal (2007) argues that once an individual indulges in underground economic activity, it gets difficult to break out of the spiral due to, the informal income not being taxed because of poor documentation. Tax evaders fear that if they declare their informal incomes, they will be punished. Once a person gets involved in underground economy, they build up relationships and their personal profiles so it gets tougher for them to leave what they have got hold of and start all over again, so they keep themselves involved in the underground economy even against the risk of getting caught.

5.2. Intensity of Regulation

Regulatory authorities are normally formed to control certain things. For example one of the roles of Oil and Gas Regulatory Authority (OGRA) is responsible for setting oil prices in country. When OGRA changes the prices of oil it affects all the industries which use oil as an input, for example transport industry. In that situation, if OGRA reduces petrol prices, the transporters have the incentive to stick to old rates, and do not reduce the fares in response to reduction in petrol prices, and ultimately they become part of the underground economy.

Friedman, Johnson, Kaufmann, and Zoido-Lobaton (2000) suggests that countries that have high degree of regulations are more likely to have bigger size of underground economy in the total GDP. Johnson, Kaufmann, and Zoido-Lobaton (1998) postulates that countries that have better rule-of-law have succeeded in maintaining low level of underground economy activity. They also identify that higher regulations lead to higher incidence of bribery especially in the transition countries, and also higher effective taxes on official activities which all ultimately translates in to bigger underground economy.

There should be a considerable effort in forming regulations that can easily be implemented and government should take special measures to maintain

rule-of-law so people abide by the regulations more frequently and ultimately come in to the formal economy bracket. There should also be effort made in formulating effective regulations rather than increasing the number of regulations.

5.3. Social Transfers

Social transfers in Pakistan comprise of Zakat and different types of targeted as well as untargeted subsidies. Kemal (2007) argues that Zakat and subsidies discourage people from working in the official economy as this reduces their incomes unless they earn extra income by working in underground economy. Some people also dislike paying Zakat to the government because of their distrust in the honesty of the government in distributing, so they avoid official economy and instead indulge in underground economy sector. Johnson, Kaufmann, and Zoido-Lobaton (1999) put another perspective to the social transfer's effect on underground economy, as they postulate that it is the ineffectiveness of the system introduced by the government of social transfer that people lack trust in, which encourages them to indulge in underground economy

5.4. Public Sector Services

As more and more individuals indulge in underground economy, escaping the official economy, governments suffer reduction in the revenues, which further leads to higher tax rates and causes more people to shift from formal to informal sector of the economy. Johnson, Kaufmann, and Zoido-Lobaton (1998) finds that lower revenues deteriorate the quality and quantity of public goods and services and forces governments to charge higher tax; this translates into a stronger incentive to participate in the underground economy, and also find that countries that have high tax returns normally have fewer regulations and better rule of law, and ultimately smaller underground economy.

5.5. Social and Psychological Factors

Efficiency of the public sector has effect on the tax morale of the citizen of that country. People tend to associate themselves into psychological tax contracts in which they pay taxes willingly assuming that the state will deliver on its obligation of quality and quantity of public goods and services. Feld & Frey (2007) suggests that tax payers will be more willing to pay taxes honestly if they get valuable public service in exchange. Another factor that they highlighted was the treatment of Tax payers by the tax authority, for example if tax payers were treated as partners instead of subordinates they are more likely to pay taxes honestly, So better tax morale would ultimately translate into lower underground economy.

Cultural norms and social traditions are also factors that contribute to different outcomes in economic activities and Religion is no exception. Heinemann and Schneider (2011) investigated the impact of religion on the size of underground economy and finds that countries that were dominated with Eastern religions were associated with smaller underground economies as compared to other religions, and also find that state and religion have close proximity and this helps in rule abidance by the citizen and hence smaller underground economy.

Building strong Morales is advantageous to an economy, so governments should devote considerable effort to enhance the morale framework of a country that would contribute in curing the problem of underground economy.

5. INSTITUTIONAL QUALITY

If in a country the public institutions begin to work more effectively, it enhances the confidence of individuals on the government and people associate themselves less to the underground economy. As postulated by Bird, Martinez-Vazquez, and Torgler (2006) that for a poor country to become richer, it needs to build on its infrastructure and institutions. A country with better institutional quality is likely to have lower incidence of underground economy.

Razmi, Falahi, and Montazeri (2013) in their paper use Control of Corruption, Political Stability and Rule of Law to check the institutional quality of 51 OECD countries, and find that control on corruption blocks individuals from entering into underground economy easily, so act as a deterrence. Political stability provides economic agents with more accurate expectations about the future, so the incentive to indulge in underground economy is lowered, thirdly, better rule of law, enhances the confidence of individuals on the government, and the threat of being caught at the same time deters individuals to indulge less in underground economy.

Based on the aforementioned reasons for increase in underground economy we selected few indicators which are used as proxy to the above mentioned problems.

6.1. Analysis of Variables

Data is taken from various issues of economic survey, various annual reports of the State Bank of Pakistan, World Governance Index

6.1.1. *Inflation and UGE*

Inflation and underground economy are expected to be positively related to size of the underground economy, as price level rises, it increases the incentive for consumer as well as producers to shift their activities underground and do not report to tax authorities. Higher inflation cause labour to demand more wages, so producer has more incentive not to report actual number of

employees. Whereas higher inflation/prices in the formal sector induces consumer to buy products from informal sector, for example, Bara market that sprung up in Rawalpindi, Peshawar, Gilgit which provided cheaper smuggled goods. Inflation shows a weak but positive relationship with underground economy, as depicted by graph. Underground economy seems to respond to a threshold level of underground economy, showing a peak around 9.51 percent of inflation and then reverts back to move around the trend line. However by ignoring the peak there association seems a flat line which is also depicted by the lower correlation coefficient reported in Table 3.

6.1.2. Government Expenditure and UGE

Government expenditure would reduce the indulgence in underground economy as people greater expenditure will increase create more employment opportunity in the legal sector, however, if the quality of public good provided through government expenditure is poor, people to avoid tax will be provoked more to enter in to underground economy. Similar to inflation rate government expenditure does not show any considerable association with underground economy. The correlation is 8.7 percent and it is not statistically significant.

6.1.3. Custom Duties and UGE

Custom duties is a regulation that is imposed to prevent imports. This may imply that it is positively associated with underground economy, i.e., custom duty raises the price of commodity, and as postulated before, higher prices induces individuals to buy products from alternative source where it is available cheaply, so it would give rise to illegal economy. Moreover, higher custom duties lead to increase in smuggling activities which increases underground economy. However, custom duties is not significantly associated with the underground economy as shown by the correlation as well as the Graph.

6.1.4. Rule of Law and UGE

Rule of law refers to basic principle that law should govern nation, if a country has greater degree of abidance of law, it will have lower level of underground economy, so the relationship is expected to be negative with underground economy. This concept is related to the utility individual derives from operating in the underground economy and the disutility individual suffers from getting caught by the law, so the ultimate decision lies on the relative comparison of the two. A higher degree of rule of law will impose higher disutility from getting caught, and people will refrain from becoming part of the underground economy. Underground economy shows negative association with rule of law, as rule of law is increasing underground economy tends to decrease, however the association is based on data for seventeen years. The relationship is

also influenced by the fact that underground economy has also reduced in volume of the past fifteen years.

6.1.5. Government Effectiveness and UGE

Indicator of government effectiveness engulfs a set criterion that are judged for each country, which include, quality of public services, the quality of the civil service and its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to its stated policies. It is expected if the Government effectiveness is higher, underground economy estimates will be lower, signaling a negative relationship. Often in Pakistan civil servants are considered to be influenced by politicians and are not allowed to perform their duties independently, this has shattered the confidence of people in the credibility of government as well as the institutions responsible for implementing the policies. Underground economy shows weak positive association with underground economy for seventeen years for Pakistan. Government Effectiveness shows responsiveness to a threshold level, reaching its maximum as the government effectiveness index reaches value of -0.52 , and stays volatile between -0.52 and -0.45 , and then gradually falls as government effectiveness index improves.

6.1.6. Corruption Control Index and UGE

Corruption is expected to have a positive relationship with underground economy. Country suffering from higher corruption implies that there are more ways to manipulate the system and get away with illegal and informal activities. Corruption also shatters the confidence of people on the government and induces people to not pay taxes, and be part of the underground economy. Corruption also gives individuals to reap higher profits by setting higher prices, selling low quality products for higher prices and not abiding by the regulatory procedures. Corruption Control shows a negative association with underground economy for the years 1996-2013. Underground economy gradually decreases as corruption control index increases, however underground economy responds to a threshold level of corruption control index of -1.11 , and then drops to lower level, and fluctuates around the trend line.

6.1.7. Voice and Accountability Index and UGE

Voice and Accountability measures the extent to which a country's citizens are able to participate in selecting their government, higher degree of voice and accountability implies lower level of underground economy, as people participate more in the selection of government, they are more inclined to agree on average with the policies of the government. For example, former Soviet Union had a large underground economy, because individuals were not allowed to own land, so it left farmers unmotivated to work on the fields, creating large

shortage of food, and giving huge rise underground economic activities. Voice and accountability shows negative association with underground economy for the years 1996-2013 for Pakistan. Underground economy shows sensitivity with a threshold level of voice accountability index, at the value of -1.27 and then shows overall negative trend as index improves to a positive value.

6.1.8. Political Rights Index of UGE

This index refers to the degree of freedom in the electoral process, political pluralism and participation in political activities. Higher political rights imply lower level of underground economy. As people have more freedom in participating in expressing their views, they will be less dis-satisfied and less inclined to participate in underground economy. Expected sign for political right index is negative. Underground economy shows negative association and shows sensitivity to political right index. Overall trend is negative, but underground economy remains sensitive to threshold level of political rights index of 4 where it reaches its peak. Political Rights individually also show significant impact on underground economy, and when combined with other variables exerts a considerable effect on underground economy.

6.1.9. Civil liberty Rights Index

Civil liberties are personal guarantees and freedoms that the government cannot abridge, either by law or by judicial interpretation. Greater level of civil liberty implies that individual have greater freedom in choosing what they want to do, so greater Civil liberty will reduce underground economy, and the expected sign is negative. Civil liberty shows positive relation with underground economy, and underground economy is sensitive to a threshold level of civil liberty index of 4. Individually Civil Liberty doesn't have a considerable impact on underground economy, however combined with other variables, leaves a considerable impact.

6.1.10. Number of Documents Required for Exporting Activities and UGE

Number of documents required for exporting activities is a form of regulation that is used to judge how easy or difficult is it to export in Pakistan, if greater numbers of documents are required imply that people will be more inclined to turn to underground economy, as it makes it easier to operate in underground economy than formal, where large documentation is required, so the expected sign is positive. Number of documents required for exporting activity shows weak association with underground economy.

6.1.11. Business Freedom and Trade Freedom Index and UGE

Business freedom is an overall indicator of the efficiency of government regulation of business; Greater freedom implies lower level of underground

economic activity by individuals, so the expected sign is negative. Trade freedom is a composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services so if a country has greater trade freedom index, it implies that there are fewer tariff and non-tariff barriers and more opportunity for people to work in formal economy, rather than opting for the underground economy. The expected sign of Trade freedom index is negative as well, as Tariff and non-tariff barriers act as deterrence in smooth operation of economy, for example according to business recorded, Pakistan is the third largest tea importer in the world, and due to Afghan Transit Trade Agreement (ATTA), Trade freedom between the two countries and statistics reflected increase in official channel of import of tea in to Pakistan. Underground economy and business freedom share negative association with underground economy. Underground economy is sensitive to a threshold level of business freedom index of 55, where underground economy reaches its peak as percentage of GDP, and then revolves around its trend line. Trade freedom index also shares negative association with underground economy. Underground economy shows a threshold level at the value of 31 of trade freedom index where it reaches its highest value. Both the variables, Trade Freedom and Business Freedom index individually do not have considerable effect on movement of underground economy, but combined with other variables leaves considerable impact on underground economy.

6.1.12. *Corruption perception Index*

Corruption perception index ranks countries according to the extent to which corruption is believed to exist. Higher degree of corruption perceived by resident results in lower confidence on government and bureaucracy provokes individual to indulge in activities of the underground economy. For example according to a report of Transparency international in 2014, Somalia was ranked as the most corrupt country of the world. United Kingdom's Department for International Development report in 2013 suggests that Somalia hasn't had a properly functioning government in more than 20 years, and this is reflected in the large eruption of Somali pirates, as well as huger amount of underground economy. Underground economy has weak association with corruption perception separately, as corruption perception doesn't leave a considerable impression on underground economy individually. Underground shows a peak at the value of 2.2 of corruption perception index, However, combined with other variables corruption perception does leave an impact on underground economy, which is worth considering.

6.1.13. *Political Terror Scale*

A yearly report measuring physical integrity rights violations worldwide. The Political Terror Scale measures level of political violence and terror that a

country experiences in a particular year. A country experiencing high level of violence and terror is likely to be more inclined to operate in underground economy. As terror and violence disrupts the everyday matters of the economy, and cause investment in a country to fall, [Persitz (2005)], people have less opportunities, and this translates into people opting to work in underground economy, at lower wages, and underground economy springs up to cater the need of small communities, which provide products at cheaper prices. For example [Persitz (2005)] in his paper explains the effect of Palestinian terror on Israeli economy, and suggests that countries per-capita GDP was understated by 8.6 percent in 2003 due to terror and absence of peace process. Underground economy shows positive association with Political terror, but political terror doesn't seem to exert impactful impression individually however combined with other variables political terror scale contributes to explaining the movement in underground economy considerable. Underground economy reaches its peak as Political Terror Scale reaches the value of 4.

6.1.14. Regulations

Regulation is a rule or a law that the government. Regulations are used to put a control over activities of an economic agent, some regulation result in increase in consumption of some products while some regulations are aimed at reducing the consumption of certain products in an economy. Regulation is not only restricted to consumption it is also applied on investment, for example, Security and Exchange Commission of Pakistan (SECP) controlling body of Karachi Stock Exchange (KSE) regulates the behaviour of firms, by making sure that there is minimum misinformation floated by a company. Regulation cause deterrence in the activities of economic agent, so greater regulation will cause greater indulgence in the formal sector of the economy. For example in Peru, due to high degree of regulation it takes 20 years for a piece of land to be registered on a person's name, so there are huge illegal settlements, as slumps in Peru. The expected sign is positive in this regard. Regulations show individual association with underground economy, as underground economy fluctuates with change in level of regulation in the economy. It shows negative association and is also associated with a threshold level 5.85 with underground economy. However, when combined with other variable it contributes to explaining the model effectively.

6.1.15. Capital Control and Movement of People

Movement of Capital refers to the mobility of capital to easily shift from one job to the other. If capital is mobile, it will be utilised in a place where its return is maximum, and create economic activity that would encourage utilisation of capital in formal economy, However, if capital is immobile, the efficiency of capital will be compromised, causing lower returns on capital and

increasing the likelihood of individuals to opt for operations in underground economy, where capital provides greater economic opportunity, so the expected sign is negative.

6.1.16. Capital Controls

It is a form of regulation, where a country imposes restrictions on flow of capital. Restriction maybe placed on inflow or outflow. Capital control is adopted by governments to cure the balance of payment deficit or surplus, or to serve their political agenda. Capital control causes the function of invisible hand to disrupt from reaching the equilibrium. As more capital control is placed, individuals replace their operations from formal to informal sector, because in informal sector they can direct the capital to where it is providing maximum benefit, many people use different methods to dodge the capital control system, by engaging in delays and lags in international payments. The expected sign is positive, as higher controls suggest higher indulgence in underground economy. Capital Controls do not show considerable influence on underground economy estimates. Underground economy reaches its peak when capital control reaches value of 2. However, capital control when combines with other variables leaves considerable impact.

6.1.17. Black Market Exchange Rate

Black exchange rate occurs when the official exchange rate shows little or no relationship to the value of the money. The exchange of foreign currency in underground economy forms the black exchange rate. If black market exchange rate has a little effect on the economy as a whole, there will be lower level of underground economy, as the risk associated with dealing doesn't offset the gain from operating in black market exchange rate, so individuals will avoid, if however the premium from operating in the black market substantially offsets the risk, individuals prefer operating in the underground economy. So the expected sign is positive. Underground economy and Black Market Exchange rate show weak association individually, as it doesn't show considerable changes in the underground economy, however with other variables, black market exchange rate becomes highly significant. Underground economy seems to be sensitive to value of 8.63 of black market exchange rate index, where underground economy reaches its maximum.

6.1.18. Transfer and Subsidies

Transfer and subsidies are compensations that government provides to economic agents. Transfers are paid to individuals who do not contribute to the economy by working, whereas subsidy is provided to the activities that generate other economic activities. However, government provides its transfer and subsidies through its revenue. So higher level of transfer and subsidy means that

tax payers have a greater burden, and so this would induce individuals to operate in the underground economy. Transfer and subsidies shows weak association with underground economy individually. Underground economy reaches its highest value when transfer and subsidies index reaches value of 9.7. Even though individually it has a lower impact on government but combined with other variables leave a considerable impact.

6.1.19. Legal Structure and Property Rights

Legal structure refers to the legal definition of the businesses, for example partnership, sole proprietorship, and property rights refer to the ownership of the economic resources. A country with high level of legal structure and property rights induces people to engage more in formal sector of the economy, as people have greater freedom to own resources in anticipation of earning reward on the resources, and legal structure rights provide the individual to choose the way he wants to operate in reallocating resources. The expected sign is negative, as legal structure and property rights increase, underground economy will reduce. Legal structure and property rights also show considerably weak association with underground economy individually. Underground economy reaches highest value as Legal and property right index reaches value of 3.9. However individually there is low impact of Legal structure and property rights but combined with other variables leaves considerable impact.

6.1.20. Freedom of Trade Internationally

Freedom of trade internationally refers to the absence of tariff and non-tariff restriction on import and export of goods and service. As world is becoming a global village, there is a wide debate to remove trade restrictions and adopt a free trade policy, however this notion has met a wide resistance, for example The Jobs Argument, which says that cheap foreign import would shift the consumption pattern of consumer to the imported product, and cause a reduction in the demand of local products and ultimately reducing jobs as profits are reduced. Freedom of trade internationally reduces the tariffs and non-tariff barriers involved in trade, and induce individuals to engage in the formal economy. Assuming that individuals motive is profit maximisation, or utility maximisation, having barriers reduces profits, by causing hindrance in resources being utilised where they are valued the most. The expected sign on Freedom of Trade internationally is negative. Higher freedom leads to lower indulgence in underground economy. Freedom to trade internationally shows considerable association with underground economy, as underground estimates show considerable fluctuation in the data individually. Between the value of 2.9 and 4.1 of Freedom of trade internationally, underground economy estimates show greater fluctuation, and underground economy reaches its maximum at 3.2.

6.1.21. Credit Market Regulations

Credit market deals with borrower and lenders interacting to exchange the issuance of stocks by borrower in return for a reward after a certain amount of time, and lender willing to lend excess of their funds sacrificing present consumption for future consumption. Credit market regulations, for example U.S Securities and Exchange Commission (SEC) through Securities exchange Act of 1934, part 242, introduced a law which stated that,

“A presentation of the most directly comparable financial measure calculated and presented in accordance with Generally Accepted Accounting Principles (GAAP);”

This implied increased cost for listed companies to maintain accounts and take up the services of qualified accountants who knew the procedural considerations of GAAP.

Credit Market regulation causes deterrence for borrowers and lenders as they have to comply with greater number of regulations, and some regulations might seem cumbersome to individuals and ultimately lead them to opt for operations in underground economy rather than the formal sector of economy. The expected sign is positive, as with the increase in credit market regulations there will be higher underground economic activity. Credit Market regulations show weak association with underground economy as underground economy. Individually credit market regulations do not explain much of the movement in underground economies. However, combined with other variables, it does lead to useful contribution in explaining fluctuation of underground economy. The threshold level of credit market regulation index is 5.63, where underground economy reaches its maximum and then drops.

6.1.22. Tax

Tax has been considered the most prominent factor that contributes to the underground economy. Tax is paid by the economic agent working in the formal sector of the economy, and people in the underground economy evade taxes. As higher taxes imply comparatively lower disposable income compared to formal sector, so people have more incentive to evade taxes. People derive higher utility from higher income level, they compare the risk of getting caught and the utility they get from tax evasion. If utility gained is higher, underground economy will increase, where as if disutility of getting caught outweighs the gain from tax evasion individual opts for formal sector. The expected sign is positive, underground economy will increase as the tax increases. Tax shows weak association with underground economy. Individually Tax doesn't show considerable impact on underground economy. Underground economy shows a threshold level at 309.48 billion with taxes.

6.1.23. Labour Force Participation

Labour force participation refers to share of population in the legal age or working, employed or seeking work. Labour force participation is calculated for civilian labour force as proportion of civilian population. As labour force participation level increases underground economy is expected to reduce, as labour force participation is calculated for formal sector of economy; higher labour force participation signals lower level of underground economy. Labour participation has a considerable association with underground economy, and underground economy shows volatility from as labour participation increases from 49 percent to 50.3 percent and underground economy reaches its peak at labour participation of 49.5 percent. Labour participation, combined with other variables will considerably contribute to explaining the fluctuation in underground economy.

6.1.24. Urban Population

Urban population refers to the proportion of population that resides in urban areas of the country. The definition of urban is relative to the country in consideration and urban area of one country maybe not be urban when compared to other. However, World development indicators define urban population on the basis of estimates from United Nation World Urbanisation prospects. As population increases, same resources need to be divided among more people, and overall competition for resources increases, which pushes prices higher. Higher prices leads to germination of underground economy, as people who cannot afford higher prices opt for buying the same products in underground economy. Increasing urban population for a developing country also leads to development of slumps as can be seen in Islamabad. Urban population can also lead to increase in underground economy as more and more low skilled labour pours in to cities, and low level of jobs for low-skilled labour leaves the low skilled population unemployed. With poor social security structure in Pakistan, people start to work at lower wages in informal sector.

6.1.25. Rural Population

Rural population is the part of population that resides in geographic areas that are located outside cities and town. As rural population increases it causes more involvement in primary sector, which is mostly measured in terms of production it produces in a given time, rather than individual. So increase in rural population causes more people to be involved in primary sector, which causes increase in production, and leads to more economic activity, which leads to higher level of formal activity in other sectors like secondary and tertiary. So increasing rural population would cause reduction in underground economy.

6.1.26. Age Dependency Ratio of Young

Age dependency ratio of young is a age to population ratio that measures the proportion of dependent that are young up to the age of 15 to productive part of population which is the employed Labour force. This measures the how dependent economy is on productive population. As the ratio of young dependent population increases as percentage of working population, there is higher burden on government and household to provide for the increase burden. Higher social security burden on government causes government to increase its tax base to provide for the dependent population which causes people to misreport their incomes to avoid paying higher taxes. Country like Pakistan which has dysfunctional social security system, individuals who provide for their own burden, try to avoid paying taxes because that reduces their disposable income, and individual maybe involved in illegal activities to make their ends meet, or work two jobs. For example many government employees work private jobs to supplement their incomes.

6.1.27. Arable Land

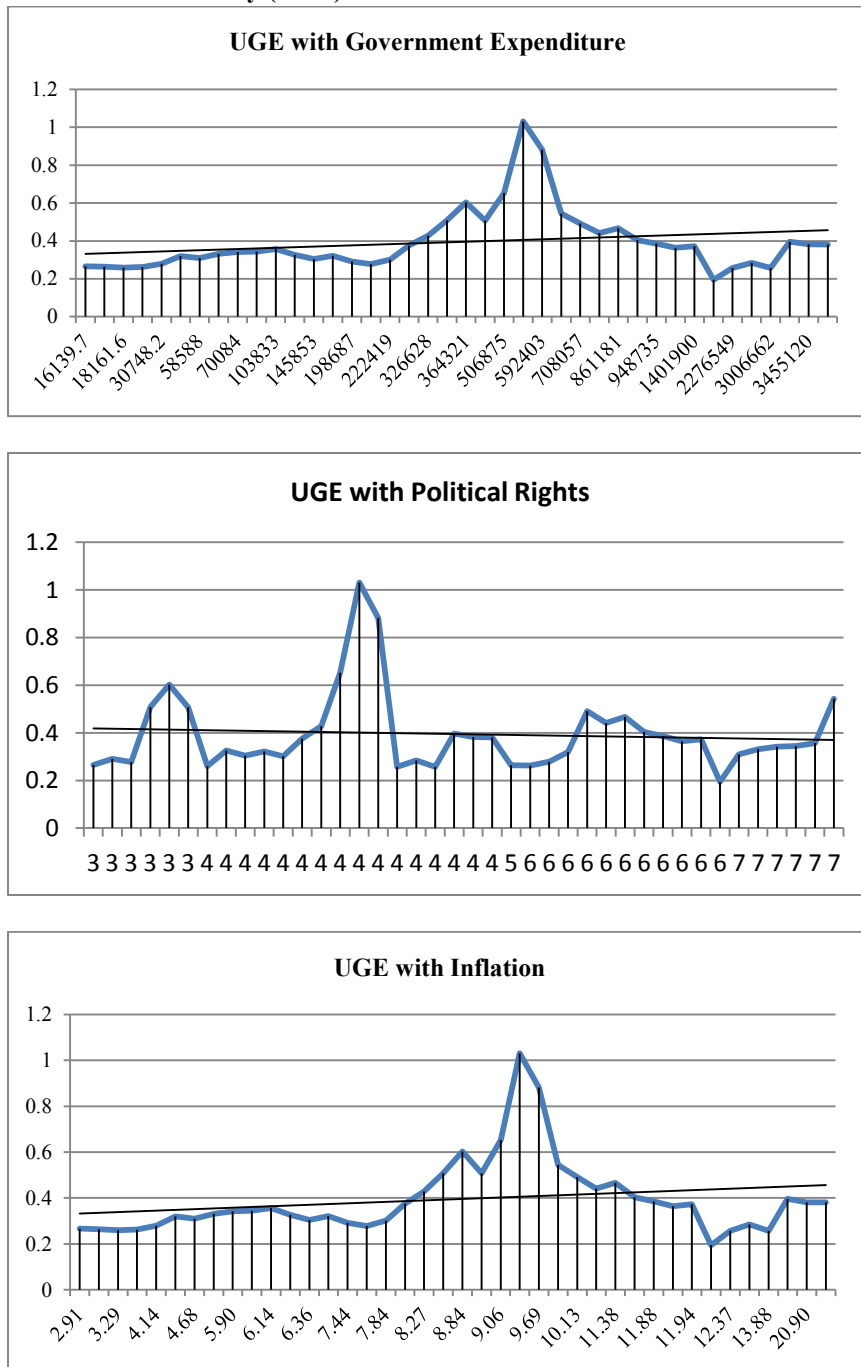
Arable land refers to the land that goes through crop rotation, Food and Agriculture Organisation (FAO) define arable land as “Arable land is agricultural land occupied by crops both sown and harvested during the same agricultural year, sometimes more than once”.

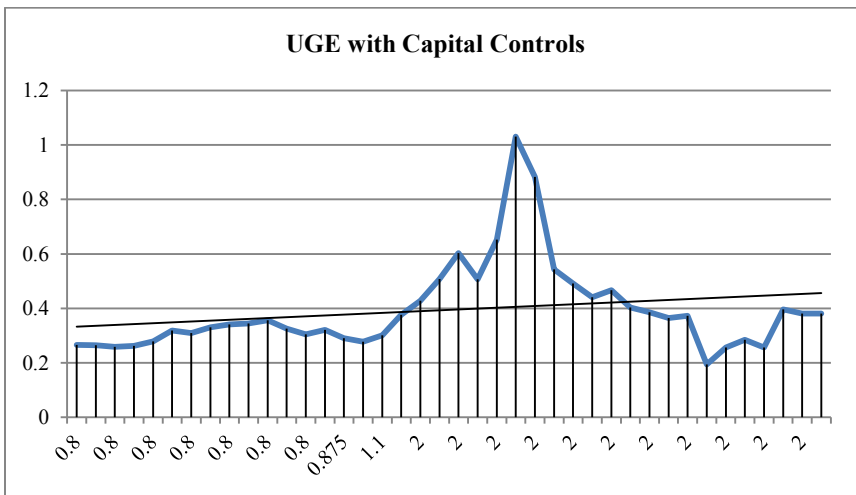
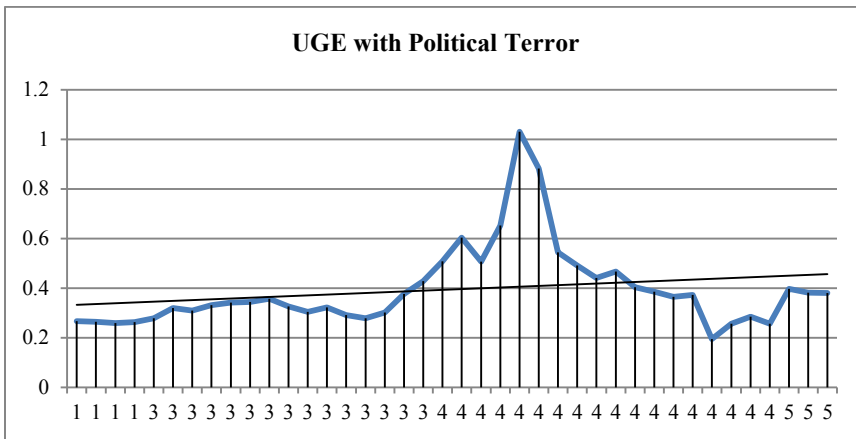
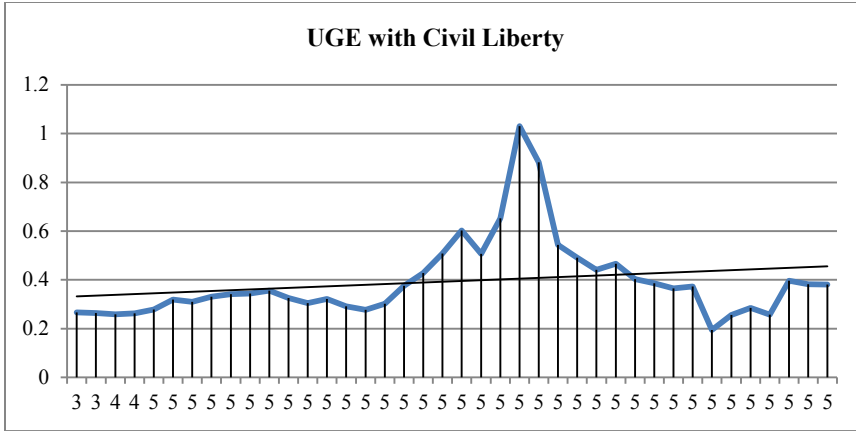
Table 3

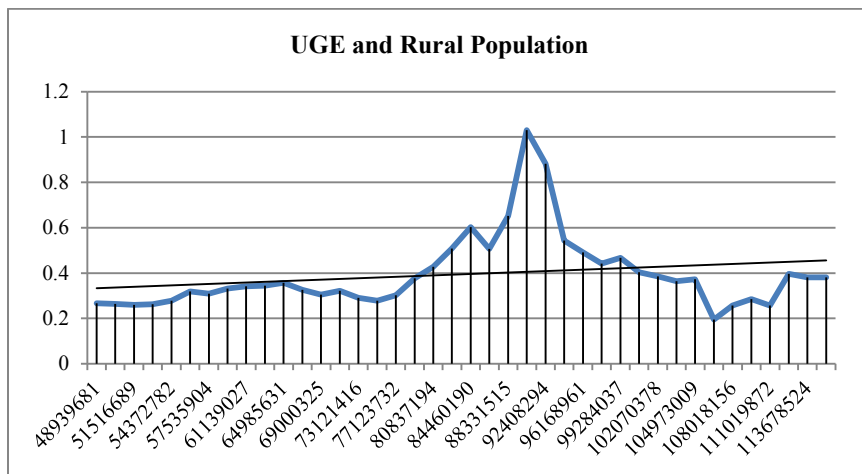
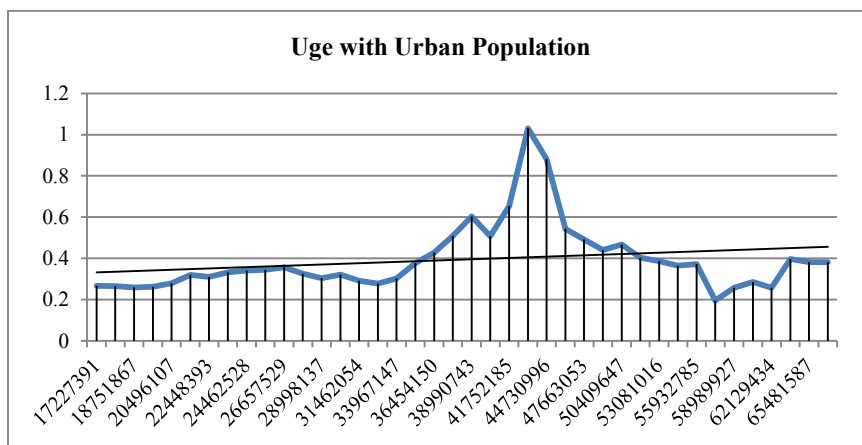
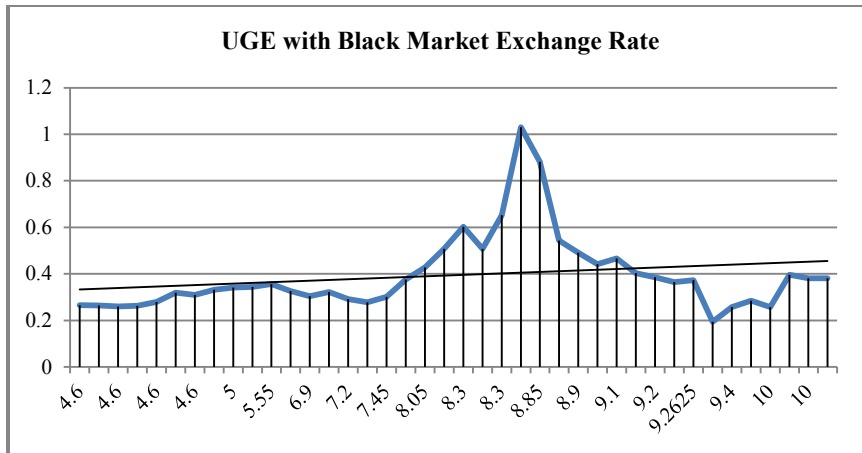
Correlation Matrix

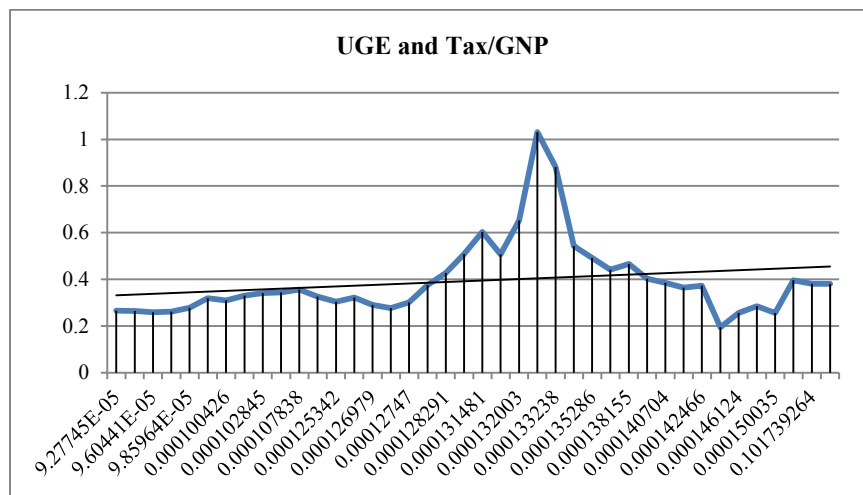
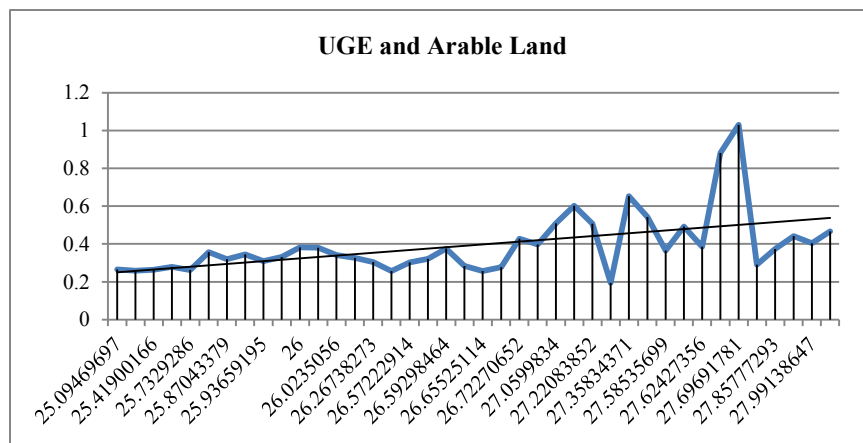
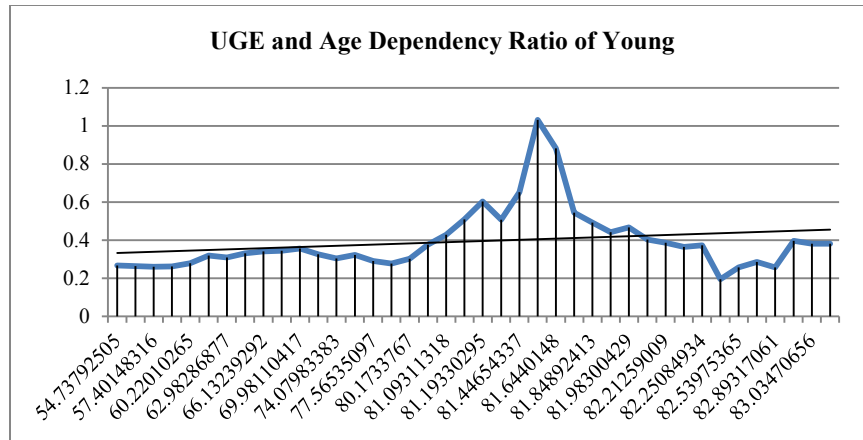
Variable	Correlation	T-Stat
Inflation	0.178	1.26
Government Expenditure	-0.087	0.49
Unemployment percent	0.369	2.32
Labour Participation	-0.607	3.50
Government Effectiveness Index	0.604	3.03
Corruption Control Index	-0.253	1.05
Voice accountability	0.441	1.96
Political Right Index	-0.151	0.96
Civil Liberty Index	0.213	1.38
Political Terror index	0.311	2.01
Business Freedom Index	-0.737	4.62
Trade Freedom Index	-0.777	5.38
Corruption Perception	0.209	0.43
Regulation	-0.158	0.90
Control of Capital and Movement of People	-0.181	1.04
Capital Control	-0.154	0.88
Custom Duties	0.009	0.05
Rule of Law	0.604	3.03
Black Market Exchange rate	-0.394	2.43
Transfer and Subsidies	0.349	2.11
Legal Structure and property Rights	0.528	3.52
Freedom to Trade Internationally	-0.156	0.89
Credit Market Regulation	-0.213	1.23
Tax	-0.030	0.19

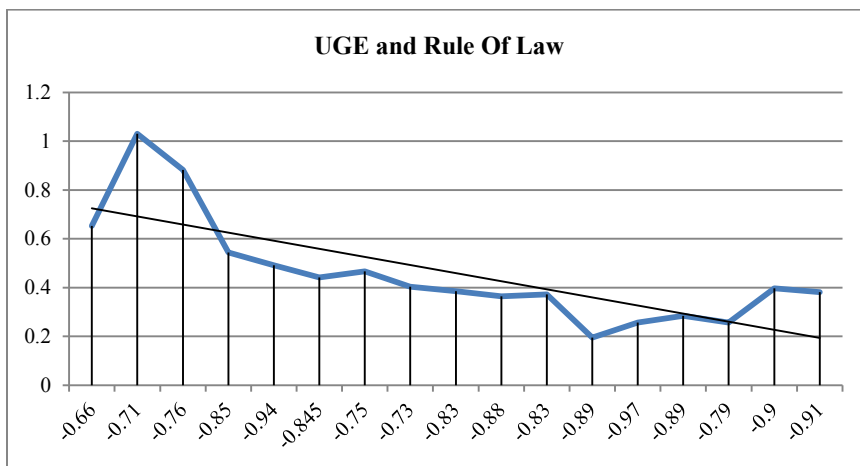
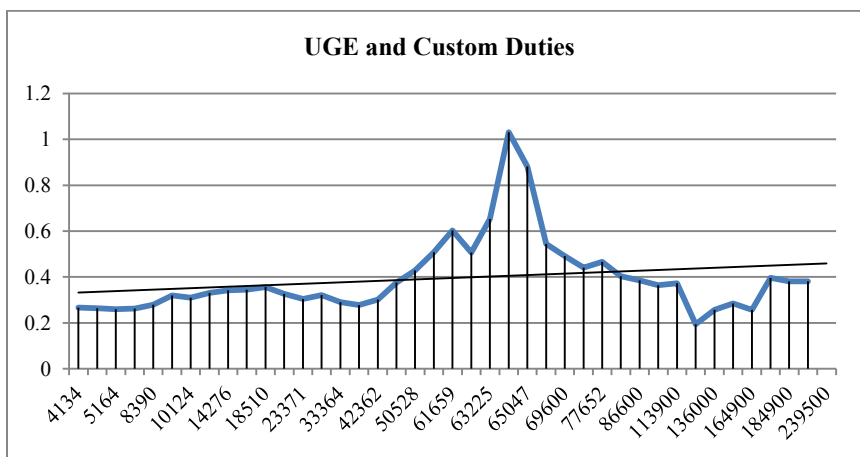
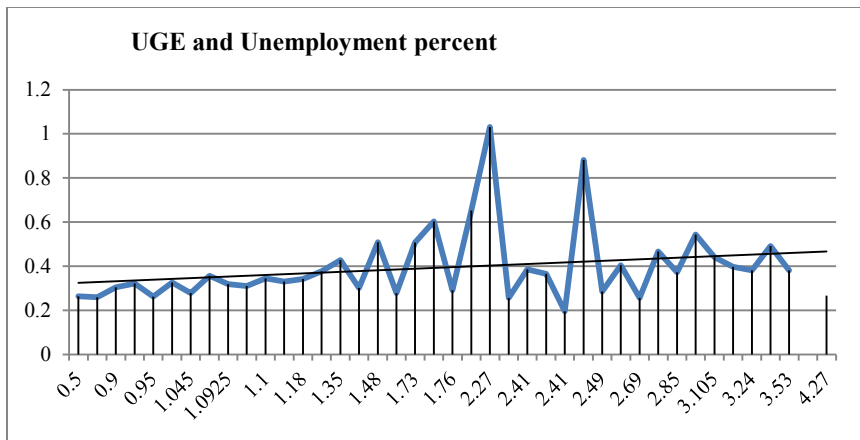
Fig. 4. Graphical Representation of Variables with Underground Economy (UGE)

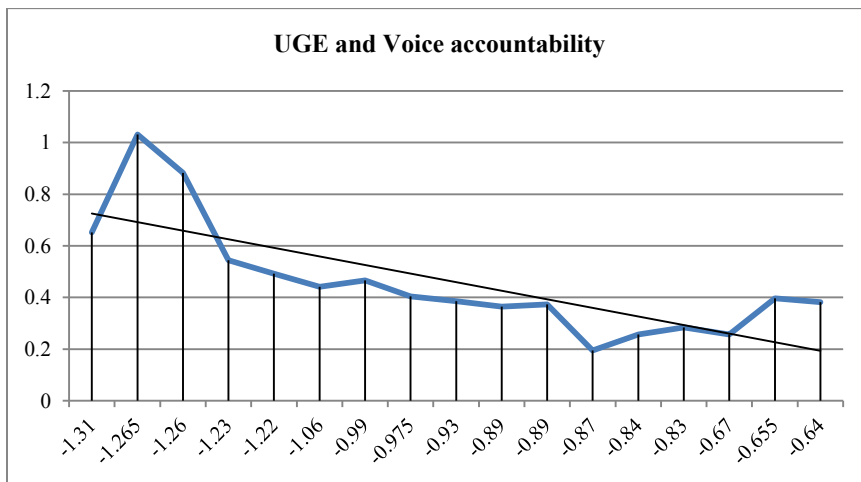
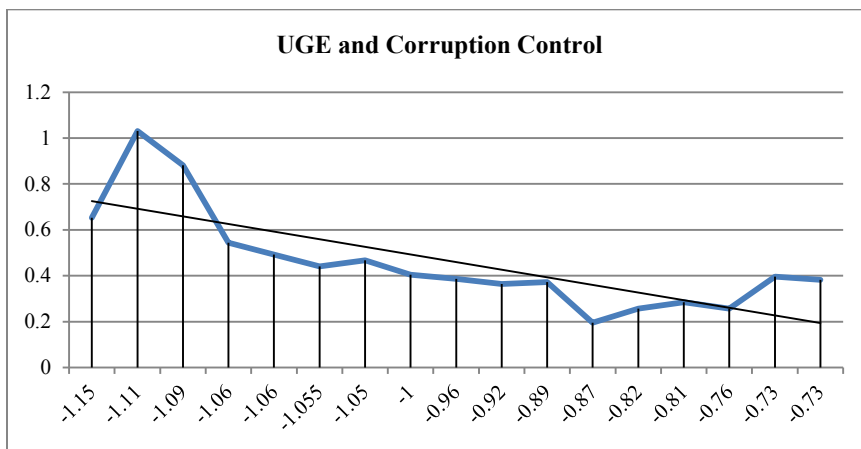
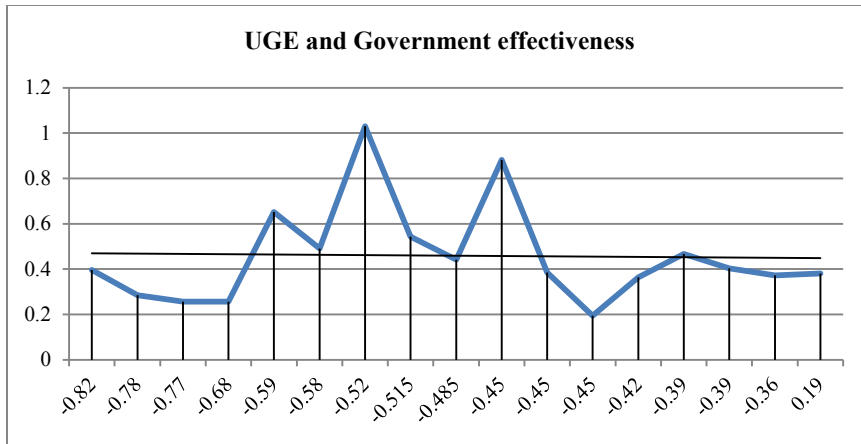


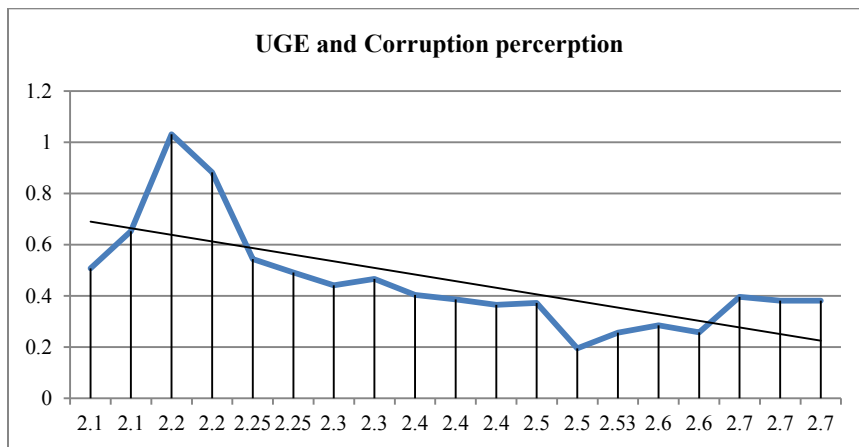
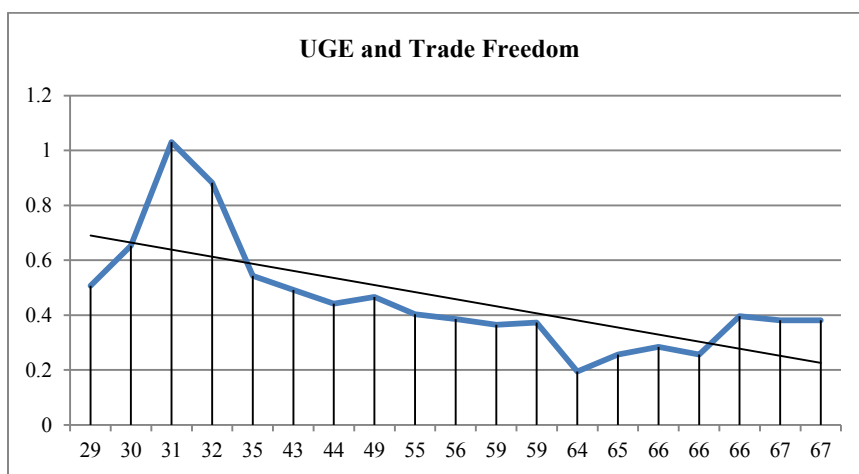
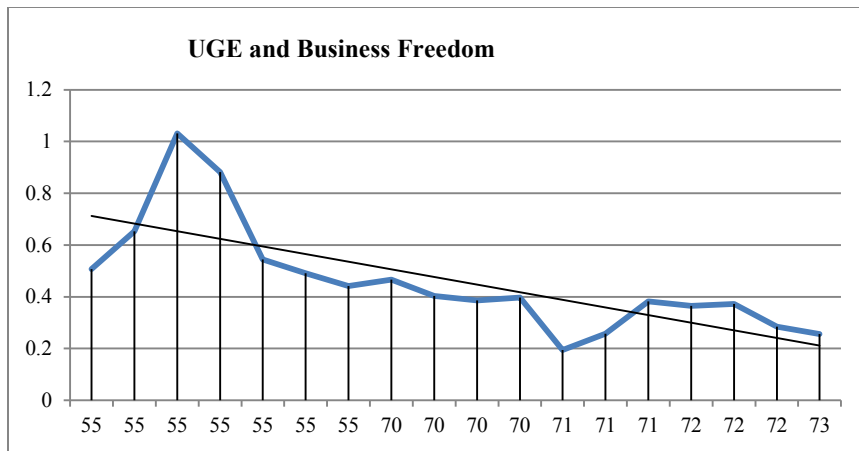


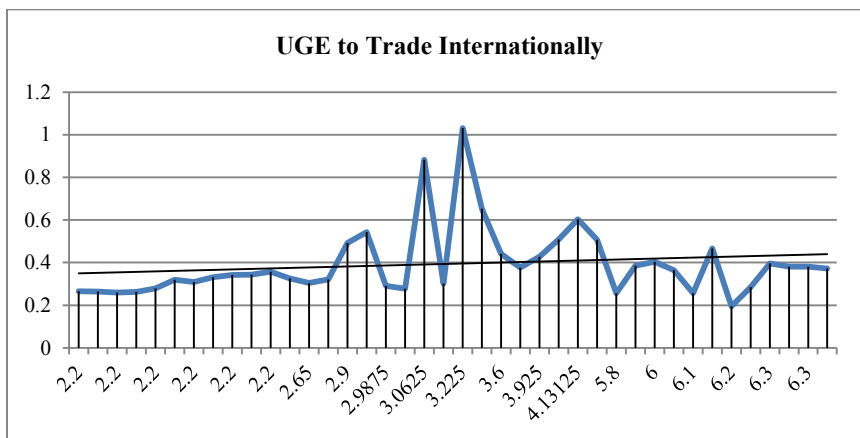
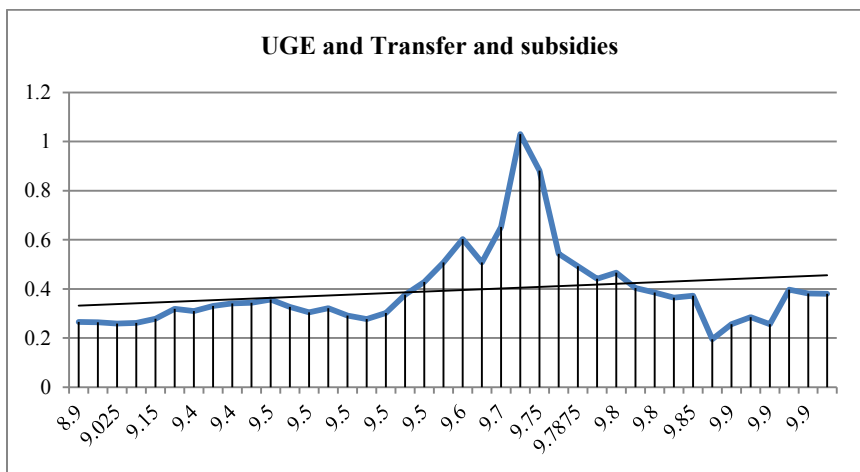
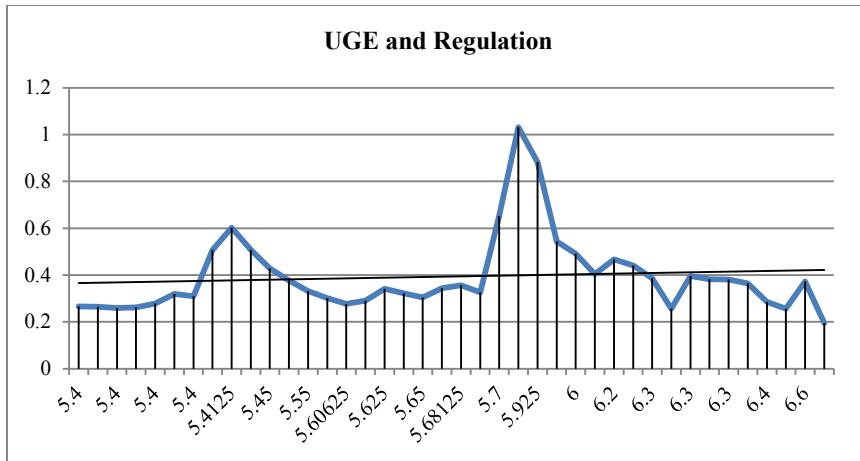


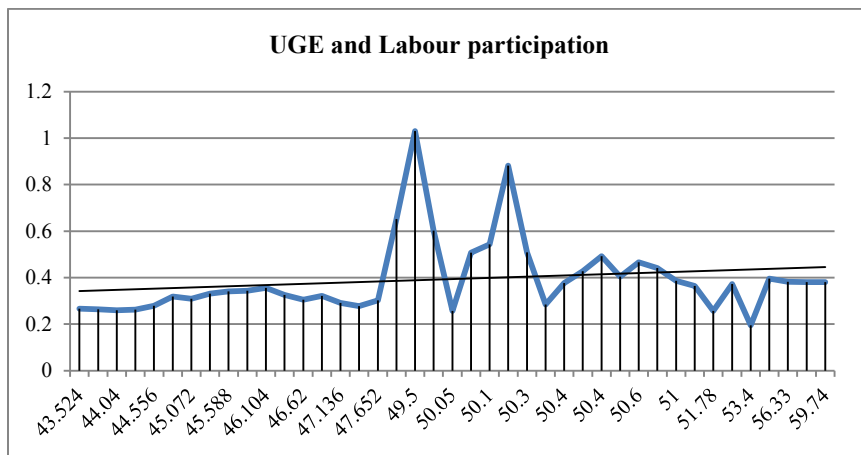
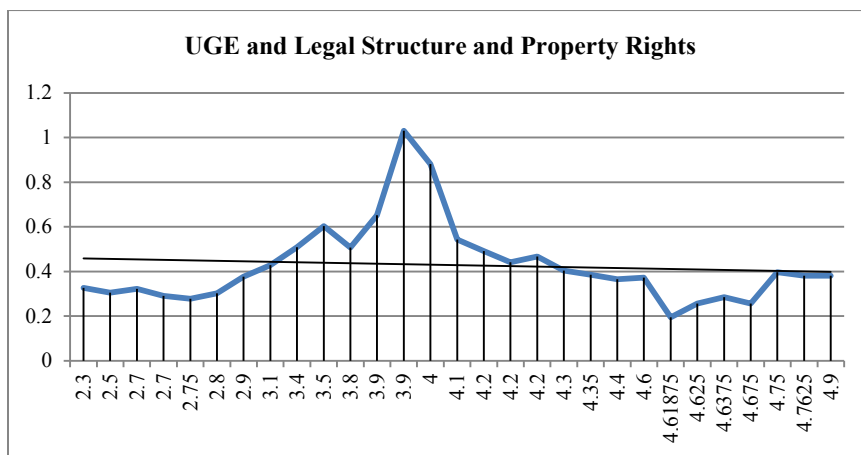
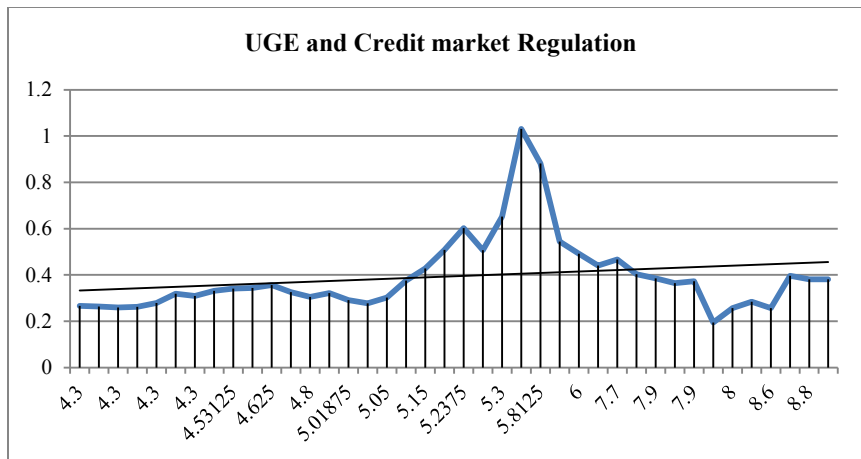












7. DETERMINANTS ESTIMATIONS AND RESULTS

Where,

UE = Underground Economy
 G = Government Expenditures
 INF = Inflation rate
 PR = Political Right
 CLI = Civil Liberty Index
 PTS = Political Terror scale
 REGU= Regulations
 KC = Capital controls
 BMER= Black Market Exchange Rate
 CKMP = Capital control and movement of People
 UP= Urban Population
 RP= Rural Population
 UER = Unemployment Rate
 ADRY = Age dependency ratio young
 AL= Arable Land
 TY = Total Tax return/GNP

In the regression equation, Underground economy (UE) is the dependent variable, C term represent the intercept value, which implies that when all other independent variables are equal to zero UE will still exist by the amount depicted by intercept term. The independent variable G, INF, PR, CLI, PTS, REGU, KC, BMER, CKMP, UP, RP, UER, ADRY, AL and TY show their effect on underground economy individually keeping all other variables constant.

Coefficient of determination is represented by R^2 , which represents how well the econometric model explains the variation in the dependent variable, R^2 ranges from 0 to 1. 1 show that the model explains 100 percent of the variation in the dependent variable due to a change in independent variable. 0 on the other hand shows that the econometric model does not capture any of the independent variable that explains the variation in the dependent variable. A model with higher R^2 is preferred over a model with lower R^2 value. Adjusted R^2 is another determinant that is used to check how well the model explains the variation in dependent variable. Adjusted R^2 is used to take account of the fact that, by adding an extra explanatory variable, R^2 increases, however adjusted R^2 only increases if the new added variable is increases R^2 more than expected.

Durbin Watson stat, is used to test the autocorrelation in the residuals from the equation. The value of Durbin Watson stat lies between 0 and 4. If the Durbin Watson stat is equal to 2 it shows no autocorrelation, Durbin Watson less than 2 shows positive serial correlation, values above 2 and close to 4 represents negative correlation between the error terms.

7.1. Model of Underground Economy Determinants

Dependent Variable: UE				
Method: Least Squares				
Sample (adjusted): 1974 2013				
Included observations: 40 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.861238	1.874758	-3.126397	0.0046
G	-0.012210	0.007554	-1.616341	0.1191
INF	0.003192	0.002937	1.086892	0.2879
PR	-0.034491	0.013408	-2.572455	0.0167
CLI	0.045294	0.028140	1.609599	0.1206
PTS	0.064756	0.036386	1.779697	0.0878
REGU	0.162523	0.143179	1.135104	0.2675
KC	-0.708888	0.122997	-5.763445	0.0000
BMER	0.064376	0.015742	4.089439	0.0004
CKMP	0.058627	0.022296	2.629474	0.0147
UP	2.03E-07	5.55E-08	3.656406	0.0012
RP	-1.37E-07	3.50E-08	-3.904569	0.0007
UER	-1.639804	1.065338	-1.539233	0.1368
ADRY	0.096140	0.020545	4.679425	0.0001
AL	0.042483	0.042092	1.009275	0.3229
TY	4.297593	2.040229	2.106427	0.0458
R-squared	0.910952	Mean dependent var		0.394094
Adjusted R-squared	0.855297	S.D. dependent var		0.165475
S.E. of regression	0.062946	Akaike info criterion		-2.403892
Sum squared resid	0.095094	Schwarz criterion		-1.728341
Log likelihood	64.07785	Hannan-Quinn criter.		-2.159634
F-statistic	16.36784	Durbin-Watson stat		2.348620
Prob(F-statistic)	0.000000			

7.2. Econometric Analysis of Variables

7.2.1. Government Expenditure UGE

Government expenditure shows negative relationship with underground economy, as government expenditure increases by 1 percent, on average underground economy decreases by 1.22 percent. This is not in line with the previous findings, as increase in government expenditure is either financed through raising taxes, or through borrowing, both of which put excess burden on individuals in formal sector, however, one explanation for the negative sign assuming increase expenditure is spent on increasing quantity and quality of public goods, is that increased government expenditure implies that public

goods will be higher, and higher government expenditure may also imply that individuals have greater variety and better quality compared to lower level of government expenditure, so people will be satisfied on average more and this will translate into individuals staying in the formal sector rather than underground economy.

7.2.2. Inflation and UGE

Inflation shows positive relationship with underground economy, as inflation rate increases by 1 percent underground economy increases on average by 0.32 percent, this is in line with the findings of previous findings. As inflation increases, price levels get higher, which pushes people into higher tax bracket, increasing the burden of tax and causing individuals to opt for underground economic activities. The spiral doesn't stop here; higher prices cause workers to demand higher wages, pushing economy into cost push inflation, which further increases producer to look for cheap labour in underground economy, and it leads to increase in underground economy.

7.2.3. Political Rights

Political rights show negative relationship with underground economy, as political rights index improves by 1 percent on average underground economy reduces by 3.45 percent. As political rights increase people have more discretion to follow their choices, and this induces more freedom to choose the political structure which ultimately leads to lower level of underground economy. The value of political rights is significant at 1 percent, and has a higher magnitude compared to other.

7.2.4. Civil liberty Index

Civil liberty shows positive relationship with underground economy. The econometric model suggests that with 1 percent increase in Civil liberty index on average increases underground economy by 4.52 percent. The index is based on points from 1 to 7, where 1 represents strong civil liberty, and 7 representing weak civil liberty. The t-stats show that the results are insignificant, but the sign is in line with the theory, as civil liberty increases it implies that government has lesser power to become a hindrance in individual's choices, so people indulge in lesser amount of underground economy.

7.2.5. Political Terror Scale

Political terror scale shows a positive relationship with underground economy. As political terror scale deteriorates by 1 percent, underground economy increases on average by 6.48 percent, and the value is significant at 10 percent. Political Terror Scale is based on values from 1 to 5, where 5 shows that terror has spread to all population, and leaders impose their ideology on population, whereas, 1 implies that there is wider prevalence of rule of law, and

people are free to express their political views. Lower level of Political terror will make people more satisfied with the governments, and so law compliance will be higher as compared to situation where political terror is exceptionally high.

7.2.6. Regulations

Regulations show positive relationship with underground economy. As regulations increase by 1 percent, on average it increases the underground economy by 16.25 percent. Even though the magnitude is fairly high, but the t-stats show that the value is insignificant, at 10 percent. The positive sign is as expected. The index is based on a scale of 1 to 10, 1 represent lower level of regulations and 10 represents higher level of regulations that are more effective. As regulations increases, the economic activity becomes cumbersome for few individuals and they no longer operate in the formal sector, and rather shift to underground economy to avoid regulation. The indulgence however is subject to the relative utility gained from breaking the law, and disutility from getting caught.

7.2.7. Capital Control

Capital control shows a negative relationship with underground economy, as capital control index increases by one percent underground economy on average decreases by 70.89 percent. Capital control is highly significant at 1 percent. Capital control is based on an index from 1 to 10, where 1 represents tight capital control and 10 represents favourable capital controls. As capital controls become favourable, people have lesser marginal gain from still operating in underground economy, so they reduce their activities in underground economy and instead become part of the formal economy.

7.2.8. Black Market Exchange Rate

Black market Exchange rate shows positive relationship with underground economy, as black market exchange rate becomes favourable by 1 percent, underground economy on average increases by 6.44 percent, and is highly significant at 1 percent. Black market exchange rate index is based on values from 1 to 10, 1 represents poor or unfavourable exchange rate market in underground economy, and 10 shows good market in underground economy. As Black market for exchange rate becomes better and favourable and transactions are made easy, it provokes individuals to opt for underground economy.

7.2.9. Control of Capital and Movement of People

Control of capital and movement of people has a positive relationship with underground economy, as control of capital and movement of people increases by 1 percent, underground economy on average increases by 5.86 percent. This is significant at 1 percent. The index ranges from 1 to 10. 1 shows unfavourable

conditions and 10 show favourable conditions. As the value of index increases the underground economy is predicted to increase. Higher labour and capital mobility should theoretically reduce the underground economic activity, but according to the model it predicts that underground economy will increase as mobility increases, one explanation for this can be that in Pakistan rule of law, and accountability is very low, which means even if movement is facilitated, the mechanism to record data is still weak, which causes a lot of activities to slip by statistics, and people move easily from job to job, without the need for declaring their needs, because chance of getting caught and punishment is still low, due to high level of corruption in institutions.

7.2.10. Urban Population

Urban population has a positive relationship with underground economy. As urban population increases by 1 percent, underground economy on average increases by 203 percent. The t-stat is highly significant at 1 percent. As population increases, same resources need to be divided among more people, and overall competition for resources increases, which pushes prices higher. Higher prices leads to germination of underground economy, as people who cannot afford higher prices opt for buying the same products in underground economy. Increasing urban population for a developing country also leads to development of slumps as can be seen in Islamabad. Urban population can also lead to increase in underground economy as more and more low skilled labour pours in to cities, and low level of jobs for low-skilled labour leaves the low skilled population unemployed. With poor social security structure in Pakistan, people start to work at lower wages in informal sector.

7.2.11. Rural Population

Rural population shows negative relationship with underground economy. As rural population increases by 1 percent, underground economy decreases on average by 137 percent, t-stat is highly significant at 1 percent. Rural population of Pakistan is mostly involved in primary sector, and is highly involved in agricultural sector. As rural population increases it causes more involvement in primary sector, which is mostly measured in terms of production it produces in a given time, rather than individual. So increase in rural population causes more people to be involved in primary sector, which causes increase in production, and leads to more economic activity, which leads to higher level of formal activity in other sectors like secondary and tertiary. So increasing rural population would cause reduction in underground economy.

7.2.12. Age Dependency Ratio of Young

Age dependency ratio of young shows positive relationship with underground economy. As age dependency ratio of young increases by 1 percent underground economy increases by 9.61 percent. The t-stat is highly significant

and 1 percent level. As the ratio of young dependent population increases as percentage of working population, there is higher burden on government and household to provide for the increase burden. Higher social security burden on government causes government to increase its tax base to provide for the dependent population which causes people to misreport their incomes to avoid paying higher taxes. Country like Pakistan which has dysfunctional social security system, individuals who provide for their own burden, try to avoid paying taxes because that reduces their disposable income, and individual maybe involved in illegal activities to make their ends meet, or work two jobs. For example many government employees work private jobs to supplement their incomes.

7.2.13. *Arable Land*

Arable land shows positive relationship with underground economy, as arable land increases by 1 percent underground economy on average increases by 4.25 percent. The t-stat is insignificant at 10 percent level. Arable land signifies that there is more cropped land, so more labour is required, the labour working in agriculture in Pakistan doesn't file returns, and instead operates in the underground economy, so if Arable land increases more labour is required which becomes part of the underground economy which leads to increase in overall underground economic activities. Arable land signifies that there is more cropped land, so more labour is required, the labour working in agriculture in Pakistan doesn't file returns, and instead operates in the underground economy, so if Arable land increases more labour is required which becomes part of the underground economy which leads to increase in overall underground economic activities.

7.2.14. *Tax per GNP*

Tax per GNP shows positive relationship with underground economy, as tax/GNP increases by 1 percent underground economy on average increases by 429 percent. The t-stat shows that the value is insignificant at even 10 percent confidence level, however, the sign is in line with the theory, which postulates that as tax increases the underground economy increases as people try to abate taxes, so higher tax to GNP ratio implies that there is large amount of tax which induces people to opt for underground economy.

8. CONCLUSION

Underground economy is part of every economy around the world. In an economy some activities are recorded while others are not, either they are deliberately not reported or otherwise missed out and become part of the underground economy. Nevertheless, different researchers define underground economy differently, suited to their objectives and approach to study.

Underground economy is an amalgamation of legal and illegal activities, however special care needs to be taken when categorising activities as illegal, as some activities perceived illegal in one country might not be illegal in another country.

Presence of underground economy distorts income statistics of a country, showing reduced growth, which falsely signals onset of recession. The signal is then further strengthened as more labour moves from formal to underground economy, and still claims unemployment/income support benefits. At the same time as price statistics are recorded from the official sector of the economy, the price indices are overstated as they don't reflect the potentially lower price level in the underground economy. Higher price indices infuse Labour to demand higher wages, and social security payments to be raised, and higher inflationary expectation of inflation which is ultimately realised in to real inflation. The negative statistics of the economy push government to intervene directly and indirectly to cure the problem by trying to stimulate economy, this further pushes economy in to inflation. Higher prices push more people in to higher tax bracket, and provide more incentive for people to move to underground economy so they can avoid higher tax payments, shrinking the tax base of government. To finance increasing budget deficit, government is forced to increase interest to attract foreign funds and compensate for higher expected inflation. All the repercussions of underground economy erodes confidence of people on government and pushes economy further away from its ideal stat, signifying that flawed information system engages policy makers and citizen to produce misguided and misleading actions.

It is fairly important to tackle the determinants of the underground economy, to avoid spiraling into unforeseen economic circumstances. To measure underground economy of Pakistan, The first step is to measure size of underground economy, for which monetary approach has been used, and the econometric method applied is Ordinary Least Square (OLS). The data is from 1973 to 2013. The results show that underground economy of Pakistan increased in the 1990s, as U.S put economic sanctions on Pakistan for failing to show that it was not conducting nuclear weapon programme, and in the same decade Pakistan faced high political volatility, with multiple governments being changed. In 1998 underground economy reached its peak as Pakistan conducted its first nuclear weapon test in response to India, which triggered series of sanction from Europe and U.S. However, underground economy shows an overall decreasing trend after the decade of 1990s.

To calculate determinants Ordinary Least Square (OLS) has been used and data set is taken from year 1973-2013, with exception to some variables that were not completely available for the time period. Many demographic, financial, political and economic variables have been used, however, the variables that are all significant at 10 percent confidence interval are:

- (1) Political rights and Political terror both show significant impact on underground estimates of Pakistan. As Pakistan is faced with weak political structure, regime changes, and insurgencies and is the front line for global war on terror, Pakistan has suffered as a consequence low level of political rights and high level of political terror, which has helped mushroom vast amount of underground economic activities.
- (2) Capital control, Black Market exchange rates and capital control and movement of people, these variables show significance at 10 percent confidence interval. These variables show easiness of operating internationally, and show significant impact on underground economy of Pakistan. Pakistan has a large overseas population that uses illegal channel to send money back to Pakistan, and different groups in Pakistan are also involved in money laundering such as Khanani and Kalia International (Private) Limited which was shutdown in 2008 on the charges of money laundering.
- (3) Urban population, Rural population and Age dependency of Young these variables are also are significant at 10 percent confidence interval, and contribute significantly in explaining the movement in underground economy. These variables signify the burden on productive population of the economy, greater degree of dependency leads to higher underground economy.

Limitations

The study conducted has used OLS technique of estimation, improving the econometric technique of measuring determinants will provide better results. The quality of data is weak; improving data quality is required to form better inferences from the data. There is need to develop better indices.

Policy Recommendation

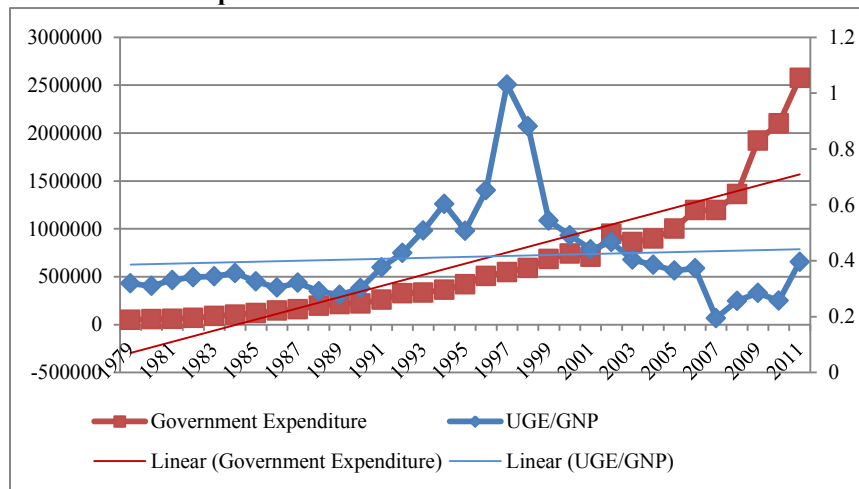
Pakistan is faced with many challenges internally as well as externally, to reduce underground economy Pakistan needs to have a sound political structure that promotes greater freedom to choose the political structure that majority wants. Sectarian violence and caste based political structure further deteriorate the economic situation, which pushes more people in to underground economy. A better rule of Law, and stronger law enforcement would help prevent growth of underground economy.

Pakistan holds a key geographic position in the continent, and enjoys close ties with neighbour China. Friendly capital control, favourable official exchange rates and lubricating labour and capital mobility, will help Pakistan boost its official economy, and at the same time reduce underground economy. Pakistan should work closely with its neighbours to enhance its capacity, and formulate legal channels.

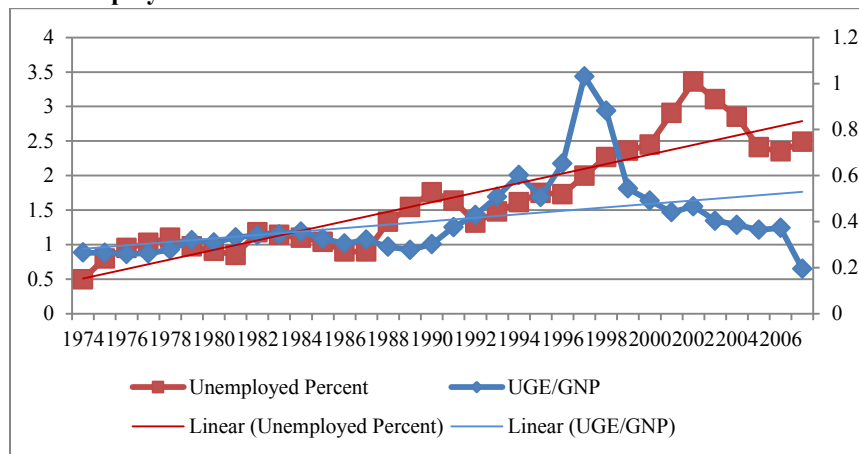
The population of Pakistan is rapidly growing, and so is population in the urban areas. Pakistan needs to develop plans to accommodate the growing population migrating to urban areas for better opportunities by creating opportunities in their native areas, and managing sub-urban areas for population to gradually move to towns and cities rather than directly entering the urban areas, and engage in underground activity. High growth of Rural population and age dependency of young can be controlled by initiating awareness programmes that deal with birth control, and reproductive health issues.

APPENDIX

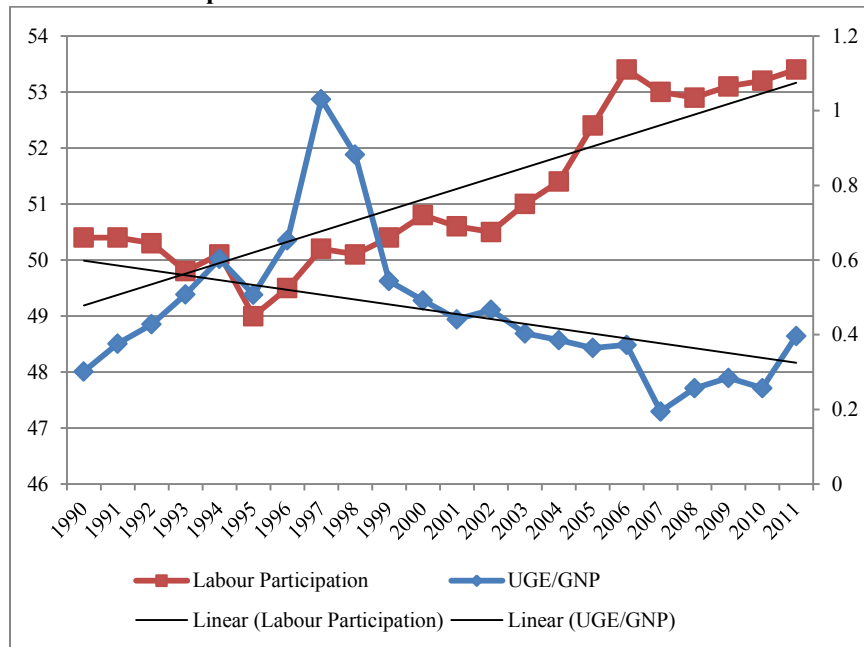
1. Government Expenditure



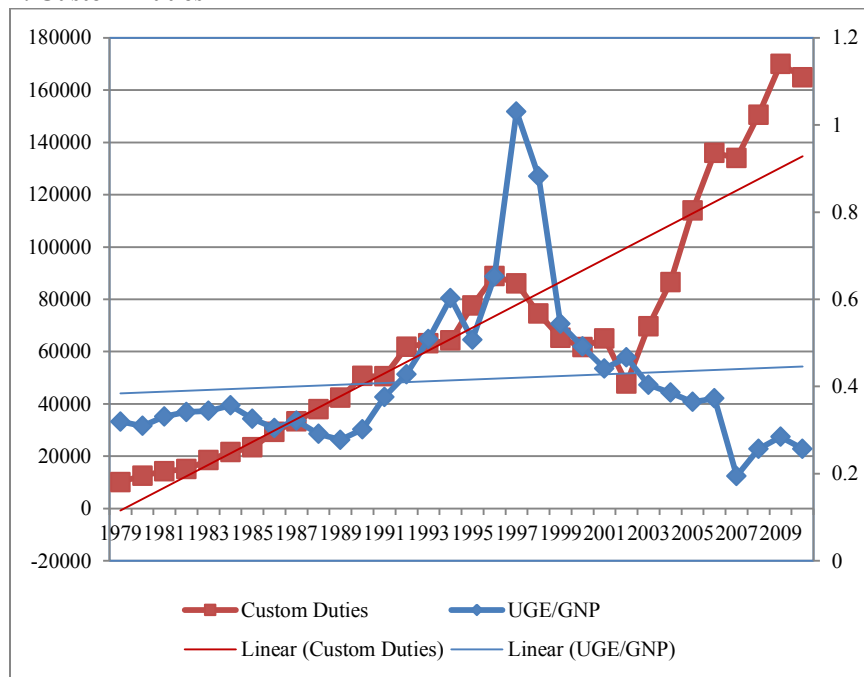
2. Unemployment Percent



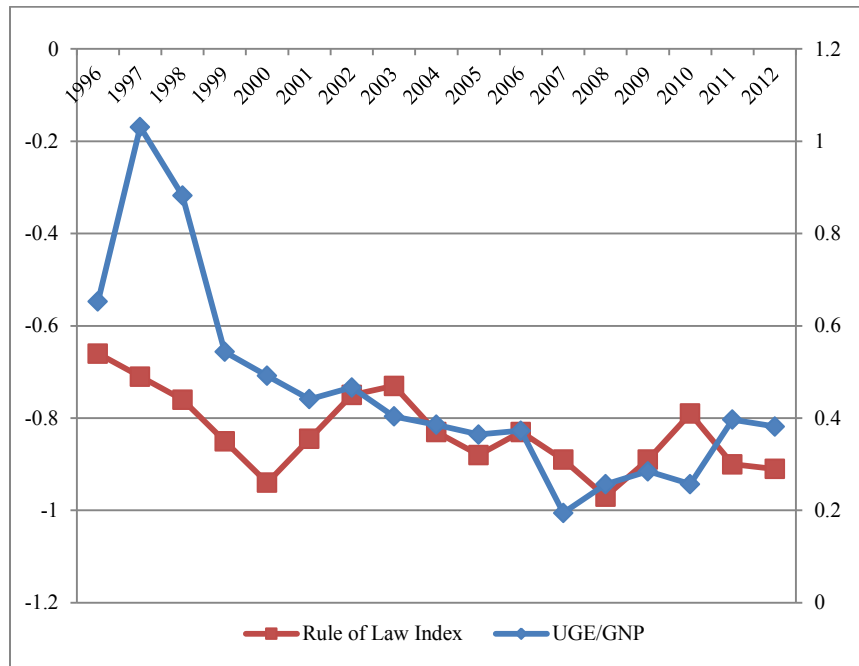
3. Labour Participation



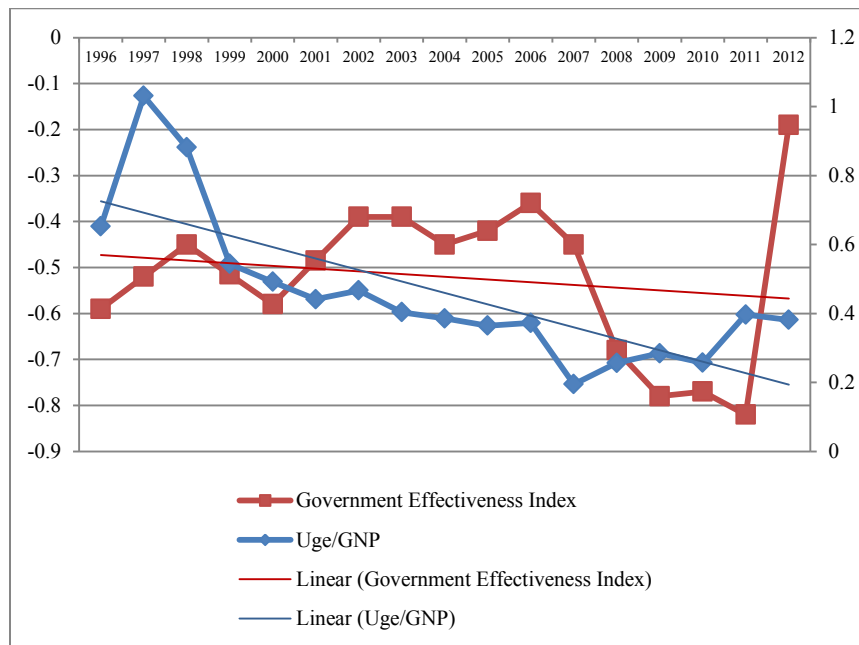
4. Custom Duties



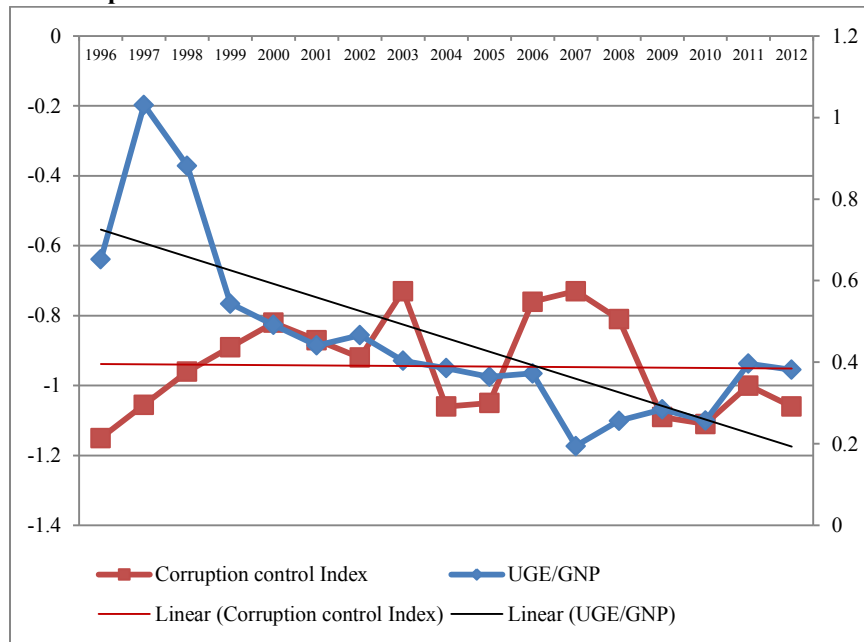
5. Rule of Law Index



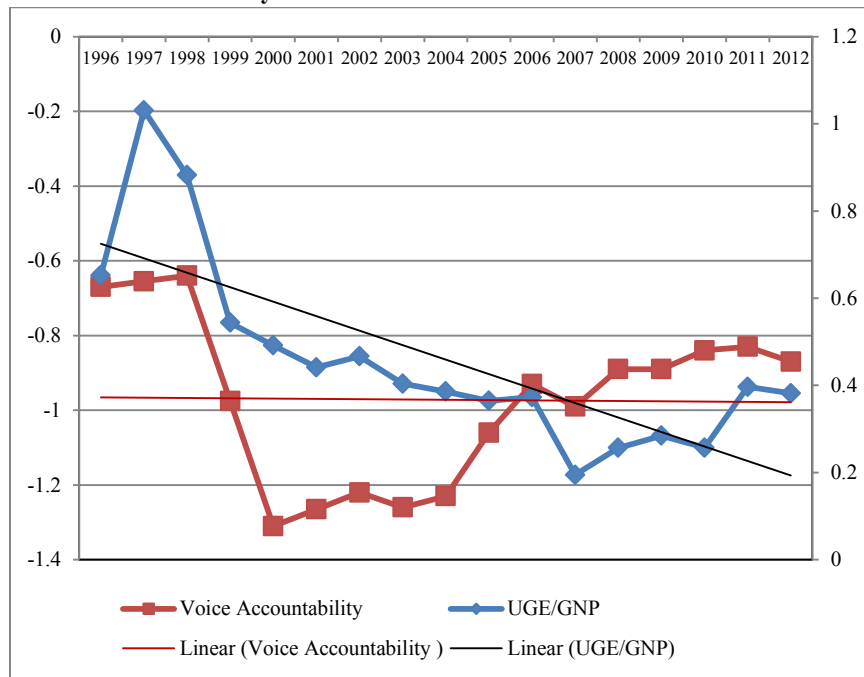
6. Government Effectiveness Index



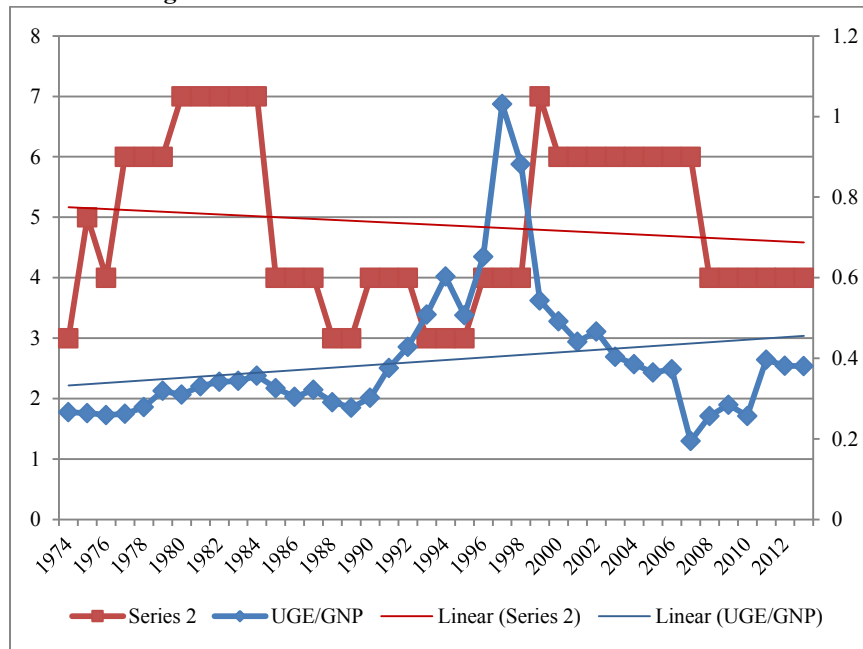
7. Corruption Control Index



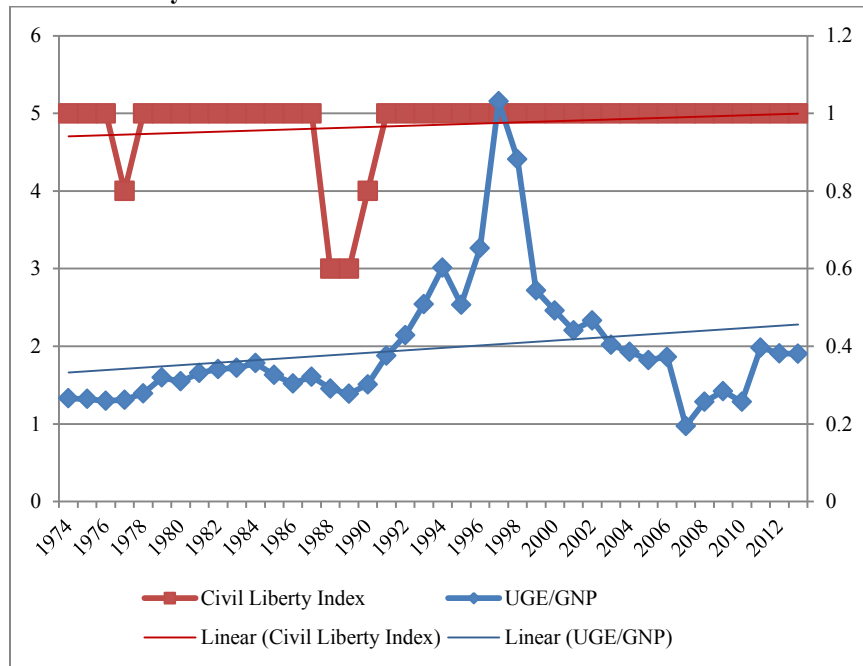
8. Voice Accountability Index



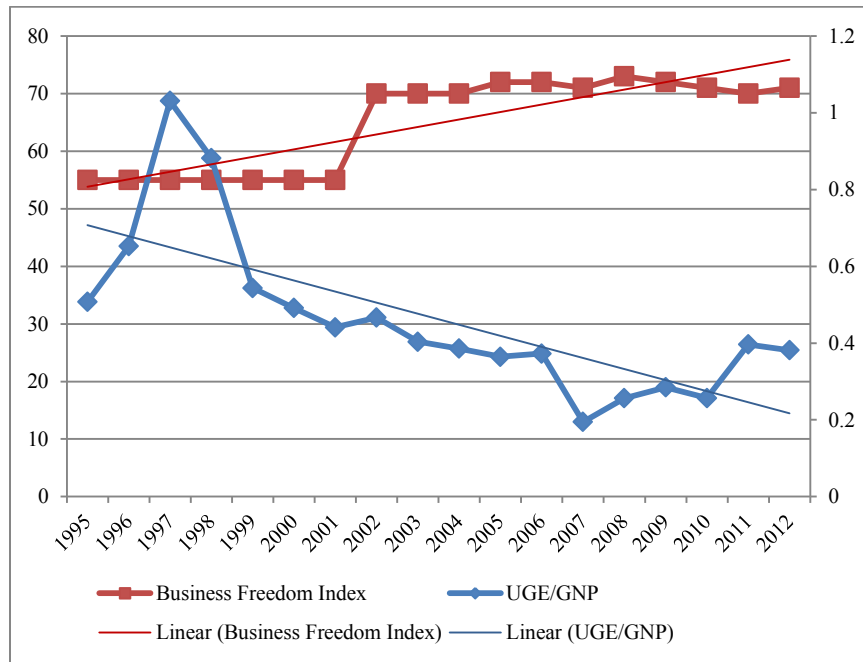
8. Political Rights Index



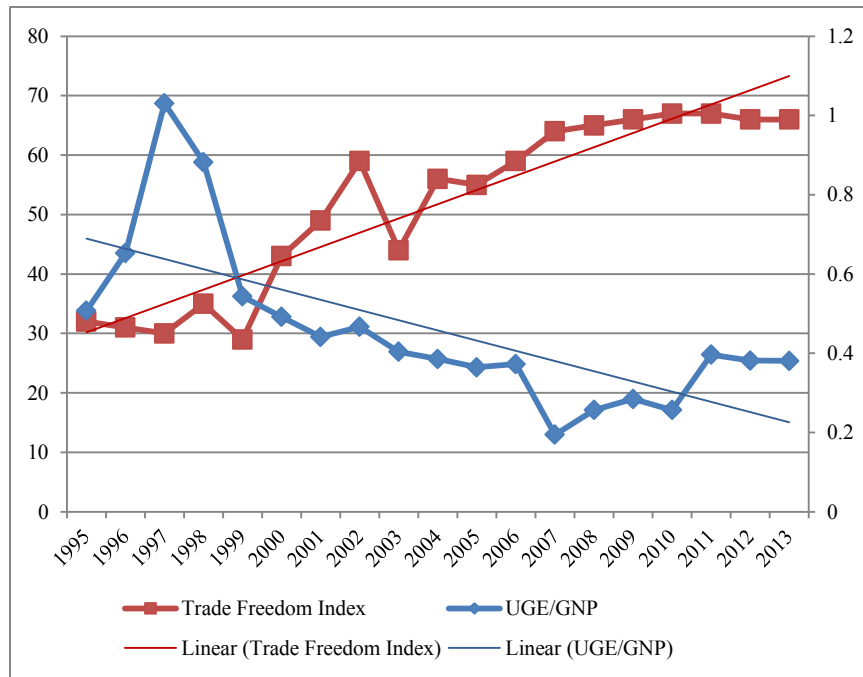
9. Civil Liberty Index



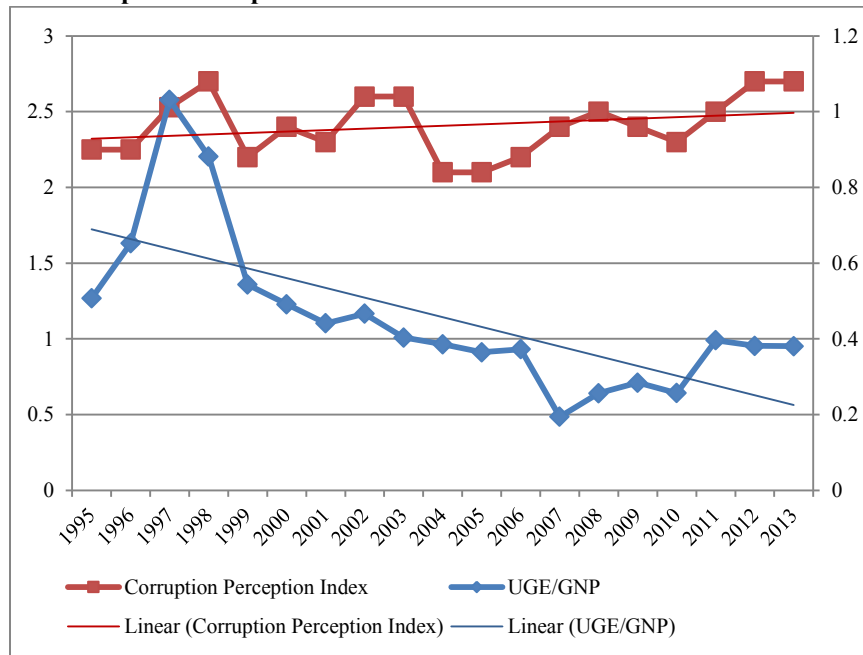
10. Business Freedom Index



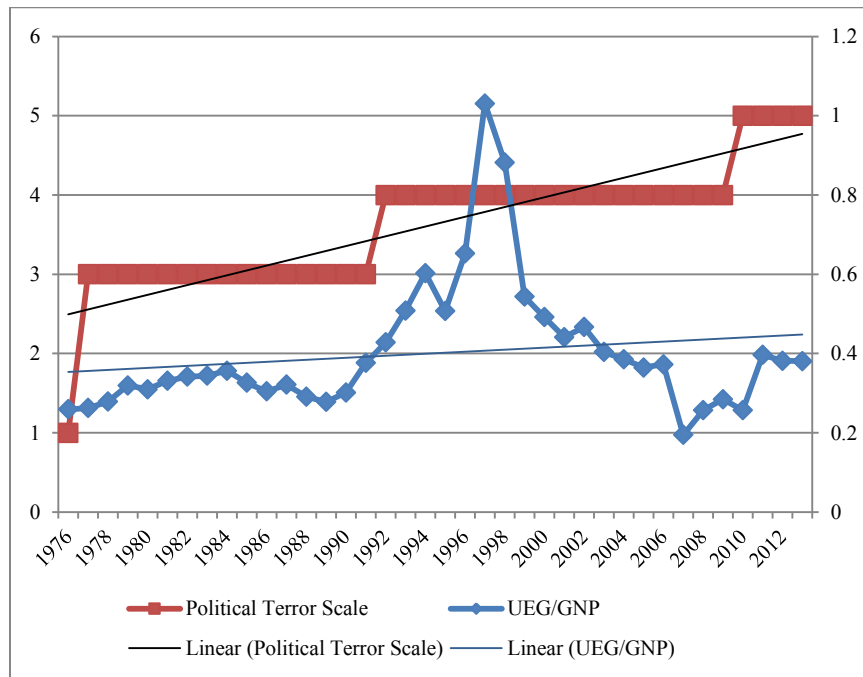
11. Trade Freedom Index



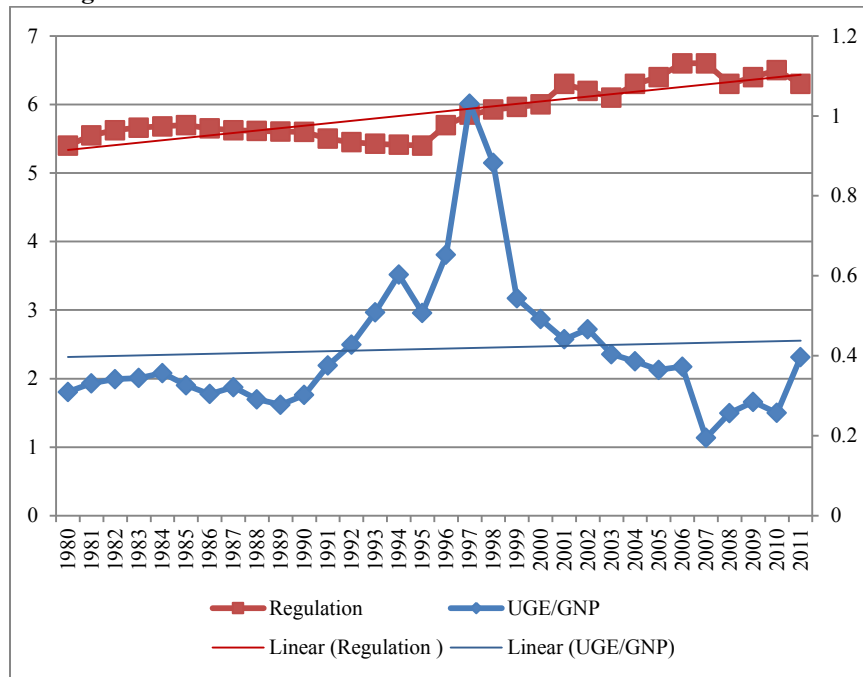
12. Corruption Perception Index



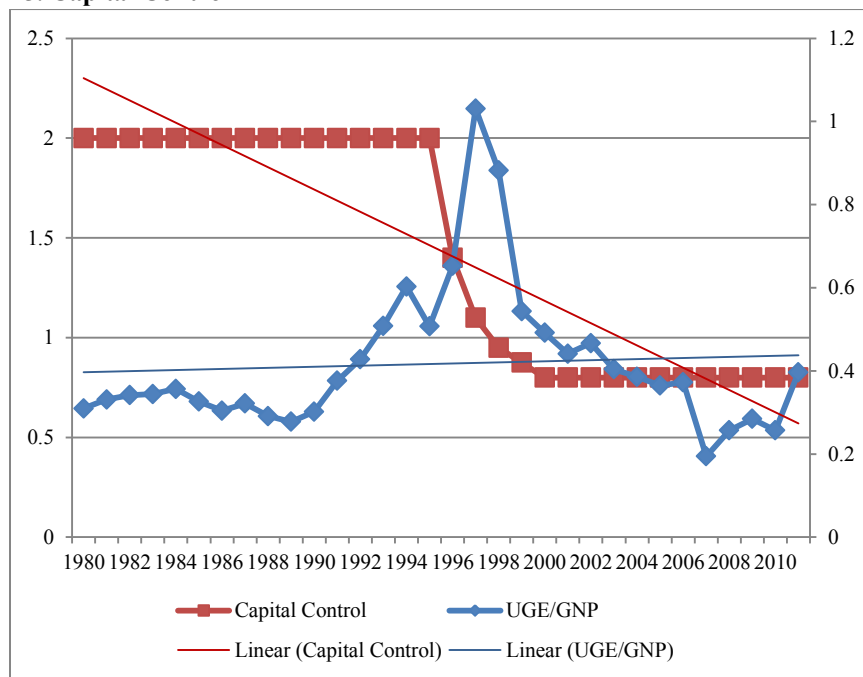
13. Political Terror Scale



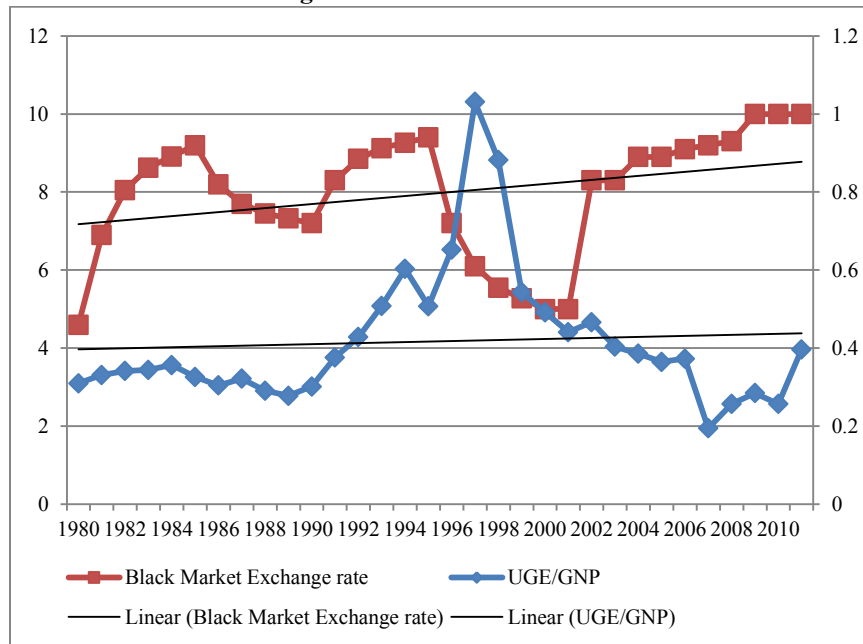
14. Regulations



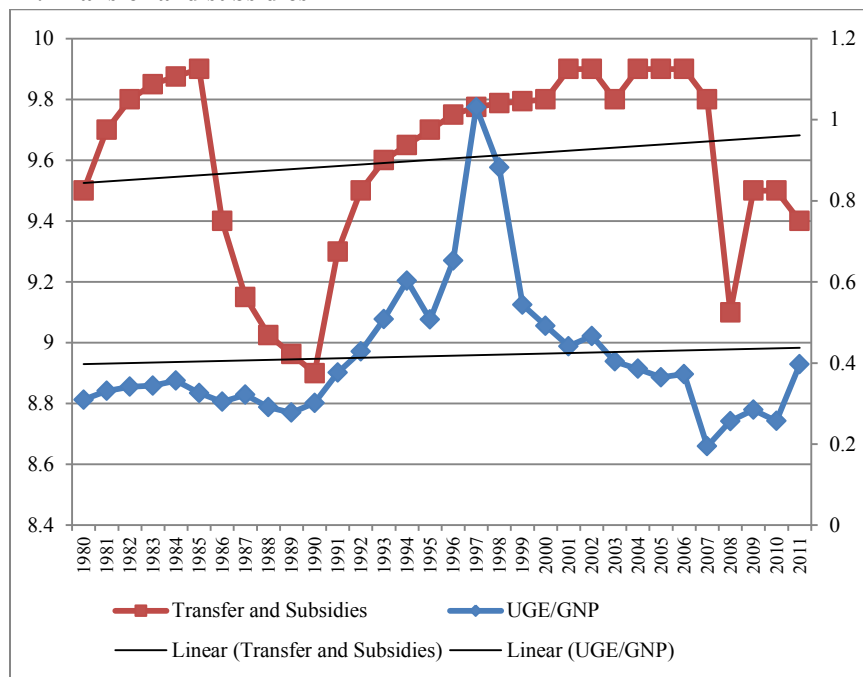
15. Capital Control



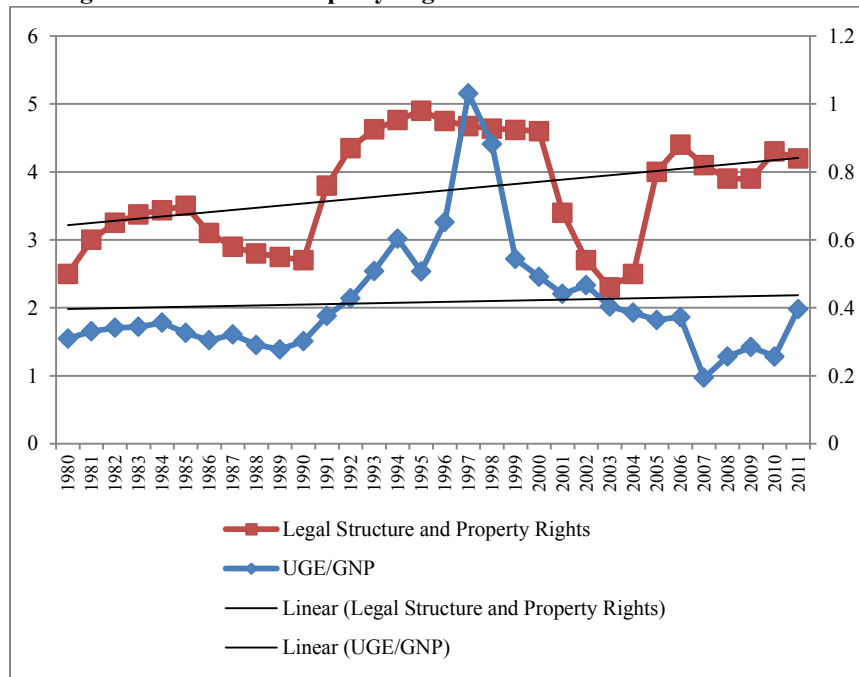
16. Black Market Exchange Rate



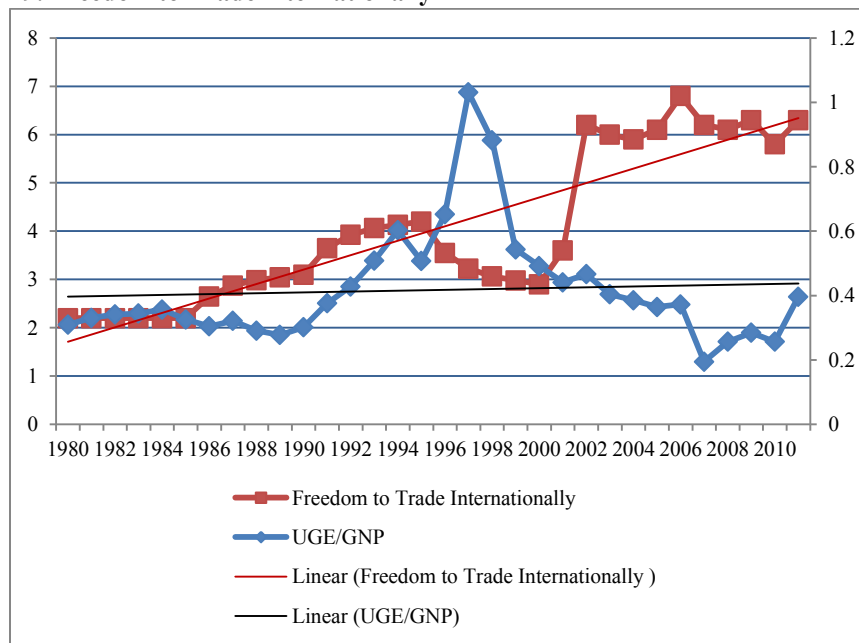
17. Transfer and subsidies



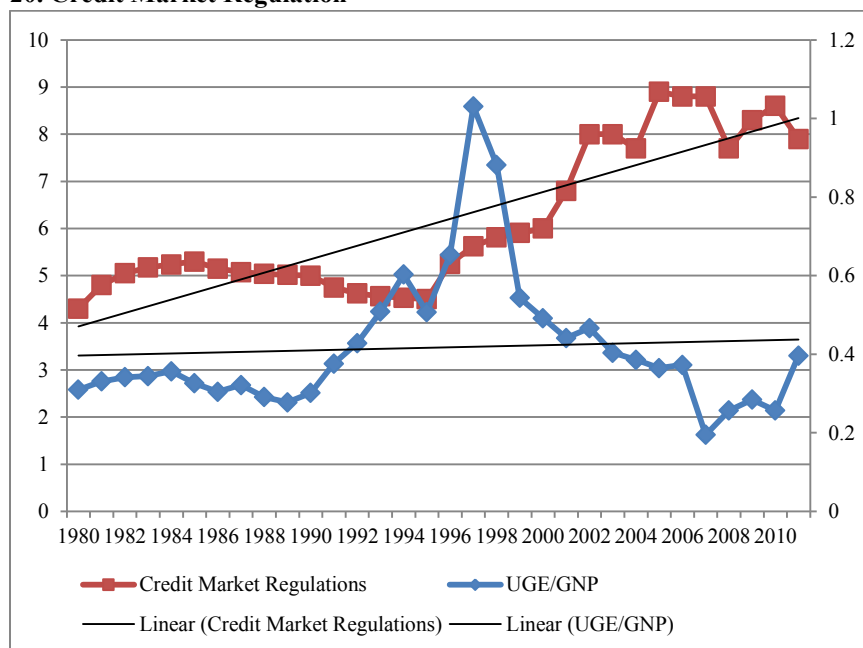
18. Legal Structure and Property Rights



19. Freedom to Trade internationally



20. Credit Market Regulation



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