Currency Demand Approach and Underground Economy in Qatar

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Abstract

The growth of the underground economy has become a serious challenge and concern to the official economy of many countries. Based on the adjusted currency demand function this paper estimates the magnitude of the underground economy behind tax evasion in Qatar over the period of 1980-2010. The results show that the average of the underground economy in Qatar constitutes 17.03% of the official GDP. While, the average of the tax evasion as a percent of the total non-oil tax revenues estimated at 16.50% and at 2.12% of the official GDP respectively.

Keywords: tax evasion, underground economy, gdp, tax revenues, Qatar.

Introduction

The research on underground economy has received a considerable attention among the economists over the world (Torgler & Schneider, 2009). This is due to its impact on macroeconomic variables (Trebbicka, 2014). The extent and magnitude of the activities of the underground economy differ from country to country (Asiedu & Stengos, 2014; Putniņš & Sauka, 2011).

Due to the concealed nature of the underground activities, various methods have been used to measure its size as no official data is available or can be collected (Schneider & Savasan, 2007). Thus, it is difficult to obtain an accurate estimation about the true size of the underground economy, either in emerging or advanced economies (Torgler & Schneider, 2009; AnaMaria, 2013). Nevertheless, many studies have been conducted for the developed countries (Schneider, 2006; Schneider & Enste, 2000; Schneider & Klinglmair, 2005; Feld & Schneider, 2010; Dreher & Schneider, 2010; Schneider, Buehn, & Montenegro, 2010) and very few for developing countries (Schneider et al., 2010; Schneider & Klinglmair, 2005).

Qatar, a member of the GCC countries is also experiencing growing activities of the underground economy. Financial restrictions for sending money out of the country by the foreign workers contribute to the use of illegal means to send their money to their home countries (Naufal & Termos, 2010). Foreign workers in Qatar are not allowed to transfer money that exceeds their total salaries received for the period of six months. The tight regulations imposed on the foreigners in Qatar have forced them to use relatives and friends or unlicensed financial intermediaries to send money home (Shah, 2009; Naufal & Vargas-Silva, 2010). According to Shah (2010), the illegal transfers of money from the country to abroad is predominantly practiced
among illegal workers. By resorting to illegal channels, they avoid paying taxes and higher processing fees (Naufal & Vargas-Silva, 2010).

Applying MIMIC model which is based on currency demand approach Schneider et al. (2010) found that the weighted average volume of the underground economy (as a percent of official GDP) in Qatar was 14.4%. The estimation is considered as weak and biased because of the assumption of equal velocity of money in both underground and formal economies (Ahumada, Alvaredo and Canavese; 2009). Therefore, the main drawback of the study is that the estimated coefficients are biased and unreliable. In the same vein, the estimated values may bring about a meaningful understanding of the actual phenomenon of the underground economy in Qatar.

By employing the Adjusted Currency Demand Approach (Ahumada, et al.; 2009) the study aims to measure the extent of the underground activities through a behavioral pattern of financial variable (example; tax burden). This study looks at the outflow of money and the activities of the underground economy in the Qatari economy.

The organization of this paper is as follows: Second section introduces an overview of Currency Demand Approach Evolution. The third section describes the methodology behind the model specification. In the fourth section, the results of the empirical analysis will be presented. The last section introduces the conclusion with the contribution.

**Literature Review**

The currency demand approach as a proxy to estimate the magnitude of the underground economy is based on the assumption that money in terms of cash is used to perform the transactions that were concealed from the authorities (Breusch, 2005; Ahumada et al., 2008). Unlike transactions in other form of assets that are documented in financial institutions and easily traced (AnaMaria, 2013), these transactions are hard to trace as they leave no observable tracks (Ahumada et al., 2009; Agbi, 2014). Therefore, an increase in the size of underground activities in the economy can be linked to an excessive use of cash (Berger, Pickhardt, Pitsoulis, Prinz, & Sarda, 2014). If the amount of cash used to undertake illegal transactions can be estimated, then this amount could be multiplied by the income elasticity of money to obtain a measure of the volume of the underground economy (Ahumada et al., 2007).

According to Schneider (2006), Cagan (1958) used currency demand approach to link the increased in money and the tax burden to the underground activities in the U.S. over the period of 1875 -1955. Applying the same approach, Gutmann (1977) estimated the size of the underground economy in the US over the period of 1937-1976 based on four fundamental assumptions (Fethi et al., 2006). First, the tight regulations and higher rate of tax burden forcing individuals to engage in underground economic activities (Gerxhani, 2004; Schneider et al., 2010). Second, cash is the only used as a medium to perform the concealed transactions in the underground economy, and the excessive use of cash is an indication of the expansion of the underground economic activities and tax evasion (Schneider, 2012; Schneider & Buehn, 2013). Third, the magnitude of the underground economy can be estimated based on the sample size of money demand over time (Fethi et al., 2006). Finally, the income elasticity of money (money velocity of income) is assumed to be the same in both economies (formal economy and underground economy). Then, the volume of the underground economy is calculated by multiplying the velocity of money with the value of illegal money that can be used to perform illegal activities (Ahmed & Ahmed, 1995; Breusch, 2005; Ahmed & Hussain, 2008).
Cagan's approach has also been employed by Tanzi (1980, 1982, 1983) for the US economy. The basic idea of Tanzi was to form a link between the ratios of money demand in relation to soared rates of the tax burden (Ahumada et al., 2009). Consequently, this was used to obtain new estimates of the volume of the underground economy for the US (Dell’Anno & Halicioglu, 2010).

Ferwerda et al. (2010) stated that Tanzi (1983) proposed his basic regression model for the currency demand and concentrated on the possible conventional causes or normal causes of raising tax burden and other causes of making agents to engage in the underground economy. In his model, the main factors included were the ratio of cash holdings to current and deposit accounts, a weighted average tax rate, a proportion of wages and salaries to the national income, the interest paid on savings deposits and the per capita income (Fethi et al., 2006; Ferwerda et al., 2010). Using currency demand function, the size and the growth trend of the underground economy can be estimated as the difference between the estimated volume of money or currency without tax variable i.e. fiscal variable or taxation variable; and the volume of actual currency with tax variable (Ahmed & Hussain, 2008). The process captures the estimation of extra volume of money that was assumed as money hold by agents for their transactions in the underground economy (Dell’Anno & Halicioglu, 2010).

Next, we assume that the income velocity of money (currency) is the same and its uses in the underground economy for legal demand for money, M1 in the official economy. Then, the volume of the underground economy can be calculated and then it also can be compared to the official statistics of GDP (Schneider & Klinglmair, 2005). The method of currency demand is the most widely employed method in the study of the underground economy (Amin, 2008). It has been applied to measure the magnitude of the underground economy through an excessive use of money in terms of cash in many countries in the world (Hernandez, 2009). For example, it was applied in the studies on the U.S., Tanzania, Italy, New Zealand, Spain, Mexico, South Africa, Peru, Pakistan, Ghana, Ethiopia, Romania, Canada, Turkey, and Colombia. Nonetheless, some questions have been raised regarding some aspects of currency demand approach (Schneider & Hametner, 2014). First, not all transactions in the underground economy are using cash. Therefore, the total size of the underground economy (including transactions in the form of barter) may be larger than the one previously estimated (Schneider, 2006).

Second, only the financial variable such as tax burden was considered as a main cause of the underground economy (Schneider & Hametner, 2014; Schneider & Savasan, 2007). Meanwhile, other variables which may also contribute to the underground economy such as the tight regulation, and taxpayers’ behavior toward the authority were ignored. Although lacking in the reliable data for the majority of the countries in the study, however these neglected variables may show a larger size of the underground economy (Schneider & Hametner, 2014). Third, the studies that were conducted using the currency demand approach to measure the extent of the underground economy were built on the assumption that the velocity of money has the same value in both economies (Alexandru & Dobre, 2011).

As claimed by Ahumada et al. (2007), the assumption is only commensurate if the income elasticity of money is one which is not the case with the previous studies. Therefore, the estimation of the underground economy should be adjusted as suggested by Ahumada et al. (2007: 2009). Finally, the method assumes that there are no illegal activities of the underground economy in the base year of the study’s period. Where the assumption remains vulnerable to criticism, shirking this assumption nevertheless will require adjustment on the size of the underground economy.
Jauhari B. Dahalan and Awadh Ahmed Mohammed Al-Gamal

The estimated size of the underground economy could be larger than that volume reported (Schneider & Buehn, 2013).

Research Method

Model Specification

Following the literature, the currency demand model is based on the recent model of currency demand approach of Ahumada et al., (2009) where the coefficient of income elasticity for money in the long run is not equal to one as in the previous studies. The model is expressed as follows:

$$M_1 = \alpha_0 TR_t^\beta G_t^\gamma REM_t^\delta \exp(\gamma h_t)$$ ..............................(1)

Where $M_1$ is the currency in circulation plus demand deposits at time $t$ as the dependent variable, $TR_t$ is the total non-oil tax revenues over all the economy at time $t$ excluding the receipts of oil revenues, $G_t$ is the nominal Gross Domestic Product at time $t$, $REM_t$ is the outflow of money that is remitted by the foreign workers to their home countries at time $t$, $h_t$ in equation (1) represents the opportunity cost of holding money $i_t$, which is interest rate on deposits over a period $t$, and $\pi_t$ is the inflation rate at time $t$, i.e. $h_t = (i_t + \pi_t)$, $\alpha_0$ is a constant, and $\varepsilon_t$ is the error terms.

By taking natural logarithms of both sides of equation (1), and substituting for $h_t$. The estimable model of currency demand function in equation (1) is now transformed into a linear form:

$$\ln M_1 = \alpha_0 + \beta_1 \ln TR_t + \beta_2 \ln G_t + \beta_3 \ln REM_t + \gamma_1 i_t + \gamma_2 \pi_t + \varepsilon_t$$ ..............................(2)

All variables are in nominal term, and the expected signs for the parameters of the explanatory variables in the equation (2) are as follows:

$$\beta_1, \beta_2, \beta_3 > 0, \gamma_1, \gamma_2 < 0.$$

Zivot and Andrews (1992) Unit Root Test

The procedure of Zivot and Andrews (1992) unit root will be conducted in order to capture strong inferences about the order of integration of the variables in the currency demand function model of Qatar. A spurious finding in the presence of the structural break, and a sharp reduction in power of the properties of a series has been argued to be attributed to the usual ADF test (Gregory, Nason & Watt, 1996; Gregory & Hansen, 1996). Therefore, Zivot-Andrews's (1992) unit root test as one of the widely acclaimed unit root tests that takes into consideration the presence of structural break in the series is employed. The test allows for only one time break in each tested variable, in which case, the time break point is endogenously estimated at unknown point as it occurs at time $t$. The test consists of three models as follows:

Model (A): the change in the level shift or intercept of series at unknown time break point, $T_b$:

$$\Delta Y = \mu^h + \theta^h DU_t + \beta^h t + \alpha^h T(B) + \sum_{i=1}^{k} \Delta Y_{t-1} + \varepsilon_t$$ ..............................(3)

Model (B): the change in the slope of series in the trend function occurring at unknown time break point, $T_b$:
\[ \Delta Y_t = \mu^b + \beta^b t + \gamma^b D T_{t}^* + \alpha^b Y_{t-1} + \sum_{i=1}^{k} C_i^b \Delta Y_{t-i} + \hat{e}_t \] \hspace{1cm} (4)

Model (C): the change in the level shift and in the slope of series with trend occurring at unknown time break point, \( T_b \):

\[ \Delta Y_t = \mu^c + \theta^c DU_{t} + \beta^c t + \gamma^c D T_{t}^* + \alpha^c D(T_b)_t + \sum_{i=1}^{k} C_i^c \Delta Y_{t-i} + \hat{e}_t \] \hspace{1cm} (5)

Where \( DU_{t} \) in equations (3) and (5) is a dummy variable for level shift at each time a break occurs, while \( D T_{t}^* \) in both equations (4) and (5) is a dummy variable representing change that occurs in the trend. The dummy of \( DU_{t} = 1 \) if \( t > T_b \), or 0 if \( t \leq T_b \), while the dummy of \( D T_{t}^* = t - T_b \) if \( t > T_b \), or 0 if \( t \leq T_b \). Where \( T_b \) is the date at which structural break takes place. The guideline for choosing the date of a structural break is by selecting the minimum value of the t-statistics for testing the null of \( \hat{\alpha} = (\alpha - 1) = 1 \) for the whole models. If the t-statistics is less than its critical values at all levels of significance, it implies that the included variable has a unit root or non-stationary with one structural break point. If the t-statistics is greater than its critical value, it implies that the variable under test has no unit root with one break point or stationary with one break. Since rejection of null does not mean rejection of a unit root itself, but would imply rejection of unit root without a break (Lee & Strazicich, 2003). The critical values are provided by Zivot and Andrews (1992), while the optimal number of lag length will be based on Akaike Information criterion (AIC).

**Gregory and Hansen Cointegration Test**

Gregory and Hansen’s (1996) cointegration test is an extension of Engle-Granger (1987) technique of cointegration test. It is applied to investigate the long run relationship between currency demand function and its determinants in the presence of a possible structural break (Singh & Pandey, 2012; Banafea, 2014). The test is a residual-based approach to test the null hypothesis of no cointegration against the alternative hypothesis of cointegration with one unknown structural break (Gregory & Hansen, 1996; Kumer, Webber & Fargher, 2013). It allows for I(1) variables over all the system at one unknown time break point (Omotor, 2011). The determination of a potential unknown break point is endogenously estimated, since the time break point is unknown (Gregory & Hansen, 1996). Gregory and Hansen (1996a) have presented three models that allow to test the null against alternative hypothesis of long run relationship taking into account the existence of structural break in the cointegrating relationship.

Model (1): the possible structural change in the level shift at unknown time break point, \( T_b \) as:

\[ Y_t = \mu_1 + \mu_2 DU_{t_0} + \alpha_1 X_t + e_t \] \hspace{1cm} (6)

Model (2): the possible change in the level shift with trend at unknown time break point, \( T_b \) as:

\[ Y_t = \mu_1 + \mu_2 DU_{t_0} + \mu_2 t + \alpha_1 X_t + e_t \] \hspace{1cm} (7)
Model (3): the possible change in the regime shift or full break where both the level shift and the slope coefficients change at unknown time break point, $T_b$ as:

$$Y_t = \mu_1 + \mu_2 DU_{it} + \alpha_1 X_t + \alpha_2 X_t DU_i + e_t,$$

Where $Y_t$ the dependent variable of cointegrating system is, $X_t$ is independent variable, $t$ is a time trend. $\mu_1$ represents the intercept before the level change, while $\mu_2$ denotes the change in the intercept at a time break. $\alpha_1$ represents the cointegrating slope coefficients before time break occurs, while $\alpha_2$ denotes the change in the slope coefficients of the cointegrating system after time break occurs, $t$ is the time subscript and $e_t$ is an error term.

In all these three models, $DU_{it} = 1$ if $t > k$ and $DU_{it} = 0$ if $t \leq k$, where $k$ is the break time point at which break occurs. The time break dates are achieved by an estimation of the cointegrating systems for all possible break dates. The time break date is chosen at a value that minimizes the $t$-statistics or at which absolute value of the test $t$-statistic is at its maximum compare to its critical values provided by Gregory and Hansen (1996) using Monte Carlo experiments. The number of optimal lag length will be chosen automatically based on the criteria of Schwartz Bayesian information criterion (BIC), Akaike Information criterion (AIC) and $t$-test criterion (TTC). The three models above in equations (6), (7) and (8) are extended to test the cointegration relation for all the variables that are included in the currency demand function of Qatar. The new models can be expressed as follows:

Model (1): cointegration equation with level shift dummy as:

$$\ln M_t = \mu_i + \mu_t + \alpha_1 ln(TR_t) + \alpha_2 ln(G_{it}) + \alpha_3 ln(Rem_i) + \alpha_4 i + \alpha_5 \pi_i + \epsilon_i,$$

Model (2): cointegration equation with level shift dummy and trend as:

$$\ln M_t = \mu_i + \mu_t + \mu_t + \alpha_1 ln(TR_t) + \alpha_2 ln(G_{it}) + \alpha_3 ln(Rem_i) + \alpha_4 i + \alpha_5 \pi_i + \epsilon_i,$$

Model (3): cointegration equation with regime shift dummy (full break) where both the level shift and the slope coefficients change as:

$$\ln M_t = \mu_i + \mu_t + \alpha_1 ln(TR_t) + \alpha_2 ln(TR_t) DU_{it} + \alpha_3 \ln(G_{it}) + \alpha_4 \ln(G_{it}) DU_{it} + \alpha_5 \ln(Rem_i) + \alpha_6 \ln(Rem_i) DU_{it} + \alpha_7 \ln(Rem_i) DU_{it} + \epsilon.$$

The choice of the best model to investigate the long run relationships between currency demand and its determinants will be based on the model that is consistent with the theory and passes the diagnostic tests. However, the residuals obtained should be tested for its stationary in level as introduced by Engle-Granger (1987). This is in order to realize a robust inference on the cointegrating relationship.

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1 The econometric software, RATS version 8.1 package will be used to perform the test of Gregory and Hansen's (1996) cointegration test.
Short Run Estimation and Diagnostic Tests

In this paper the dynamic short run Error Correction Model (ECM) will be constructed based on the LSE-Hendry method called the General to Specific (GETS) approach as explained by Rao, Singh and Kumar (2010). To do this, the currency demand function in its first adjustment in Equation (2) is transformed into the following form:

$$\Delta \ln M_1 = -\lambda [\ln M_1, -(\alpha_0 + \beta_1 \ln (TR), + \beta_2 \ln G, + \beta_3 \ln Rem, + \gamma_1 \pi_1, + \gamma_2 \pi_2)]$$

Where $\lambda$ refers to an adjustment coefficient of ECM. It should be negative, less than one and significant. This is due to the fact that the demand for currency can fluctuate in the current time period as a result of the changes in its determinants. The independent variable that may interpret the behavior of currency demanded can also change in the current and past time period. Thus, equation (12) will be rewritten in a more general accurate specification as follows:

$$\Delta \ln M_1 = -\lambda [\ln M_1, -(\alpha_0 + \beta_1 \ln (TR), + \beta_2 \ln G, + \beta_3 \ln Rem, + \gamma_1 \pi_1, + \gamma_2 \pi_2)]$$

$$+ \sum_{i=1}^{n} \delta_i \Delta \ln (TR)_{t-i} + \sum_{i=1}^{n} \delta_i \Delta \ln (G)_{t-i} + \sum_{i=1}^{n} \theta_i \Delta \ln (Rem)_{t-i}$$

$$+ \sum_{i=1}^{n} \psi_i \Delta \pi_{t-i} + \sum_{i=1}^{n} \varphi_i \Delta \pi_{t-i} + \sum_{i=1}^{n} \gamma_i \Delta \ln M_{1-t-i}$$

Where $\Delta$the difference operator, and the term $\Delta \ln M_{1-t-i}$ describes the changes in the lagged dependent variable. The term ECM is the difference between the actual and estimated currency demand at time $t - 1$, which is included in the equation (13) in order to introduce most capable fit of general dynamic specification of the adjustment process. In line with this technique, equation (13) will be estimated using OLS and the insignificant lagged variables will be discarded till the last fitted version of the adjustment model of the short run dynamic error correction is obtained.

In essence, the short run error correction model will be obtained based on the estimation of the equation (13). Hence, the dependent variable of currency demand is regressed on its lags, its own determinants with their current and lagged terms and the one period lagged residuals that are obtained from the cointegrating equation which were determined by Gregory and Hansen’s (1996) methodology (see Singh & Pandey, 2009; Rao & Kumar, 2009; Omotor, 2011; Dritsakis, 2012; Kumar & Webber, 2013; Kumar, Webber & Fargher, 2013). The final version of short run dynamic error correction model will be tested for normality, serial correlation, functional form (for model misspecification), heteroscedasticity of the residuals and the stability test of currency demand function using Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) tests.

Estimation of the Underground Economy

Following Ahumada et al (2009), Ahmed and Hussain (2008) and Macias and Cazzavillan (2009), the analysis of the underground economy in the Qatari economy is conducted. For each year over the study’s period, the predicted values of the currency demand function will be derived first with the tax revenues variable ($\hat{M}_{1t}$) and in the second time, the predicted values of the currency demand
function will be derived without tax revenues variable \( (\ln M_1^* \ast \omega_T) \). The difference between these two predicted values is multiplied by the actual total value of money outside banks \( M1 \) over the period to give the level of illegal currency. The illegal money to demand currency ratio for each year will be formulated as follows:

\[
\text{Illegal money } (IM_1^t) = [(\ln M_1^* t) - (\ln M_1^* \ast \omega_T)]^{\ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ld goods and services
Results and Discussion

Analysis of the Underground Economy in Qatar

Based on the estimated GH-2 model, Table 5 provides estimates of the size of the underground economy in Qatar over the period of 1980-2010. The results introduce that the underground economy in the Qatari economy grew from about R.Q4,839 billion in 1980 to R.Q71,908 billion in 2010. As a percentage of GDP, the average size of the underground economy constitutes 17.03% of the official GDP over the study’s period. It was 16.90% of the official GDP in 1980 and 15.51% of the official GDP in 2010. As can be shown in Table 5, the average size of the underground economy in Qatar is greater than that average size, as reported by Schnieder et al. (2010).

From the results, the magnitude of the underground economy as a percent of the official GDP has been steadily increasing since 1980 to the end of 2010, excluding the year 1998s. This is because the average was at its peak point of 18.14% of the official GDP. The statistics of Table 5 indicate that the underground economy in the Qatari economy has increased significantly since 1980. The development of the trend for the underground economy in Qatar is less compared to some other Asian and African developing countries such as Bangladesh, Malaysia, Morocco, Guyana, Tanzania, Malawi, Ethiopia. However, the rank of the underground economy in the Qatari economy itself is relatively bigger than its official economy.

Table 5. Estimates of illegal money, underground economy and tax evasion in Qatar based on the GH-2 model over the period of 1980-2010.
The result also indicates that the size of the underground economy in Qatar reflects the informal employment of the foreign workers in the economy as a result of tight regulations levied. Qatar has largest number of immigrants, which constitute about 72.4%, 76.3%, 80.5% and 81.6% of the total population over the period of 1990, 2000, 2005 and 2010. The foreigners engage in illegal job to meet the payment of their sponsors, an amount of money they agreed, after they have been given permission to work in the country (Sturm et al., 2008). This is done in order to obtain faster profits. The result of the underground economy to the official economy in Qatar is demonstrated in Figure 1.

![Graph](image.png)

**Figure 1:** The size of the Underground Economy to the Official GDP in Qatar over the study period.

However, the results show that the size of illegal money in Qatar grew from about R.Q 594 million in 1980 to about R.Q23,276 billion in 2010. The level of the illegal money as a percent of money in circulation outside banks (M1) in the Qatari economy has been steadily growing since 1980 (26, 11%) till the end of 2010 (26,57%). The average size of the illegal money to the money outside the banks has reached about 26,70% over the study period. The result of the illegal money and legal to the total amount of money outside the bank in Qatar is shown in Table 5 and illustrated in Figure 2.
Figure 2: The size of illegal, legal money to the money outside the banks in Qatar over the study period.

This finding provides that the underground economy in Qatar is brought about by the huge outflow of money to abroad illegally due to the distortion in the economic policies. In addition, an increase in the underground economic activities is attributed to the fact that illegal workers have no way to access legal banking services, which requires that workers in most cases should be resident of the country officially. However, even if the workers are resident officially, formal or informal workers have a limited financial constrain to remit (less than their salaries) their money home (De Brauw, Mueller, & Woldehanna, 2013). Since the owners have to account for the sources of large amounts of money owned, much money goes unrecorded through informal channels. In addition, there is no red tape restriction to sending money in illegal ways and the cost of sending such money is less than that in the formal ways (Freund & Spatafora, 2005; Beine, Lodigiani, & Vermeulen, 2012). To that extent, the size and growth of the tax evasion in the Qatari economy amounted to about R.Q 190 million in 1980 to R.Q 9,163 billion in 2010. It has been growing steadily since 1980 from 0.66% to 1.98% in the end of 2010, excluding the years of 1998 and 2009. The higher rates of tax evasion compared to the official GDP reached 3.71% in 1998 and 3.93% in 2009. The level of tax evasion as a percent of GDP is soaring rapidly since 1998. The higher level of tax evasion compared to the official GDP was estimated at R.Q 7.556, 9.657, 13.967 and 9.163 billion respectively in the last four years of the study period. The result of tax evasion to the official GDP is illustrated in Figure 3.
On the other hand, the results indicate that the tax evasion constitutes a significant portion of the non-oil tax revenues in the Qatari economy. The growth rate of tax evasion as a percent of total non-oil tax revenues was estimated at 16.90% in 1980 to about 15.50% in 2010. The average growth rate is 16.50% over the study period. The result suggests that tax evasion practices in the Qatari economy are concentrated among the Small and Medium-sized enterprises. The result can be shown as in Figure 4.

The results show that an increase of tax evasion in the Qatari economy is attributed to the higher growth rate of the tax burden in the economy. Since, the average rate of non-oil revenues as in percentage to the Gross Domestic Product in Qatar which reflects the tax burden amounted to 13.11% over the study period. The higher average rate was around 20% in 1998 and remained at the highest level over the
later period of study. The result on the size of tax evasion as a component of the underground economy in the Qatari economy could be a result of wrong fiscal policy, which led to losses in the revenues of the government. The increased tax burden is more costly to owners of business firms in the private sector (Dabla-Norris, Gradstein & Inchauste, 2008). In fact, this result confirms that taxation and underground economy move together over time, as it can be seen in Figure 5. However, the result suggests that tax evasion is a component of illegal activities of the underground economy in the Qatari economy. The underground economy involves different illegal activities.

![The Trend of Tax Evasion and Underground Economy in Qatar](image)

**Figure 5**: The trend of tax evasion in and underground economy Qatar over the study period.

**Conclusions**

This study estimated the size of the underground economy and tax evasion in the Qatari economy over the period of 1980-2010 using the Gregory and Hansen cointegration test based currency demand approach. The results suggest that the size of the underground economy in Qatar is growing significantly over the period of study. The level of the underground economy as a percent of the official GDP increased steadily from 1980 to 2010. The average size of the underground economy in Qatar constitutes 17.03% of the official GDP over the study period. It was 16.90% and 15.51% of the official GDP in 1980 and 2010 respectively, while the average size constitutes 17.03% of the official GDP. From the analysis, the average size of the underground economy in Qatar is greater than that reported by Schnieder et al. (2010). The development of the trend for the underground economy in Qatar is less in comparison to some other Asian and African developing countries such as Bangladesh, Malaysia, Morocco, Guyana, Tanzania, Malawi, and Ethiopia. However, the rank of the underground economy in the Qatari economy itself is relatively higher than its official economy.

The findings also reveal that the size of illegal money in the Qatari economy is around R.Q 594 million in 1980 to about R.Q 23,276 billion in 2010. The growth level of the illegal money as a percent of money outside banks (M1) in the Qatari economy had been steadily growing from 26, 11% since 1980 to 26,57% till the end of 2010. The average size of the illegal money to the money outside the banks has risen to about 26,70% over the period of study. However, the magnitude of the tax evasion amounted to about R.Q 190 million in 1980 to R.Q 9,163 billion in 2010. It had been growing steadily from 1980 to the end of 2010, excluding the year 1998 and 2009 respectively. The growth rate of the tax evasion as a percent of the official GDP in Qatar had been steadily increasing from 0.66% in 1980 to 1.98% in the end of 2010, and it was soaring rapidly since 1998. The higher rates of tax evasion in
comparison to the official GDP reached 3.71% in 1998 and 3.93% in 2009. The findings provide that the underground economy in Qatar stems from the higher rate of tax burden and the huge outflow of money that is remitted by the foreign workers to abroad illegally due to the distortion in the economic policies. The size mainly reflects the informal employment of the foreign workers in the economy as a result of the cheapest price of foreign labor compared to local.

To that extent, Qatar has the largest number of immigrants compared to its national population. The Qatari authorities embarked on tight regulation that can drive foreign workers to engage in illegal activities of the underground economy. Foreigners get permission to work by themselves within the country based on their agreement with their sponsors to pay back an agreed amount of money (Sturm et al., 2008). This study suggests that the size of the underground economy in Qatar should be taken into account when any economic policy is formulated. There are a number of reasons for this conclusion: First, due to its negative impact of reducing government revenues since the tax evasion is increasing and the oil reserves could not forever sustain the economy (Muceku & Muca, 2014). Second, the size of the underground economy is currently estimated at 15.51% of the official GDP as at end of 2010, which is bigger compared to the relative size of its economy. Finally, an increase in the illegal activities of the underground economy could be a damaging factor to economic development planning in the Qatari economy.

References


