Measuring the Shadow Economy in Zimbabwe: Using the Monetary Method

JDG Nhavira
University of Zimbabwe, Zimbabwe.
Email: nhavira@zol.co.zw

Abstract
The main purpose of this study is to estimate the size of the shadow economy in Zimbabwe using the monetary method. The monetary method or the currency approach has become a popular way of measuring the size of the shadow economy. It assumes that cash is employed to make transactions that agents want hidden from official records. It is based on the difference between declared income and the income implied by the observed currency demand. The major conclusions of this study can be expressed as follows: The size of the shadow economy has increased as a proportion of GDP from 25.6 per cent to 33.0 per cent in 2013 while the total value of tax evasion has increased from ZW $243,005,524.7 in 1979 to USD $880,908,339 in 2013. The evidence also demonstrates that the rate of growth of the informal economy has been higher than the formal economy.

Key words: Underground, unreported, unrecorded, undeclared, informal, shadow, GDP, national statistics
JEL: O17, O11 H26, E59
1. Introduction

The main purpose of this study is to estimate the size of the shadow economy in Zimbabwe using the monetary method as in Tanzi (1982, 1983). More specifically, the present work addresses the question of the size of the shadow (unreported) economy in Zimbabwe and estimates the revenues that are lost due to tax evasion.

Economists have been interested in the issue of the shadow economy since the last decade of the 20th century. The shadow economy refers to any economic activity that is unrecorded in national statistics. As a vicious cycle, undeclared economic activities of economic agents reduce the tax revenues, leading to tax authorities increasing taxes to compensate for the loss of tax revenues, stimulating another increase in the share of unreported incomes. Characterising the nature of the shadow economy and its mechanism is essential for determining the optimal strategies for the government. Undeclared transactions result in underestimating the official GDP which has implications for macroeconomic management and stability as any fiscal and monetary policy decision would be based on biased official statistics. Furthermore, projections for expenditure are lower as most countries base their budget projections with reference to the official GDP figure.

Therefore, determining the size of the shadow economy is important because it distorts the GDP figure since national accounts do not register a number of economic transactions. The size (averages) of the shadow economy varies from 11 per cent of registered GDP for OECD members to 20 per cent for emerging economies and 39 per cent for developing countries (Schneider, 2000; Ahumada, Avarado, Canavesse and Grosman, 2009). Thus one of the most important challenges that national tax systems confronts is the problem of taxing unreported economic activities.

However, by its very nature, measuring the shadow economy, is not an easy task. The matter is further complicated by the existence of different concepts and different estimation methods tied to particular concepts. This has resulted in estimation methods developing into an important theoretical and empirical issue.

The increase in the shadow economy creates problems for governments and policy makers. It accelerates corruption and advocacy, lowers the official economy’s income, distorts economic information by overstating unemployment, understating growth rates, and reduces government revenue. There are several reasons attributed to the increase in shadow economy. These include increasing tax burdens and social security contributions, increased regulations in the official economy, particularly in the labour markets, poor governance and the presence of significant corruption in government operations.
However, everything is not all doom and gloom. The shadow economy encourages entrepreneurship and innovation, generates income which is spent in the official economy, induces prices in the official economy to decline in order to remain competitive, and provides employment and a source of income (Greenidge Holder and Mayers, 2005).

The monetary method or the currency approach has become a popular way of measuring the size of the shadow economy. It assumes that cash is employed to make transactions that agents want hidden from official records. It is based on the difference between declared income and the income implied by the observed currency demand. The popularity of the monetary method arises from the fact that it covers all money transactions and requires no expensive surveys that are restricted to a sample and therefore permits regular estimations to trace the evolution of the size of the shadow economy with relatively easily available data.

In examining the data and the results one should take the following historical highlights into account. In 1999-2001 violent farm invasions took place in Zimbabwe disrupting agricultural production and in the process undermining the country’s industrial base which was highly dependent on agriculture. Secondly, monetary policy in Zimbabwe changed drastically from 2003-2008 with the central bank becoming development banking oriented and engaging in quasi-fiscal activities (Gono, 2003-2009). This period culminated in hyperinflation which was brought to a halt through dollarization in 2009 February. This also marked the demonetisation of the Zimbabwe dollar.

The next section presents a brief outline of the evolution of the monetary method. Section 3 discusses the data source, data description and methodology based on the econometric estimation of the demand for currency. Section 4 presents the empirical results and section 5 concludes.

2. Literature Review

Transactions made using cash are difficult to trace. This is why the monetary method of measuring the shadow economy is based on the assumption that cash is the preferred medium for making transactions that economic agents wish concealed from official records. In contrast, assets recorded in financial institutions and their uses are recorded in such a manner that transactions made with them can be easily inspected. Thus where the amount of currency employed in hidden transactions can be estimated then this amount could be multiplied by the income-velocity of money to get a measure of the size of the shadow economy.

There are various monetary approaches which researchers have used to measure the size of the shadow economy thus far-

(i) Gutmann’s approach:

In 1977, Gutmann estimated the shadow economy of the United States (U.S.) estimating it at $200 billion. His research was based on four key assumptions: Cash is the shadow
economy’s medium of exchange; high taxes give impetus to the shadow economy; changes in taxation and other restrictive regulations alters the ratio of currency to demand deposits; and identified 1937-1941 as the period in which there was an absence of an underground economy in the U.S.

Feige (1979) criticised Gutmann (1977) ‘s assumptions as follows; that the first assumption was unrealistic as most shadow economy money is initially externalised and then reintroduced into the economy through business loans. Furthermore, irregular purchases can take place by, cheque, debit cards with little risk of detection. The third assumption of Gutmann (1977) is criticised on the basis that the ratio of currency to demand deposits alters over time due to various factors.

(ii) Feige’s approach:

Feige (1979) measured the underground economy of the United States of America based on the quantity theory of money: $MV+M′V′= PT$

Where,
- $M =$ Currency notes
- $M′ =$ Demand deposits
- $V =$ Velocity of the currency notes
- $V′ =$ Velocity of money of the demand deposits
- $P =$ Composite price index of existing and newly created goods.
- $T =$ Physical volume of transaction.

Feige’s approach was to first determine $M$, $M′V$ and $V′$ and thereafter determine $PT$. The result for $PT$ is then divided by the observed income to GNP, which gives the estimate of the shadow economy. In this regard the observed income $py$ is the product of the price index of newly created goods and services and $y$ is the real income. In the absence of a shadow economy, the nominal GNP derived should equal the official GNP. When there was no shadow economy, i.e. 1939 Feige found that the estimated ratio of $PT/GNP$ was 10.3 per cent which he regarded as normal. However, his estimations for GNP for 1976 and 1978 and divided by the 1939 normal ratio he derived the nominal GNP. The difference between his derivation and the official GNP provided the estimate for the shadow economy.

Interestingly, neither Gutmann (1977) nor Feige (1979) employed econometric estimates of the demand for currency. They determined the quantity of money reserved for shadow transactions by reference to a prior point in time described as free of a shadow economy. The size of the shadow economy is obtained by multiplying the income-velocity of circulation (which is assumed to be the same for the official and the shadow economies) by that amount of money.

(iii) Tanzi’s approach:
Tanzi (1980; 1983) built his approach based on the insights gained by Cagen (1958) who was interested in estimating the long run behaviour of the currency ratio over the period 1875-1955. He identified a number of factors that influenced this currency ratio (defined as currency/money supply) as follows: The opportunity cost of holding currency; expected real income per capita; the volume of retail trade (cash being more preferred); the volume of travel per capita (cash being more preferred); the degree of urbanisation; the rate of tax on transactions. Cagen (1958) pointed out that there is a direct and positive relationship between the income tax rates and the currency ratio.

Tanzi’s approach has been criticised by Feige (1986) contemptuously dismissing Tanzi’s contribution to the literature as being merely his relaxation of his third assumption regarding treatment of the ratio of currency to checkable deposits in the reported economy. Furthermore, Feige (1986) also criticised Tanzi for using a multiplicative functional form to estimate the observed currency ratio.

However, the criticism continued. Even Tanzi’s choice of variables were singled out for criticism. Earlier, Acharya (1984) had criticised Tanzi, inter alia, for employing Gross National Product as a proxy for output. Meanwhile, Hassan and Suk-Yu (2010) argued that the choice of dependent variable is really at the discretion of the researcher. Notwithstanding the various criticism levelled against Tanzi and his approach, it is still the best method available for obtaining an estimate of the size of the shadow economy. By definition, the shadow economy is difficult to estimate precisely because it is hidden.

Schneider and Kinglmaier (2004) estimated the size and official economy of 24 African countries, in particular, Zimbabwe. Their estimate of the shadow economy for Zimbabwe is around 59.4 per cent of GNP. In another study Saunders for 2001/2002 and 2002/2003 estimated the shadow economy using the DYIMI/MIC and monetary method as 61 per cent and 63.2 per cent respectively for the periods.

Using the monetary method, Makochekanwa (2012) estimated the second economy in Zimbabwe. He found that the shadow economy had escalated from about 10 per cent of registered GDP in 1980 to 70 per cent in 2008 before declining to 52 per cent in 2009.

Tanzi (1980) based his study on two assumptions; that the shadow economy is fuelled by high taxes; second that currency is employed for transaction and storing wealth purposes. The model subjected to empirical tests is as follows:

\[
\ln(C/M2) = \beta_0 + \beta_1 \ln T + \beta_2 \ln WS/NI + \beta_3 \ln R + \beta_4 \ln Y + e
\]

Where,

- \(C/M2\) = Ratio of currency holdings to money defined as M2
- \(T1\) = Ratio of personal income taxes to personal income net of transfers’.
T2 = Top bracket statutory tax rate.
T3 = Weighted-average rate on interest income
Ws/NI = Ratio of wages and salaries in national income.
R = Interest rate
Y = Per capita income
e = Error term

(iv) The Monetary Method

Henry (1976) argued that the shadow economy tends to use higher denomination notes. He, therefore, suggested that bills of $100 and above be withdrawn from circulation to facilitate analysis of the change in the composition of total currency in circulation. This approach has been criticised on the basis that it ignores the effect of high inflation in the economy as the currency holding would alter over time thereby making large bills appear relatively small.

The research by Tanzi (1982, 1983) employed econometric estimates of the demand for currency. The estimated equation of the demand for currency is not dependent on determining a historical point where no shadow economy existed as in the Gutmann (1977) study. It also recognises that income velocity depends on income and the opportunity cost of holding cash and not solely on those variables that motivate economic agents to conduct hidden transactions.

In conclusion, the literature demonstrates the existence of a widespread interest and concern from researchers, academics and policy makers about the shadow economy around the world. In contrast interest in Sub-Saharan Africa, in the topic seems to be lacking. This is most likely due to the difficulties and frustrations inherent in this particular field. It is hoped that this paper will contribute to the literature and spark debate. This is so because economic decisions that rely on incomplete official macroeconomic data are more likely to be ineffective.

3. Data Source, Data Description and Methodology

This study uses an indirect method known as the monetary approach which employs an aggregated data set to estimate a money demand equation in order to determine the size of the informal/underground economy in Zimbabwe. The monetary method is used extensively in the literature to estimate the underground economy. This approach has been utilised by (Filho, 2012; Ahumada, Alvaredo and Canavese, 2007; Iqbal, Qureshi and Mahmood, 1998; Greenige, Holder and Mayers, 2005; Ahumada, Alvarado, Canavese and Grosman, 2009; Ahmed and Ahmed, 1995; shabsigh, 1995; Haque, 2013) It is based on the concept that the underground economy’s activities are concealed from authorities and therefore depend on
currency to carry out transactions. It follows therefore, that the underground economy uses relatively more cash than the visible economy.

A surge in informal activity increases money demand. Consequently, variables that influence the underground economy such as direct and indirect tax burden should ideally be included in the estimated money demand equation. In this paper, government expenditure ratio to GDP is used to represent the tax burden, also included is real GDP per capita, real interest rates (to incorporate opportunity cost of holding cash) and the ratio of currency to money supply or M2.

3.1 Data Source

Annual data on currency in circulation, M1 and M2, Real Gdp per capita annual growth rate, Government expenditure are drawn from the World Bank data base. Data are collected from 1979 -2013. The theoretical justification for the selected variables in the empirical model is as follows:

(i) This research hypothesizes that as the taxation level increases economic agents are encouraged to evade taxes through the use of currency and thereby raising the demand for currency and consequently, the ratio of currency holdings to money currency/M2.

(ii) The real interest rate is included as it is expected that a higher real interest rate may increase the opportunity cost of currency holdings thereby leading to a decline in currency demand. Consequently, the effect of an increase in real interest rate on the demand for currency is expected to be negative.

(iii) An increased level of economic development reflected and defined in terms of annual growth rate in per capita gross domestic product is anticipated to decrease the demand for currency as economic development is assumed to replace currency by other financial instruments. Consequently, we anticipate a decline in currency/M2 ratio when the economy experiences rapid economic growth.

3.2 Data Description

Data used in this model are currency money supply ratio, Government expenditure, and real rate of interest. The most widely used measure of broad money is M2. This is the main measure of the money supply and is the economic indicator generally used to measure the amount of liquidity in the economy as it is relatively easy to track. For tracking the variable that induces economic agents to conceal transactions, we use government expenditure as ratio of GDP.

3.3 Methodology

At the commencement of the analysis a correlation matrix is specified to test for relationships among the variables and the time series are tested for stationarity using
Augmented Dickey-Fuller (1979) and Kwiatkowski, Phillips, Schmidt, and Shin (KPSS, 1992). The model estimation is based upon the work of Tanzi (1980, 1983) model but with some modification to suit the Zimbabwean economy. Moreover, currency demand methods including those of Tanzi (1980, 1983) original model are built upon the regression demand model with multiple time series variables. As previously alluded to the model has been utilised by (Bagachawa and Naho, 1994; Filho, 2012; Ahumada, Alvaredo and Canavese, 2007; Iqbal, Qureshi and Mahmood, 1998; Greenidge, Holder and Mayers, 2005; Ahumada, Alvarado, Canavese and Grosman, 2009; Ahmed and Ahmed, 1995; Shabsigh, 1995; Haque, 2013). The first step is to specify and estimate a demand function for currency with the following assumptions -

3.3.1 Model assumptions

- All activities in the underground economy rely on currency for transactions. This includes RTGS and debit cards. Even where taxes were absent, the currency ratio would be impacted by illegal and criminal activities such as gambling or smuggling to name a few.
- The velocity of money for currency in the underground economy is the same as that of narrow money M1 or that of the legal money or an average of these two.
- The higher the government expenditure as a proportion of GDP the larger the underground economy and the money demand.

The second step is to run the model again and set GE equal to zero to obtain an estimate of the amount of cash demanded in the absence of incentives to conceal transactions.

The third step is to obtain the difference between observed currency and the currency under no incentives which will reveal the hidden economy.

The fourth step is to multiply the above result by the velocity of circulation.

3.3.2 Empirical Model

The basic regression equation for the currency demand as suggested by Tanzi (1980, 1983), is the following:

\[ C_r = f (RGP + GE + Ri + Dep int + \frac{M1}{M2})_{t-1} \]

Where,

- \( C_r \) = Currency holdings ratio
- \( RGP \) = real GDP per capita growth rate (annual)
- \( GE \) = Government expenditure % of GDP
- \( Ri \) = Real interest rate
- \( Dep int \) = Deposit int rate (annual)
- \( \frac{M1}{M2} \) = Lagged currency ratio

4. Empirical Results
The demand for currency has been estimated by regression analysis and the results are reported as follows:

Dependent variable: Cash holdings

The dependent variable is cash holdings and the model summary in table 1 below highlights that R squared = 1.000 which implies that cash holdings can be explained by the predictor variables and that all the variation in demand for currency is explained by the estimated ANOVA equation.

Table 1: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.934</td>
<td>.873</td>
<td>.849</td>
<td>15.76786</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Government Expenditure (%), GDP, GDP Per Capita Growth (%), M1/m2, Deposit Interest, Real Interest Rate (%)

Table 2: The ANOVA equation highlights the F-statistic which indicates a perfect fit with the equation.

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>46064.371</td>
<td>5</td>
<td>9212.874</td>
<td>37.055</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>6712.885</td>
<td>27</td>
<td>248.625</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>52777.256</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Cash Holdings
b. Predictors: (Constant), Government Expenditure (%) GDP, GDP Per Capita Growth (%), M1/m2, Deposit Interest, Real Interest Rate (%)

In table 3, the coefficients of the predictor variables for deposit interest, lagged M1M2, are positive and statistically significant at the 0.001 level. Government expenditure is statistically significant at the .05 level. Whilst real interest coefficient is negatively correlated to cash holdings and GDP per capita growth rate but both are statistically insignificant.

Table 3: Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>-17.503</td>
<td>20.896</td>
<td>-.838</td>
<td>.410</td>
</tr>
<tr>
<td>Deposit Interest</td>
<td>1.378</td>
<td>.246</td>
<td>.956</td>
<td>5.604</td>
</tr>
<tr>
<td>M1/m2</td>
<td>.768</td>
<td>.154</td>
<td>.431</td>
<td>4.975</td>
</tr>
<tr>
<td>Real Interest Rate</td>
<td>-.085</td>
<td>.058</td>
<td>-.278</td>
<td>-1.462</td>
</tr>
<tr>
<td>GDP Per Capita Growth (%)</td>
<td>.688</td>
<td>.548</td>
<td>.106</td>
<td>1.255</td>
</tr>
<tr>
<td>Government Expenditure (%)</td>
<td>2.231</td>
<td>.949</td>
<td>.261</td>
<td>2.351</td>
</tr>
</tbody>
</table>

da. Dependent Variable: Cash Holdings
Table 3a: Summary statistics and results from regression analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation cashholding</th>
<th>Multiple regression weights $b$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td>-17503</td>
</tr>
<tr>
<td>Dep. int</td>
<td>.799**</td>
<td>1.378</td>
<td>.956</td>
</tr>
<tr>
<td>Govt Exp</td>
<td>-.174</td>
<td>2.231</td>
<td>.261</td>
</tr>
<tr>
<td>GDP PCAP</td>
<td>-.478**</td>
<td>.688</td>
<td>.106</td>
</tr>
<tr>
<td>Real int</td>
<td>.499**</td>
<td>-.085</td>
<td>-.278</td>
</tr>
<tr>
<td>M1/m2</td>
<td>.562**</td>
<td>.768</td>
<td>.431</td>
</tr>
</tbody>
</table>

Correlation matrix

Below in Table 4 is a correlation matrix. It reports the results of 15 correlations. Statistical hypotheses are:

$H_0$: $p = 0$ [there is no actual correlation]

$H_A$: $p \neq 0$ [this is a correlation]

The null hypothesis was rejected in the following instances - Cash holdings ratio correlate positively with deposit interest, real interest, and statistically significant at the 0.01 level whilst m1/m2 is statistically significant at the 0.05 level. GDP per capita growth rate and Government expenditure has a negative sign and is statistically not significant. Furthermore, there is no evidence of multi-collinearity.

Table 4: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Deposit Interest Rate (%)</th>
<th>GDP Per Capita Growth (%)</th>
<th>Government Expenditure (%)</th>
<th>M1/m2</th>
<th>Cash Holdings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deposit Interest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>-.548**</td>
<td>-.508**</td>
<td>.317</td>
<td>.799**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.001</td>
<td>.002</td>
<td>.068</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>34</td>
<td>35</td>
</tr>
<tr>
<td>Real Interest Rate (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.859**</td>
<td>-319</td>
<td>-659**</td>
<td>.382*</td>
<td>.499**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.066</td>
<td>.000</td>
<td>.028</td>
<td>.003</td>
</tr>
<tr>
<td>N</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>GDP Per Capita Growth (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>-.548**</td>
<td>-319</td>
<td>1</td>
<td>.157</td>
<td>-.125</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.001</td>
<td>.066</td>
<td>.368</td>
<td>.480</td>
<td>.004</td>
</tr>
<tr>
<td>N</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Government Expenditure (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>-.508**</td>
<td>-659**</td>
<td>.157</td>
<td>1</td>
<td>-.019</td>
</tr>
</tbody>
</table>

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Furthermore, in order to arrive at the estimates of the shadow economy and tax evasions, it is necessary to compute the components of illegal money, legal money, tax evasion and velocity of money as indicated below:

### Illegal money

Subsequent to the estimation of currency demand above, the size of the shadow economy and tax evasion were computed as follows (Iqbal, Qureshi and Mahmood, 1999; Ahmed and Hussain, 2008):

The equation for the level of illegal money can be expressed as follows:

\[(IM) = (M1/M2)t – (M1/M2)wt\] …….. (2)

### Legal money

The difference between the sum of currency (M1) and total money supply (M2) and the estimated illegal money yields legal money (LM).

The equation for legal money can be expressed as follows:

\[LM = M2 – IM \] ……….. (3)

### Velocity of money

The income velocity (IV) of money can be expressed as an equation as follows:

\[IV = GDP/LM \] ……….. (4)

It is assumed that the velocity of illegal money is the same as that of legal money. Thereafter an estimate of the shadow economy can be obtained by multiplying illegal money by the income velocity of money. The equation for the shadow economy can be expressed as follows:

\[SE = IM * IV \] ……….. (5)

### Tax Evasion

**Correlation is significant at the 0.01 level (2-tailed).**

*Correlation is significant at the 0.05 level (2-tailed).**

<table>
<thead>
<tr>
<th></th>
<th>GDP</th>
<th>Sig. (2-tailed)</th>
<th>.002</th>
<th>.000</th>
<th>.368</th>
<th>.915</th>
<th>.318</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>35</td>
<td>34</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>M1/m2</th>
<th>Pearson Correlation</th>
<th>.317</th>
<th>.382</th>
<th>-.125</th>
<th>-.019</th>
<th>1</th>
<th>.562**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig. (2-tailed)</td>
<td>.068</td>
<td>.028</td>
<td>.480</td>
<td>.915</td>
<td>.001</td>
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<td>34</td>
<td>34</td>
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<td>34</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Cash Holdings</th>
<th>Pearson Correlation</th>
<th>.799**</th>
<th>.499**</th>
<th>-.478**</th>
<th>-.174</th>
<th>.562**</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.003</td>
<td>.004</td>
<td>.318</td>
<td>.001</td>
<td></td>
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<td>35</td>
<td>34</td>
<td>35</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>
Finally the level of total tax evasion (TE) in Zimbabwe can be computed multiplying the estimates of the shadow economy (SE) by government expenditure (GE/GDP) as follows:

\[ TE = SE \times \left( \frac{GE}{GDP} \right) \]

(6)

4.1 Estimates of the Shadow Economy and Tax evasion

The size of the underground economy and tax evasion - The estimates of the level of the shadow economy and tax evasion for the period 1979-2013 are reported in table 4 below. The results therein highlight that the shadow economy grew from zero 1979 to US $7,684,784,664 in 2013. Column (f) reports that the shadow economy as a proportion of GDP was around 0 per cent in 1979 which escalated to 60.0 per cent in 2013. The level of tax evasion is reported in column (g). It indicates that the level of tax evasion rose from zero to US$ 1,600,797,513 in 2013. The estimates of tax evasion are based on a firm assumption that incomes in the shadow economy would be taxed at the same rate as those in the formal or visible economy.

As regards the growth rates of the shadow economy as compared to the formal economy as depicted in column (g) and (h) reports that the shadow economy grew at rates of 00.0, -19.0, 1210.4, -585.5, 180.6, -81.5, -1149.5 and 15.8 in 1979, 1991, 1992, 2000, 2003, 2008, 2009, 2013 correspondingly, while growth rates in the visible economy for the same periods were 00.0, -1.6, -21.9, -2.5, -9.7, -16.6, 84.7 per cent and 2.6. Each of these dates is related to an economic event. 1979 is one year before independence, 1991 was the year of economic structural adjustment programme commencement, 1992 was the year financial liberalisation began, 2000 was the year land invasions began, 2003 was the year when currency shortages began, 2008 was the hyperinflationary year prior to dollarization, 2009 was dollarization year and 2013 is the present day or four year of a dollarized economy.

The apparent faster growth rates of the shadow economy appears to be a major factor contributing to government fiscal deficit since government expenditure expands with the overall economy (including formal and informal) while tax revenues grow at the slower pace of the formal economy.

Table 5: Estimates of the Shadow Economy in Zimbabwe

<table>
<thead>
<tr>
<th>Year</th>
<th>Money Illegal</th>
<th>Money Legal</th>
<th>Money of Legal</th>
<th>Money Shadow</th>
<th>Money Tax</th>
<th>Money Economy</th>
<th>Money Evasion</th>
<th>Money Shadow Economy</th>
<th>Money Growth rate of shadow Economy</th>
<th>Money Growth rate of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(b)</td>
<td>(c)</td>
<td>(d)</td>
<td>(e)</td>
<td>(f)</td>
<td>(g)</td>
<td>(h)</td>
<td>(i)</td>
<td>(j)</td>
<td>(k)</td>
</tr>
<tr>
<td>1979</td>
<td>-459793683</td>
<td>1126393683</td>
<td>4.6</td>
<td>-2113437919</td>
<td>-387476910</td>
<td>-40,8</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1980</td>
<td>347288575.4</td>
<td>862514125</td>
<td>7.7</td>
<td>2689233516</td>
<td>509766733,7</td>
<td>40,3</td>
<td>-227,2</td>
<td>29,0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>306951393</td>
<td>1092448607</td>
<td>7.3</td>
<td>2251000490</td>
<td>364536923,8</td>
<td>28,1</td>
<td>-16,3</td>
<td>20,0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>724223522,6</td>
<td>1022176477</td>
<td>8.4</td>
<td>6050473907</td>
<td>1124983975</td>
<td>70,9</td>
<td>168,8</td>
<td>6,6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Conclusions and Policy Implications

This study has estimated the existence of a shadow economy and tax evasion in Zimbabwe over the period 1979-2013 using the monetary method as employed by Tanzi (1980, 1983) and by Iqbal Qureshi and Mahmood (1999) among others. The cost of the shadow economy and its increasing size must be large (7.6bn US$). Particularly, when one estimates the loss of tax revenues and the demand on government services by the nefarious economic activities taking place in the shadow economy should be a major contributing factor for any fiscal deficit. This leads to an implied higher uncertain cost of doing business.
particularly when the element of discretion that is exercisable by public officials is pervasive, acts as a deterrent to the implementation of a private sector–led development strategy.

The major conclusions of this study can be expressed as follows:

a) The size of the shadow economy has increased as a proportion of GDP from 40.3 per cent in 1980 to 60.0 per cent of GDP in 2013. [That is from 2.6bn Zimbabwe dollars in 1980 to 7.6 bn USD in 2013. The population in 1980 stood at 7.6 million 50 per cent of whom were above 15 years of age dividing this by 3.8 million means 1000 Zimbabwe dollars of income per adult was unreported then. In 2013 the population stood at 13 million 50 per cent of whom were above 15 years of age dividing this by 6 million means 1100 USD of income per adult was unreported. By 2008 unemployment in Zimbabwe was estimated at around 80 per cent. However, the most recent census report argues that the majority of Zimbabweans engaged in selling vegetables on street corners, barbers, flea market stall keepers are gainfully employed therefore unemployment in Zimbabwe is estimated at 11 per cent by Zimstat (2013).]

b) The total value of tax evasion has increased from Zimbabwe dollars 509766733.70 to USD$1,600,797,513 in 2013. [In 1980 the exchange rate was Zimbabwe dollar one = one USD.]

c) The evidence also demonstrates that the rate of growth of the informal economy has been higher than the formal economy.

In contrast to the Makochekanwa (2012) study which reported that during the hyperinflationary period the shadow economy was 70 per cent of GDP in 2008 and 52 per cent in 2009 when the hyperinflation was halted through dollarization, this study found that the shadow economy was -36.8 per cent and 209.10 per cent respectively. As can be seen the results differ depending on the objectives of the study.

[It should be noted that as inflation accelerated official statistics were no longer being reported. In any event the shadow economy became the “official economy” as goods and services were available in the shadow economy in exchange for United States dollars.]

This study does not attempt to present a detailed plan that would reduce the size of the informal economy. Actions required for reform agenda include economic liberalisation, fiscal discipline (austerity), greater space for the private sector, tax reforms consisting of lower rates and a broadening of the tax base, enhanced transparency in decision-making, and policy consistency are some of the areas in which policy alterations need to be made. Isolated piece-meal actions would be a hindrance. Corruption in particular requires a comprehensive measure of reforms in order to successfully tackle the problem and should be a crucial plank in the reforms of government.

References

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Filho, B 2012 An Estimation of the Underground Economy in Brazil


