'Reflects The Hidden': Measuring Sri Lankan Shadow Economy

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Introduction

The existence of a large shadow economy typically poses difficulties in any stage of development in a country, irrespective of the process development in a adopted by it. This may distort and undermine the true picture of public finance and discourage the labor force in the formal economy. As a result of this, workers and producers in the shadow economy do not pay taxes but use public services. These free riders reduce the quantity and quality of public goods and services. Moreover, they pose obstructions to people who pay taxes and discourage them from acting in accordance with law. Impacts on taxation and unemployment are key determinants (Dell'Anno and Solomon, 2008, Schneider et.al, 2010, Davidescu and Dobre, 2012) in measuring the size of shadow economy. In the context of Sri Lanka, Samaranayake and Dayaratna-Banda (2015) had made an attempt to estimate the size of theshadow economy as a percentage of GDP. Within that they found 'underemployment' to be a factor which determines the nature of shadow economy. Moreover, unemployment rates are failed to reflect the true extent of the employment problem in today's socio-economic conditions (Sengenberger, 2011). In fact, unlike developed economies, developing nations generally experience issues with the underutilization of skills of their labour forces. This may lead to the absorption of underutilized workers in to the shadow economy. However, a robust theoretical justification for this treatment of the rate of underemployment as a causal factor is necessary. The theoretical reasoning by Samaranayake (2016) proposes the use of the rate of underemployment as a novel determinant in estimating the Sri Lankan shadow economy.

Objective

The objective of this study is to estimate Sri Lankan shadow economy for the period 1990-2015, using the rate of underemployment as a novel determinant.

Methodology

This study used Structural Equation Methodology (SEM) to estimate the size of shadow economy for the period 1990-2015. Methodology includes Multiple

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Indicator Multiple Cause[2] (MIMIC) models with two types of equations, the structural equation and the measurement equation. The path diagram of the Structural Model has been developed through combining both equations to explain the unobserved variable. Structural equation consist seven causal variables and measurement equation with two indicators.

Figure 1: The MIMIC model path diagram with causal variables and indicators
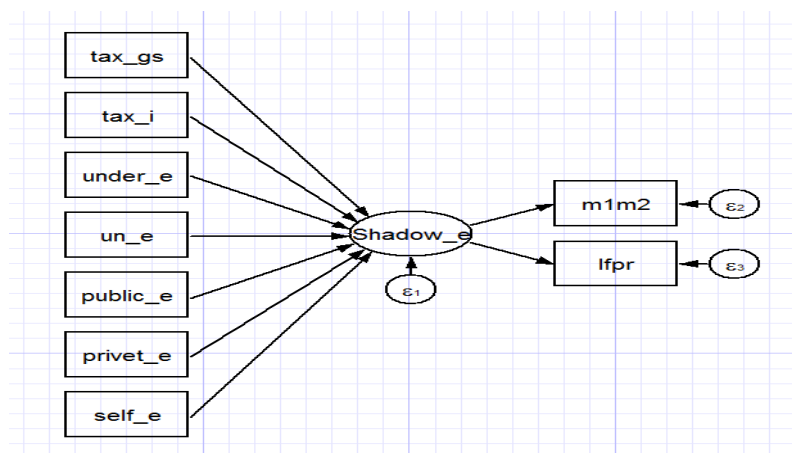
Source: Author Preparation

Required data were obtained from Annual Reports of the Central Bank of Sri Lanka, from the World Bank Data base, and from the Annual Reports on the Labor Force Survey conducted by the Department of Census and Statistics. The models were estimated using STATA-13 statistical software. The best structural models were chosen to calculate shadow economy as a percentage of Sri Lankan GDP from benchmark equation. This equation can be simplified as below,

$$[\tilde{\eta}_t \times [\eta^*_{base} / \tilde{\eta}_{base}]] = \widehat{\boldsymbol{\eta}}_t \qquad (2)$$

Where $\tilde{\eta}_t$ for value of structural calculation as a percentage of GDP from the selected MIMIC model for year t, η^*_{base} for average size of the previous estimations of shadow economy in the base year, $\tilde{\eta}_{base}$ for value of the structural calculation from the selected MIMIC model for the base year and $\widehat{\eta}_t$ for size of the shadow economy as a percentage of GDP in Sri Lanka.

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[2]The Multiple indicator multiple cause model (MIMIC) has its basis from factor analysis of psychometrics and its revelation in economics is through the latent variable models of Zellner and Goldberger in 1970's.

This study introduces underemployment as a determinant (causal variable) for thedevelopment of a path diagram to estimate the size of shadow economy in Sri Lanka. Study uses values for each proposed determinant from 1990 to 2015. But data for the rate of underemployment was available only during the 2006 to 2014 period from the Annual Labour Force Survey (LFS) reports of Department of Census and Statistics. Therefore, data series for underemployment rate is predicted on average for other time periods (from 1990-2005 and 2015) using simple calculations.

$$\sqrt{\frac{\sum_{i=2006}^{2013}(UNDER\_E_i - UNDER\_E_{i+1})^2}{n}} = \mathbf{D} \dots\dots\dots (1)$$

$$Estimation\ (E_i) = \begin{cases} UNDER\_E_{i+1} + D\ if\ i < 2006 \\ \\ UNDER\_E_{i-1} - D\ if\ i = 2015 \end{cases}$$

The above equation is used to calculate average estimates for the rate of under employment as a prediction while use the trend of given values from 2006-2014. Here, E_i are the estimations for missing values of underemployment where *'i'* represent each year. Within the equation, 'D' is used as an average for lags of given values over time, and '*n*' as the number of lags of given years before the estimations.

Results and Discussion

The approximate data set with both estimated and given values for underemployment from 1990 to 2015 varies between 14 to 2 with a decreasing trend due to the average lag (D) 0.55 for differences in underemployment rates during the given years. Thereafter, each and every causal variables and measurement variable is tested for the unit root test (ADF) and all are stationary under I (1) process.

After setting all variables accurately, 16 different MIMIC models have been run to find the fitted models. Proxies of model selection criteria are taxation on goods and services, taxation on income and profits and underemployment. Results were assigned two fitted models (See annexure 1) to perform the benchmark calculations. MIMIC 5-1-2a is a model with five causal variables and two indicators which can depict the existence of the Sri Lankan shadow economy. All causal variable and indicators are significant under 99% of confidence level as in the results. Structural

results illustrate strong positive coefficients for under and self-employment. Even both types of taxation and unemployment demonstrate positive coefficients. On the other hand the shadow economy indicates a positive relationship to indicators LFPR and the M_1/M_2 ratio. MIMIC 7-1-2 includes seven causal variables and two indicators. Underemployment and self-employment are given strong positive coefficients similar to results of MIMIC 5-1-2a. Both types of taxation are given positive coefficients of below 95% confidence level. Unemployment, public employment and private employment are not significant under 95% of confidence level. Therefore, only four causal variables are considered under this model. On the other hand, the shadow economy indicates a positive relationship with LFPR and a negative relationship with the M_1/M_2 ratio.

Then the benchmark calculations obtain three sets of estimations to estimate the average size of the Sri Lankan shadow economy as a percentage of GDP. Calculations for both MIMIC models give similar results with a decreasing trend from 1990 to 2015. Estimates were distributed over 40 percent of GDP (See annexure 2).

Conclusion

Then the comparison of estimated values with the size of shadow economy is done separately with two types of taxes, underemployment and self-employment. Both estimates for shadow economy prove the theoretical implication of a positive relationship between taxation and shadow economy (See annexures 3&4). As a result, taxation on goods and services (indirect taxes) will make a significant impact on shadow economic activities, because higher the indirect taxes may lower the purchasing parity of people and majority of them fail to find alternatives within the formal economy to improve their income, the burden placed on the public will encourage them to complement formal-sector earnings by engaging in shadow economic activities.

Therefore the Government needs to think twice about the regressive tax system which has long persisted in Sri Lanka. In the context of taxes on goods and services, tends to implies positive impact as a causal variable to determine the size of shadow economy but relatively low in strength to determine the behaviour of estimated values. The positive impact from under-employment as a causal variable is very higher to determine the size of shadow economy and relatively good in strength (but not at all) to determine the behaviour of estimated values. Because estimated values for the shadow economy demonstrate a negative trend, the behaviour of both variables represent similar trends but with different slopes (See annexure 5). However, the current status of Sri Lankan labour market indicates a decreasing trend for underemployment. This appears a favourable trend which the Government should sustain in order to decrease the size of shadow economy.

The behaviour of self-employment and the size of shadow economy represent different trends but with high correlation (See annexure 6). The high coefficient with positive impact in determining the size of shadow economy describes more of the behaviour of estimated values. Therefore, the Government should continue their work to decrease the number of self-employed people from the informal sector and to encourage them to engage with the official market economy. On the other hand, self-employed people from official economy should be clearly accounted under the Government tax collectors, since the Government can then improve their tax income without posing a further burden on consumers with new tax reforms.

Keywords: Benchmark Calculations; MIMIC Models; Shadow Economy; Under-employment

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