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Referee Report of the Paper

Hidden Economies and the Socially Optimal Fiscal-Tax to Liquidity-Tax Ratio

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The paper suggests that the optimal fiscal-tax to liquidity-tax ratio should be larger the smaller is the size of the hidden economy relative to the size of the formal sector. The analysis is based on a closed economy model that is an extension of Phelps' (1973) optimal tax model. The extension allows for the introduction of a hidden economy sector. Empirical testing using cross-section and panel data evidence is presented to support the theoretical result.

My comments are the following:

1-Theory and Empirical Analysis.

i) The closed economy model assumes the relative size of the shadow economy as exogenously given and, for that given size, the optimal fiscal-tax to liquidity-tax ratio that government should choose is obtained. Data on the sizes of the shadow economies used for the empirical analysis comes from different papers. Some of them use the *monetary method* to get the size of the shadow economy. The *monetary method* is based on econometric estimates of the demand for currency that are used to get the amount of currency held by economic agents in excess of the quantity required to finance registered transactions. This excess of currency multiplied by the income-velocity of circulation (assumed to be equal in the registered and shadow economies) gives a measure of the size of the hidden sector. The following equations formalize the way in which the measurement is done:

$$Y_H = vC_H$$

where Y_H is the size of the shadow economy, v is the income-velocity of circulation and C_H is currency held in excess of the amount required to finance registered transactions and so $C_H = C_T - C_R$. C_T is total currency and C_R is cash held to finance registered transactions. Then, it is assumed that

$$C_T = A(1+t)^\alpha Y_R^\beta e^{-\delta i}$$

and

$$C_R = AY_R^\beta e^{-\delta i}$$

where A , β and δ are constants, Y_R is the size of the registered economy and t and i are the fiscal and liquidity taxes respectively. To get C_R the fiscal-tax variable in the demand function for C_T is taken as zero because it is assumed that the fiscal-tax is the variable which represents the incentives agents have to make hidden transactions. Then

$$Y_H = v[AY_R^\beta e^{-\delta i} ((1+t)^\alpha - 1)]$$

for the simple case in which $\beta = 1$. And so

$$\frac{Y_H}{Y_R} = v[Ae^{-\delta t}((1+t)^\alpha - 1)]$$

The last equation shows how, using this method, the relative size of the shadow economy is estimated for given values of the fiscal and liquidity taxes. So, at least a part of the data used in the empirical test of the paper assumes exogenous what is endogenous in theory and vice versa. This point should be addressed by the author.

ii) Part of the data used in the empirical test is inaccurate. Data for the size of the Argentine shadow economy comes from Ahumada, Canavese and Alvaredo (2001). The main purpose of that paper is not to measure the size of the Argentine shadow economy but to point out that, in many cases, the use of the *monetary method* is not accurately applied and to suggest a way to correct wrong estimates. Estimations are correct only when the transactions elasticity of the demand for cash is one. The measurement for Argentina illustrates the problem. Another example is the estimation for Australia taken from Bajada and Schneider (2003). The result of this estimation is that the average size of the shadow economy in the period 1990-2000 is about 14.6% of GDP while the corrected estimation is only 10.4%. This problem may be present for other countries and incorrect estimations should be corrected to use the data in the test.

iii) Conclusions should be judicious. The author says "...estimates based on a diverse sample of 36 countries suggests that the elasticity of the tax ratio with respect to the hidden economy share is close to minus one. The data also suggests that this issue on formulating the optimal tax mix is particularly relevant for developing and transition economies given their relative large hidden economy shares" (page 20). The whole theoretical analysis is performed within a closed economy model and so the currency substitution phenomenon is ignored. Many hidden transactions in developing and transition economies are financed with foreign currencies (mainly US dollars). Any rise in the liquidity-tax may only induce a substitution of domestic cash for dollar bills without any increase in the collection of seignorage. The author should try to modify the theoretical model to open it to be able to include transactions made in a foreign currency. This point is important to evaluate if the paper is relevant at all.

2-Details (but important details).

i) The very first equation of the paper (equation (1)) is wrong. It reads

$$\theta(t) = T + \frac{\pi M}{P} - \frac{i_D - \pi}{P}$$

and it should read

$$\theta(t) = T + \frac{\pi M}{P} - \frac{(i_D - \pi)D}{P}$$

otherwise it does not make economic sense and is impossible to get equation (4) from it.

ii) Definitions should be consistent. In equation (11) wealth does not include the capital stock but in equation (16) it does include the capital stock.

3-Details (but not so important details).

i) Notation should be consistent. In the model π denotes inflation while P is inflation in the empirical test and it denoted the price level in the model.

ii) The paper should be written with care. In page 2 it reads “This survey is therefore proceeds along.....” In page 12 it reads “...the inflation rate is rate is only 0.009...” In page 17 it reads “...redundant because perfectly collinear...” In page 19 it reads “...the statistical significance of does drop in most cases.”

4-Conclusion.

The paper is not ready for publication and I doubt whether the subject is relevant at all if the currency substitution phenomenon is not duly addressed.

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