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ON THE ECONOMIC RATIONALE OF ESTIMATING THE HIDDEN ECONOMY*

Dilip K. Bhattacharyya

The estimation of the hidden economy may be considered as a human passion for knowing the unknown. Although a large literature on the hidden economy exists, the subject is still controversial at a very basic level. There are disagreements about: (1) the definition of the hidden activities; (2) the terms used to describe these activities; (3) the estimation or measurement procedures; and finally, (4) on the use of these estimates in economic analysis. In this paper we will only consider the issues related to estimation, economic and econometric analysis of the hidden economy. Thus we implicitly accept the term hidden economy and explicitly state the definition before entering into the main discussions. For a comprehensive study of past literature readers are referred to Feige (1989), Gaertner and Wenig (1985) and Tanzi (1982) and the large number of references in these books.

The use of the hidden economy estimates for economic and econometric analysis can be classified into three potentially distinct but interrelated categories: (a) the derivation of economic theory and/or its implication for the existing theories; (b) the formulation of economic policies; and (c) econometric modelling. If we consider that the tax evaded income is the only constituent of the hidden economy then the issues are almost obvious for all three categories. However, as we will see later, such a simple interpretation of the hidden economy estimates is generally not possible. For example, in this paper we define the hidden economy as the unrecorded national income. The unrecorded national income is calculated as the difference between the 'potential' national income for the given currency in circulation and the recorded national income. This definition of the hidden economy suggests that, in principle, it is larger than the tax evaded income. The empirical illustrations are taken from the studies conducted in the United Kingdom and India where this is a workable definition. However, for many other countries such an approach is totally inadequate as a measure of unrecorded national income, since the method of estimating the hidden economy is constrained by the structure of the economy.

In this paper we shall present a brief description of a general method of estimating the hidden economy and appraise the applicability and limitation of the method. Due to space constraint we shall discuss very briefly the importance of the hidden economy on economic theory and on the empirical

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verification of the theory. We shall also present empirical results to demonstrate the relevance of the hidden economy in econometric modelling and government policy formulation.

1. A Method of Estimating the Hidden Economy

According to my knowledge the first attempt to estimate the unrecorded national income was made by Kaldor (1956) who tried to estimate the income that avoided the income tax in India. However, only in late 1970s and early 1980s was any serious effort made to estimate the unrecorded national income (hidden economy) in Europe and America. These estimates are point estimates and emphasise the size of the hidden economy but do not provide other basic information such as the standard errors of the estimates. This, along with the lack of any other tests to justify the hidden economy estimates, made the whole exercise pointless to many economists. Until now only Pissarides and Weber (1989) and Bhattacharyya (1990) have attempted to provide standard errors of the hidden economy estimates.

A general outline of the estimation method used in Bhattacharyya (1990) and Bhattacharyya and Ghose (1998) is presented here for two reasons. First, this will allow us to observe very clearly what is actually estimated as the 'hidden economy'. Secondly, this approach also allows us to obtain disaggregated estimates for the hidden economy. Suppose an economic activity M is required in all k sectors/regions or industries,[1] and the level of activity M is determined by the income and other variables related to the k sectors. Thus, as an accounting identity at time 't',

$$M_t = M_{1t} + M_{2t} + \quad + M_{kt}. \tag{1}$$

By assumption,

$$M_{jt} = f_j(Y_{jt},\ Y_{jht},\ \mathbf{Z}_{jt}) \qquad \text{for } j = 1, \ldots, k. \tag{2}$$[2]

where, Y_{jt} is the recorded income/production of the jth sector; Y_{jht} is the unrecorded income/production of the jth sector; and $\mathbf{Z}_{jt}$ is a vector of other variables that determine M_{jt}.

In most situations the sectoral/regional observations on M are not available and only M_t is observable. Hence, in our subsequent discussions it is assumed that at time 't' only M_t, Y_{jt} and $\mathbf{Z}_{jt}$ are observable for all j. Using relations (1) and (2) we have,

$$M_t = \sum_j f_j(Y_{jt},\ Y_{jht},\ \mathbf{Z}_{jt}). \tag{3}$$

[1] The economic activities used for M in the existing literature are: (1) currency in circulation (Bhattacharyya, 1990); (2) total expenditure of a household (Pissarides and Weber, 1989); (3) energy consumption (Gupta and Mehta, 1982). In principle, one can use any indicator as long as the use of the indicator in each sector/region depends on the sector's/region's income or production. In principle, the estimation method suggested here is applicable to many other situations including estimation of the hidden economy for one part of the country.

[2] We are using the general functional form but in many situations the income would be $Y_{jt} + Y_{jht}$.

In (3) all variables except Y_{jht} can be observed. At this stage we look for a proxy for Y_{jht} and the proxy which produces best fitted equation (3) is taken as the estimate for Y_{jht}. The parameters estimated following this procedure have desirable large sample properties.[3] This procedure generally makes one of the parameters unidentifiable. Methods to overcome this problem are available in Bhattacharyya (1990) and Bhattacharyya and Ghose (1998). A particular method of finding a proxy for Y_{jht} will be to evaluate $\mathrm{E}(Y_{jht}|Y_{jt}, \mathbf{Z}_{jt})$ which is a function of Y_{jt} and $\mathbf{Z}_{jt}$ and use that as a proxy for Y_{jht}.[4] Supposing, $\mathrm{E}(Y_{jht}|Y_{jt}, \mathbf{Z}_{jt}) = g_j(Y_{jt}, \mathbf{Z}_{jt})$, one can use the function $g_j(.,.)$ as a proxy for Y_{jht}. The parameters in $g_j(.,.)$ are estimated along with the other parameters in (3). Then the estimates for the 'hidden economy' for the jth sector are,

$$\hat{Y}_{jht} = \hat{g}_j(Y_{jt}, \mathbf{Z}_{jt}) \tag{4}$$

and

$$\mathrm{Var}(\hat{Y}_{jht}|Y_{jt}, \mathbf{Z}_{jt}) = \mathrm{Var}[\hat{g}_j(Y_{jt}, \mathbf{Z}_{jt})]. \tag{5}$$

The unconditional variance of $\hat{Y}_{jht}$ will be higher than the conditional variance but, the difference will not be significant if the relation (3), along with the proxies, fits the data well. It is clear that the hidden economy estimates obtained by the procedure described here depend crucially on the correct measurement of M_t and its complete interactions with the national income or production. Thus, in the case of currency in circulation it is possible that a part of the current issues of currency will be hoarded (idle balance) which will cause an overestimation of the hidden economy. On the other hand a part of previously hoarded idle balance may be used along with the current issues of currency and this will produce an underestimate of the hidden economy. We assume that these two opposite forces approximately cancel themselves out.

The hidden economy measured in this fashion implies that some production or income generating activities are not included in the recorded economy. This puts into doubt the interpretation of the unrecorded income as tax evaded income. However, in Bhattacharyya (1990) a tax evasion function was estimated with the hidden economy estimates as the tax-evaded income. The estimated tax-evasion function was very similar to the estimated equation which has been reported in Crane and Nourzad (1986) with the U.S data. Thus, we have some indirect evidence to support the view that the hidden economy is approximately equal to the tax-evaded income. However, it is not difficult to identify other reasons for unrecorded income. For example, it is possible that under certain situations the cost of reporting income is too high which encourages non-reporting of income. Many people working in the informal sector of the economy have a low level of earnings which are not taxable.

[3] The results mentioned here follows from the theorems derived in Bhattacharya and Bhattacharyya (1993).

[4] The proxies used in Bhattacharyya (1990) and Bhattacharyya and Ghose (1998) belong to this class of proxies.

These incomes are also part of the estimated hidden economy. Hence, for effective formulation and tests of economic theory on such a wide range of activities it may be essential to have regional or sectoral estimates of the hidden economy.

2. The Hidden Economy and Economic Theory

It is natural to ask whether the presence of the hidden economy forces us to change or adjust existing economic theories? The existing 'theoretical' literature on tax evasion and related topics suggests that the tools and concepts used in different branches of economic theory are sufficient to analyse the phenomena of the hidden economy. However, this does not preclude new development of concepts and techniques necessary to pursue theoretical analysis of tax evasion. For example, Frey (1989) raised the question 'How large (or small) should be the underground economy?'. If the underground economy is generated by illegal acts then the proper functioning of the law would produce the underground economy of size zero. Alternatively, if the underground economy grows when the probability of detection decreases and the government finds that the cost of detection increases as the size of underground economy increases then the point of intersection of the two curves will produce an acceptable level of underground economy by the government which is likely to be non-zero. Hence, how big the underground economy should be depends on perceptions of the society and of the government. Feige (1989) argued that modelling of the macroeconomic system is distorted by missing information. Although these studies will help us to understand certain features of the hidden economy these are not sufficient to appreciate the importance of the hidden economy estimates for economic theories applied to actual observations. We are examining these issues in the subsequent sections.

3. 'Convergence' Studies and the Hidden Economy

The existence of the hidden economy affects the 'convergence' literature on two levels. First in the presence of the hidden economy the country-wide real per capita gross domestic product (GDP) estimates will be different from the Penn Data produced by Summers and Heston (1991) and used by most studies on convergence. Secondly, the error structures created in the regression equations to study the 'convergence' affect the estimates in a very unusual way due to the presence of the hidden economy.

The importance of the hidden economy in estimating the real per capita GDP has been examined here using Kravis, *et al.* (1978) short-cut method. However, the general argument will also be valid in the context of the recent contribution from Summers and Heston (1991). The basic logic used in Kravis *et al.* (1978) is quite simple. They found an empirical relationship between the real per capita GDP and the nominal per capita GDP and other variables such as 'openness' and 'price isolation' using a sub-sample of countries for which data on all these variables were available. The estimates of real per capita GDP

for the out-sample countries were derived from the estimated sub-sample regression by substituting figures for nominal per capita GDP, 'openness' and the 'price isolation'. This procedure would be at least partly satisfactory if the size of the hidden economy were zero for the sub-sample. However, due to the presence of the hidden economy the estimated parameters of the sub-sample regression are inconsistent. In addition, the presence of the hidden economy distorts the observed nominal per capita GDP and the 'openness' variable derived from the recorded GDP. These two stages of error in the estimation of the real per capita variable makes any inference based on this data unreliable. Hence, there may be a *prima facie* case for rejecting all the findings of the 'convergence' literature.

The omission of the hidden economy not only affects the data used in the convergence studies but also distorts the estimates obtained in these studies. Hence, we examine the issues using alternative concepts of convergence as summarised in Sala-i-Martin (1996). The effect of the hidden economy on σ-convergence is considered following the definition '*a group of economies are converging in the sense of* σ *if the dispersion of their real per capita GDP levels tends to decrease over time*' Sala-i-Martin (1996). In notation this can be written as:

$$\sigma_{t+T} < \sigma_t,$$

where σ_t is the standard deviation of $\ln(y_{it})$ at time 't' across i and σ_{t+T} is the standard deviation of $\ln(y_{i,t+T})$ at time '$t+T$' across i. Here, y_{it} stands for real per capita income of country 'i' at time 't'. This definition is not very rigorous for σ-convergence but sufficient for our discussion. Suppose, y_{iht} is the real per capita hidden economy income that was not included in the Penn Data. Then it is easy to show that in most situations

$$\mathrm{Var}[\ln(y_{it})] < \mathrm{Var}[\ln(y_{it} + y_{iht})].^5 \tag{6}$$

From (6) it is clear that sample variance of $\ln(y_{it} + y_{iht})$ over 'i' will be generally greater than the sample variance of $\ln(y_{it})$ over 'i' when the number of countries is large. Thus any inference drawn from the sample variance of $\ln(y_{it})$ will be erroneous and for correct findings the hidden economy estimates should be included to calculate the real per capita GDP. For example, 'convergence' hypothesis supported by Penn Data can be reversed by the inclusion of the hidden economy data. This is true even in the case of 'club convergence'.

Next we examine the impact of the hidden economy on absolute β-convergence and on conditional β-convergence. Following Sala-i-Martin we say that *there is absolute* β*-convergence if poor economies tend to grow faster than rich economies*. To test the validity of this hypothesis Sala-i-Martin (1996) estimated the following regression

$$\gamma_{i,t,t+T} = \alpha - \beta \log(y_{i,t}) + \epsilon_{i,t}, \tag{7}$$

[5] Actually, if y_{it} and y_{iht} are negatively correlated and the $\mathrm{Var}(y_{iht})$ is much smaller than $\mathrm{Var}(y_{it})$ then the inequality can reverse the direction. In our particular context this possibility is very remote.

where $\gamma_{i,t,t+T} \equiv \log(y_{i,t+T}/y_{i,t})/T$, is the annualised growth rate of real per capita GDP for country 'i' between t and $t+T$; and y_{it} is the real per capita GDP of country 'i' at time 't'. In the presence of the hidden economy both the annualised growth rate and the real per capita GDP are subject to measurement errors. Barro and Sala-i-Martin (1992) treated the problem of measurement errors in a classical framework. However, the omission of the hidden economy produces a particular structure for the measurement errors which may lead the bias of the estimator to the direction opposite to the classical prediction. This means that all the estimated β's are biased upwards, hence the 'convergence' is over emphasised in past studies. Similar results follow in the conditional β-convergence studies as well.[6]

4. Econometric Modelling and the Hidden Economy

In the last three sections we discussed the problems associated with the hidden economy estimation and testing of economic theory in the presence of the hidden economy in an abstract way. The hidden economy estimates are data which can be used to refute economic models. Hence, the economic rationale of estimating the hidden economy would rely on the positive use of these estimates in economic/econometric modelling. In the context of an individual's behaviour the hidden economy estimates can be considered as hidden income or tax-evaded income. The hidden income can also be interpreted as income from a different source and following Holbrook and Stafford's (1971) findings we consider that the propensity to consume from the hidden income is different from the propensity to consume from the recorded income. With this assumption and following Muellbauer (1981) and Bhattacharyya (1978) we specify the desired expenditure on durable goods as,

$$Z_t^* = f(\Pi_t, \Pi_{zt}, Y_{r,t}, Y_{h,t}, \ldots\ldots, Y_{r,t-m}, Y_{h,t-m}, R_t) \tag{8}$$

where,

Z_t^* is the desired level of durable goods the individual wants to purchase at time t;[7]

$\Pi_t = P_t/P_{t+1}$; $\quad \Pi_{zt} = P_t/P_{zt}$;
P_t is the price index of consumer non-durable at t;
P_{zt} is the price index of consumer durable at t;
$Y_{r,t}$ is the real recorded income at time t;
$Y_{h,t}$ is the real risk discounted hidden income at t;
and R_t is the short term rate of interest at t.

This specification encompasses four different types of alternative models that have been investigated by Cuthbertson (1980). An important extension

[6] Technical details of the argument presented here are available in Bhattacharyya (1998*c*).
[7] In defining durable goods we exclude all form of transports (car, planes, motorbike, etc). In our empirical study the real expenditure on durable goods at time 't' is taken as Z^*.

from Cuthbertson's specification is the inclusion of risk discounted hidden income in our study, which can be calculated in many different ways. In the result presented here, we assume that the risk discounted hidden income is derived from the hidden income by multiplying by a constant factor less than 1. We assume that the adjustment relation between Z_t^*, the desired level of expenditure on durable goods, and Z_t, the actual level of expenditure, can be represented by $D(\mathrm{L})\, Z_t = Z_t^*$. The model was estimated by using a 'general' to 'specific' approach where we utilised the hidden economy estimates presented in Bhattacharyya (1990).[8] The estimated equation presented below demonstrates the importance of the hidden economy estimates in explaining variations in the consumer durable expenditures.

$$\Delta_1 \hat{z}_t = \underset{}{-} \underset{(0.008)}{0.0098} + \underset{(0.208)}{0.8901}\, \Delta_1 y_{r,t} + \underset{(0.198)}{0.5920}\, \Delta_1 y_{h,t-1} - \underset{(0.462)}{0.3884}\, \Delta_1 \eta_t$$

$$+ \underset{(0.611)}{1.5323}\, \Delta_1 \pi_{z,t} - \underset{(0.042)}{0.0964}\, \Delta_1 r_t - \underset{(0.072)}{0.1371}\, \Delta_1 z_{t-4} + \underset{(0.015)}{0.1235}\, \Delta_1 SPD_t \quad (9)$$

All the small letters are logarithm of the capital letters and the figures in the parenthesis are standard errors of the estimates. *SPD* stands for a special dummy as used in Davidson *et al.* (1978)

$$\text{Adj.R}^2 = 0.543;\ \hat{\sigma} = 0.055;\ \text{Durbin-h} = -1.138;\ \text{LM}(\chi^2)_{(8)} = 12.50;$$

$$\text{Ljung-Box-Q}_{(8)} = 9.24;\ \text{ADF(4 lags)} = -10.73;\ \text{ARCH} = 0.258;$$

$$\text{Chow Test (break at 1975: 4)} = 2.192;\ \text{Jarque-Bera Test} = 1.503.$$

The estimated relation (9) is very informative. It shows that the hidden income lagged one period has a positive effect on the consumer expenditures on durable goods. The inclusion of the hidden economy estimates as an explanatory variable produced a simple dynamic structure but satisfied all conventional diagnostic tests. The signs and magnitudes of the estimated parameters satisfy the standard predictions of economic theory. By this experiment we have identified one of the possible links between the recorded economy and the unrecorded economy. This also suggests that the explicit treatment of the hidden economy estimates have a positive contribution to the economic theory as well as in econometric modelling.

Another illustration of the use of the hidden economy estimates in econometric modelling is from the study of the government expenditure function for the United Kingdom. The study was restricted to the period 1960 to 1990 using quarterly observations. Full details of the results are available in Bhattacharyya (1998*a*). We used the conventional specification of the government expenditure function that appears in the standard public finance literature. However, to capture the short run behaviour of the government expenditure

[8] The hidden economy estimates used here are slightly different from the series presented in 1990. However, this does not make a significant difference in the empirical results, see Bhattacharyya (1996). For, more detailed results consult Bhattacharyya (1998*b*).

we introduced a simple dynamic structure in the specification. The estimated equation, without the inclusion of the hidden economy, in logarithmic variables is:

$$\hat{g}_t = \underset{(12.56)}{-\ 3.5647} + \underset{(0.093)}{0.1249}\ y_t + \underset{(1.29)}{0.3466}\ h_t - \underset{(0.255)}{0.1229}\ p_{gt}$$

$$+ \underset{(0.292)}{0.1192}\ p_{ct} + \underset{(0.079)}{0.1651}\ g_{t-1} + \underset{(0.077)}{0.6805}\ g_{t-4} \qquad (10)$$

$$\text{Adj.R}^2 = 0.865;\ \hat{\sigma} = 0.0475;\ \text{Durbin-h} = 1.718;\ \text{ARCH} = 0.4371;$$

$$\text{Ljung-Box-Q}_{(4)} = 8.552;\ \text{ADF(4 lags)} = -9.558;$$

g_t = real government expenditure;
y_t = real recorded per capita GDP;
p_{gt} = prices of the government output;
p_{ct} = prices of non-government output;
h_t = size of the population.

In terms of diagnostic statistics and qualitative predictions of the theory the estimated model will be considered satisfactory. However, the long-run coefficient of y_t is 0.8089. Thus, this empirical result has no support for 'Wagners Law'. However, in the past literature there is some support for the existence of 'Wagners Law' in the United Kingdom. Hence, to examine that possibility we introduced the hidden economy estimates in the analysis. The basic assumption in this analysis is that the government has implicit knowledge of the size of the hidden economy. As the hidden economy produces indirect taxes, the government plans its expenditure by including the real per capita hidden economy in the real per capita GDP calculation. The estimated government expenditure function after the inclusion of the hidden economy is:

$$\hat{g}_t = \underset{(4.38)}{-\ 1.1408} + \underset{(0.080)}{0.1966}\ y_{ht} + \underset{(0.434)}{0.0589}\ h_t - \underset{(0.180)}{0.1364}\ p_{gt}$$

$$+ \underset{(0.198)}{0.1156}\ p_{ct} + \underset{(0.067)}{0.1675}\ g_{t-1} + \underset{(0.067)}{0.6799}\ g_{t-4} \qquad (11)$$

$$\text{Adj.R}^2 = 0.868;\ \hat{\sigma} = 0.0470;\ \text{Durbin-h} = 1.295;\ \text{ARCH} = 0.3736;$$

$$\text{Ljung-Box-Q}_{(4)} = 8.369;\ \text{ADF(4 lags)} = -9.697;$$

All variables have the same notation here except y_{ht} which includes the real hidden economy estimates to calculate the per capita GDP.

Once again we notice that the estimated equation (11) passes all diagnostic tests and the diagnostic statistics are slightly improved in numerical terms. In qualitative terms the fitting in (11) is very similar to (10). However, the major difference is the long-run coefficient of y_{ht} is 1.288 which supports the existence of 'Wagners Law'. Thus we find, once again, the inclusion of the hidden economy estimates produced a positive contribution to a long standing controversy on 'Wagners Law' in a very simple way.

These are just two examples from many possible studies one can conduct

with the hidden economy estimates, and so far our results support the use of the hidden economy estimates for empirical studies.

5. The Hidden Economy and Policy Analysis

It is clear from the empirical results presented in the last section that many policy issues can be examined using these estimated models. For example, it would be a useful exercise to examine the effect of the changes in the VAT on the marginal propensity to consume from the hidden income. Another possible study could be the effect of 'tightness' of credit availability on the utilisation of the hidden economy for consumption of durable goods. A proper examination of these issues needs elaborate simulation studies. In this section we examine the policy issues from a different perspective.

In recent years most countries have experienced a marked increase in corruption. Corruption like the hidden economy is not an open activity. Hence, to identify the extent of corruption it is necessary to find an indirect method of measuring corruption or the growth of corruption. We have argued in Bhattacharyya and Ghose (1998) that the disaggregated hidden economy estimates are very informative in identifying the growth of corruption.

Corruption necessarily involves two or more people or agents. At the individual level, corruption can take both tangible and intangible forms and may not contribute much to the hidden economy. When a firm or a company is involved in corrupt activities it necessarily involves financial transactions and that leads to the growth of the hidden economy. A simple example of such activities can be described in the context of foreign direct investment in a developing country. Suppose the foreign firm needs permission from the government and other regulatory authorities before making the direct investment in the country. In practice, the bureaucracy of the regulatory bodies makes the procedure slow. For example, a file will move to the next level from the dealing clerk only when the clerk is bribed. This type of bribery can continue at all levels before the actual clearance is received by the firm. The firm can recover the bribery cost either through its pricing system or by underreporting total production as that will help the firm to evade taxes. This implies that the higher the levels of corruption the higher will be the growth of the unrecorded economy of the industrial sector. Thus a high rate of growth of the hidden economy of the industrial sector is likely to imply a high rate of growth of corruption. In recent years the 'Central Bureau of Investigation' in India unearthed many corruption cases in the 1980s and early 1990s. Hence, looking at the growth of the unrecorded economy of the industrial sector we may be able to identify the growth of corruption.[9] Using the method described earlier we estimated the hidden economy of the service sector and the industrial sector of India (for details see Bhattacharyya and Ghose (1998)).

[9] The other sectors of the economy are also likely to get the spill over effect from the industrial sector and therefore may depict the similar growth process as the unrecorded industrial sector.

The estimates of the hidden economy of the service sector and the industrial sector of India are presented in Table 1 for the period 1960 to 1992.

The rates of growth of the industrial sector's hidden economy ($\hat{Y}_{iht}$) exhibit much larger increases than the increases in the service sector's growth of the hidden economy. This may be taken as clear evidence to suggest that the firms and companies have under-recorded the level of production during the 1980s and 1990s. The timings of these increases in under-recordings of productions coincide with the timings of a large number of corruption cases recently uncovered by the police departments in India. Hence, we conclude that the growth of the hidden economy of the industrial sector provides an effective signal of the growth of corruption. These findings have serious policy implications. Suppose the regulations and tax structures of the industrial sector are changed to reduce corruption. Then whether the policy has been successful or not can be examined from the hidden economy estimates of the industrial sector.

The final comment on the usefulness of the hidden economy estimates on policy formulation draws on the results derived in Kakwani (1978) and Persson and Tabellini (1994). According to Kakwani, in a number of situations after tax inequality of income increases in the presence of tax evasion. Persson and Tabellini show that the increase of income inequality reduces future economic growth. Combining these two findings one would conclude that tax evasion reduces future economic growth. A similar result has been obtained in Bhattacharyya (1994) where it was shown that the tax evasion reduces the 'multiplier' in the context of a simple macroeconomic model. The actions to reduce or increase the inequality of income is a part of the policy agenda pursued by the governments. Similarly policies to reduce tax evasion are also a part of the government's policy agenda. To study the effectiveness of these policies it is necessary to have an idea of the size of the hidden economy.

Table 1

Estimates of the Hidden Economy of India

(Figures are in ten million rupees)

Year	$\hat{Y}_{sht}$	% Increase	$\hat{Y}_{iht}$	% Increase
1960	46.8		1.0	
1965	119.2	154.7	4.8	380.0
1970	298.4	150.3	21.8	354.2
1975	1,086.9	264.2	159.7	632.6
1980	3,047.6	180.4	1,055.9	561.2
1985	10, 725.1	251.9	9,435.5	793.6
1988	19, 736.7	84.0	33, 980.1	260.1
1989	23, 272.0	17.9	54, 464.9	60.9
1990	26, 195.6	12.6	83, 427.0	53.2
1991	27, 074.1	3.4	118, 779.9	42.4
1992	23, 276.9	−14.0	169, 208.7	42.5

$\hat{Y}_{sht}$ = Hidden economy estimates of the service sector.
$\hat{Y}_{iht}$ = Hidden economy estimates of the industrial sector.

6. Conclusion

(*a*) A substantial literature exists on tax evasion that explains the reasons for the existence of the hidden economy but very little work has been done relating the hidden economy to the recorded activities in the economy. In this paper we have provided some empirical results which show strong statistical relationships between the hidden economy and other economic activities.

(*b*) The hidden economy by definition is not directly observable, therefore an indirect procedure is required to estimate it. Until recently the estimates produced did not pass the basic statistical tests. Improvement of the estimation procedure is essential for serious analysis of the interdependence of economic activities.

(*c*) It is apparent that the presence of the hidden economy distorts many standard economic relations, hence in policy analysis the hidden economy estimates should be used to make the policies more effective.

(*d*) The co-movement of the hidden economy with other non-observable series make the estimation of the hidden economy a legitimate exercise to identify certain types of economic problems.

It is difficult to envisage an economic system where all activities will be open and recorded. Therefore, the study of the hidden economy is essential for full understanding of the economic system we are living in.

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