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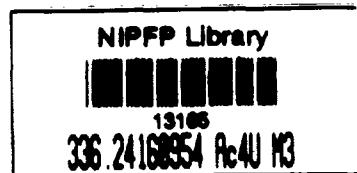
THE UNACCOUNTED ECONOMY IN INDIA :
A CRITICAL SURVEY OF SOME
RECENT ESTIMATES

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THE UNACCOUNTED ECONOMY IN INDIA : A CRITICAL REVIEW OF SOME RECENT ESTIMATES

1. Introduction

The black economy (alias the parallel economy, the unaccounted economy, the underground economy, the unreported economy, etc.) in India has been a matter of grave concern for a number of years. Twelve years ago the Wanchoo Committee Report (Government of India, 1971) depicted the phenomenon as a "cancerous growth, which if not checked, will surely lead to its (the economy's) ruination". Since then numerous articles have been written, pointing to the various deleterious consequences of the black economy, diagnosing its causes, and suggesting a wide range of remedies. During the last two years a number of writers have attempted to estimate the size of the black economy and gauge its trend over time. Some of these estimates, like their precursors, have been in the nature of "informal guesses". Others have attempted to articulate and deploy analytical methods, which have the advantage of facilitating discussion and assessment of the techniques used, and not just the results obtained. A third category of writers present estimates which purport to be based on the application of analytical techniques, but do not delineate their methods in sufficient detail to permit adequate assessment.

The principal objective of this paper is to present a critical survey of the second category of estimates of the unaccounted economy in India. Some reference will also be made, in passing, to exercises from the third category. A second objective of this paper is to outline a taxonomy for the various estimation approaches that have been

essayed in India and abroad. This is done in Section 3, immediately following a brief Section 2, which draws some key conceptual distinctions. Sections 4 through 7 evaluate four studies recently conducted for India, each exemplifying a different approach to the problem. Section 8 draws together the estimates produced by the various approaches for ready comparison and comment. The final Section offers some concluding remarks.

2. Concepts and Definitions

It is extremely important to clarify concepts and definitions pertaining to the "black" or "unaccounted economy" for at least three reasons. First, the existing literature on the subject is sometimes bedevilled by careless use of concepts. Second, when it comes to the question of estimation it is crucially (and obviously) important to know what one is trying to measure. Finally, the actual phenomena relating to the scope and workings of the black economy are sufficiently murky; exacerbating this intrinsic gloom with conceptual cloudiness is the last thing one needs.

First of all, it is important to distinguish between the flow of black income over a period of time (such as a year) and the stock of black wealth at any given point of time. Unfortunately, the term 'black money' is frequently, and confusingly, used in common parlance to refer to both black income and black wealth, when, in fact, its meaning, strictly speaking, should be limited to that portion of black wealth which is held in the form of currency and liquid bank deposits, in short, money.

Given the possibilities of "laundering" black wealth into white, the problems of estimating the stock of black wealth are even more formidable than those faced in estimating black income. Not surprisingly, all the estimates reviewed in this paper confine their scope to the estimation of black or unaccounted income in the economy.

Second, at least two distinct meanings of unaccounted income should be recognised:^{1/}

- (i) the aggregate of incomes which should have been reported to tax authorities but were not (in principle this includes incomes from illegal activities); and
- (ii) the extent to which estimates of national income and output are biased downwards because of such non-reporting (or under-reporting) of incomes and output.

The two concepts are linked by the presumption that under-reporting of incomes, outputs and transaction values to tax and regulatory authorities will find some reflection in the data sources from which national income estimates are compiled. Much depends on the sources and methods of national income accounting. It is possible to envisage economic activities

^{1/} Sometimes the phrase "black money" carries a third connotation, namely the amount of taxes evaded in a given period. Note that in this case the domain of taxes should not be restricted to direct taxes, but should also embrace indirect taxes, which account for over 80 per cent of tax revenues in India. Quite often the evasion of one tax is associated with evasion of other taxes.

which evade taxes, but the income from which is included (at least, in principle) in official national income estimates.^{2/} Conversely, the estimates of national income may be biased downwards for reasons other than tax evasion or suppression of incomes and output. Aside from questions of statistical or measurement bias, national income estimates exclude, by convention, earnings from illegal occupations such as gambling, smuggling, prostitution and black marketeering. Whether, the convention makes sense is another matter.

Each of these two main definitions can be refined and subclassified in a number of ways. The point that merits emphasis is that the two concepts are distinct, and a case can be made for the relevance of each.

3. Alternative Methods for Estimating Unaccounted Income : A Taxonomy

Given the proliferation of methods and estimates that have occurred in recent years, a modest taxonomic exercise may not be wholly redundant. The following broad approaches may be distinguished:

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- 2/ Take the example of a private doctor who underreports his earnings for 1980-81 (assessment year 1981-82). Such evasion will have no influence on the national account estimates of income from professional services for 1980-81. This is because the latter are computed on the basis of survey estimates of value added per worker for some earlier "benchmark" year which are moved forward in time with the help of price indices and then multiplied by estimates of total work force for the relevant professional service to obtain current price estimates of value added in the sector. None of the key elements of this national accounting calculation are affected by the doctor's current underreporting of income. Of course, underreporting by respondents at the time of the benchmark survey would get reflected in the national account estimates for that and subsequent years.

- a. Fiscal Approaches
- b. Monetary Approaches
- c. Physical Input Approaches
- d. Labour Market Approaches
- e. National Accounts Approaches

A brief explanatory comment on each of them is in order.

a. Fiscal Approaches

Most variants of this approach attempt to arrive at independent estimates of incomes subject to tax, compare these with the incomes actually assessed for taxation (typically much lower amounts) and call the discrepancy a measure of unaccounted income. Usually, the "independent estimate" of the tax base starts from income information contained in the national accounts. Kaldor (1956) was an early exponent of this approach in India. His methodology was used by the Wanchoo Committee Report to obtain more updated estimates of tax evaded income in India. A variant of the same method has recently been used by Chopra (1982) to estimate a time series of unaccounted income in India from 1960-61 to 1976-77; his work is reviewed in Section 4. Studies based on the same underlying idea have also been conducted in the United States (Kenadjian, 1982) and the United Kingdom (O'Higgins, 1982). The fiscal approaches, unlike the others that follow, generally make use of the first of the two definitions of unaccounted income sketched above.

b. Monetary Approaches

In essence, monetary approaches rest on the assumed stability in the relationship of various money stock aggregates to each other and to the total of income or transactions.

in the economy, and attribute departures from the "norm" values to the growth of unaccounted income in the economy.

Two variants of the monetary approach have become quite common. The first, pioneered by Gutmann (1977), for the US in 1976, picks a base year when the size of the unaccounted economy is assumed to be negligible, takes the currency to demand deposits ratio for that year to be a fixed norm, and attributes all subsequent increases in this ratio to the disproportionately growing demand for cash to finance transactions in a growing unaccounted economy. Since the currency to deposits ratio has been falling steadily in India since 1950, application of the Gutmann method yields nonsense results, such as a "negative black economy" in many of the years since 1952-53. A recent and succinct critique of Gutmann's method as applied to India is provided by Sandesara (1983).

Another monetary variant, first deployed by Feige (1979) in the US for 1976, also starts with a base year when the underground economy is assumed to be non-existent, estimates the ratio of total monetized transactions (by cheque and by currency) to total nominal GNP for that year, and attributes any subsequent increase in this ratio to the growth of the unaccounted economy. Gupta and Gupta (1982) have applied this method to India to estimate a time series for the black economy from 1967-68 to 1978-79. Section 5 summarizes and

assesses their work.^{3/}

c. Physical Input Approaches

Physical inputs approaches share a close family resemblance to monetary approaches in that both seek to identify some stable "norm" linking the use of physical inputs (or monetary stocks) to national output. Here one starts with an intermediate input, such as electric power, which is widely used throughout the economy, and for which the aggregate output and consumption data are deemed reliable. The next step is to estimate a relationship between national (or sectoral) output and input use, making due allowances for changes in technology and output mix. To the extent that the consumption of the input (power, for example) cannot be explained in terms of growth in officially measured GNP and other relevant variables, such as changes in technology and output mix, to that extent the "residual" consumption is attributed to the unaccounted economy and serves as a measure of its size. Section 6 reviews the attempt by Gupta and Mehta (1982) to apply this approach to India.

^{3/} Monetary variants have been widely used in industrial countries to estimate the size of their unreported or underground economies; see for example, Tanzi (1982b), Tanzi (1983) and the references cited therein. Some of the more sophisticated variants attempt to estimate an equation explaining changes in the ratio of currency to deposits in terms of a number of variables, including those which might spur the growth of an underground economy. In this method, originally pioneered by Tanzi, the influence of black economy variables is, in principle, separated from that of other variables which affect the currency to deposits ratio. Once this separation is accomplished the equation can be used to estimate the size of the underground economy.

d. Labour Market Approaches.

It has been suggested that the size of the unaccounted economy can be gauged from official labour force participation rates, if these are inexplicably low compared to periods or countries where the black economy is of limited significance. This approach has been used mainly by researchers in Italy [e.g., by Contini (1981)], where the official labour force participation rate has declined drastically since the late 1950s, while unofficial surveys have estimated participation rates much higher than the official ones in recent years, suggesting that growing numbers of Italians are finding gainful employment in activities not reported to the authorities. Given an estimate of the "underground" labour force and one of average value added per worker, it is easy to compute an estimate of the size of the unaccounted economy. The relevance of this approach to India is limited, because of the numerous difficulties with employment data. -

e. National Accounts Approaches

Several alternative approaches fall into this category. The first relies on the fact that a country's GNP is frequently estimated independently, from both the income and expenditure sides. Typically, the estimate from the income side is somewhat lower than that from the expenditure side. In the UK, it has been hypothesized (Macafee, 1980) that the discrepancy constitutes a measure of unaccounted incomes, which escape national output accounting from the income side but are "caught" by the expenditure side estimates. This approach hinges crucially on the independence of the national income estimates from the income and expenditure sides. Where such independence is not complete, as in India, the approach cannot be effectively

applied.^{4/}

An alternative national accounting approach to estimating the unaccounted economy is to scrutinize the national account estimates of value added for each sector and gauge the probable extent to which underreporting of outputs, prices and values might be imparting a downward bias to these estimates. Some work along these lines has been done by Ghosh et. al. (1981), which is reviewed in Section 7.

4. Fiscal Approach: Chopra's Estimates

a. The Method

Chopra's study closely follows the Kaldor/Wanchoo methodology. The key assumptions and steps in this method are as follows:

- (i) Incomes by sector of origin from the national income accounts form the starting point;
- (ii) It is assumed that there is no question of tax evasion (and therefore of tax evaded income) for incomes originating in agriculture, and, that in all other sectors, salary incomes are fully reported for income taxation;
- (iii) For all non-agricultural sectors the ratio of non-salary income to total income is estimated;

4/ The national accounts estimates of private final consumption expenditure rely on estimates of gross output by sector of origin and the latter are intimately linked to the estimates of value added by sector of origin (Government of India, 1980).

- (iv) For each sector the proportion and amount non-salary income above the income tax exemption limit is estimated;
- (v) Summation across the sectors yields an estimate of total non-salary income assessable to tax;
- (vi) Actual non-salary income assessed for income taxation is estimated and subtracted from the above total to obtain the estimate of unaccounted income for the relevant year.

Chopra deployed this method to obtain a time series of unaccounted income from 1960-61 to 1976-77. In implementing the crucial steps (iii) and (iv) Chopra used the same proportions that had been used by the Wanchoo Report in its estimate of unaccounted income for 1961-62.

In carrying out step (vi) the Wanchoo Report had obtained information on income assessed to tax for 1961-62 (assessment year 1962-63), but had resorted to a simplifying assumption for 1965-66, namely, that the ratio of evaded (or unaccounted) income to non-salary assessable income had remained constant and equal to that observed for 1961-62. This simplifying assumption was invoked to cope with the awkward fact that incomes earned in any given year are actually assessed over the next several years.^{5/} Chopra presents one set of estimates using the same simplifying assumption as the one used in the Wanchoo Report for 1965-66. He also estimates an alternative series for unaccounted

^{5/} For 1961-62 financial year (1962-63 assessment year) the Wanchoo Committee had obtained the full time profile of assessments from the revenue authorities.

income based on "a relatively less demanding assumption" for step (vi), namely, that "the ratio of the sum of assessed non-salary income in different years for the given year to the actually assessed non-salary income of the given year remain (s) constant".

The estimates obtained by Chopra are presented in Table 1, both as absolute magnitudes and percentages of Net and Gross National Product. It is interesting to observe that after 1972-73 there is a market divergence between the two series computed by Chopra; for the final year, 1976-77, the estimate based on Chopra's "own" methodology is nearly 80 per cent higher than that obtained by a direct application of the Wanohoo Report assumptions.

b. A Critique

Chopra himself points out some of the limitations of the exercise, though he does not always draw out their full implications. First, and perhaps most importantly, the sectoral national income data are assumed to provide sound estimates of total income originating in each sector. Yet, there are good reasons to believe that in key sectors, such as trade, manufacturing, ownership of dwellings and other services, the estimates of income reported in the official national income estimates may be biased downwards by substantial margins for reasons of tax evasion and related motives (See, for example, Ghosh et. al. (1981).^{6/} Not

6/ Looked at another way, the sources of data for compilation of national income estimates are, for some sectors, dependent on the same financial accounts that are submitted to the revenue authorities. Thus, the national income data do not provide independent estimates for income originating in these sectors.

coincidentally these are also sectors in which the proportion of non-salary incomes are relatively high. Taken together, these points suggest that the estimates of total assessable non-salary income may be substantially below the true levels, which, in turn, indicates significant under-estimation of tax-evaded income.^{7/}

Second, the assumption that salary incomes are fully reported for tax may embody some optimism. Aside from various hidden perquisites, there is considerable anecdotal evidence which suggests that many wage and salary earners augment their incomes through "moonlighting" on the side.^{8/} These incomes are unlikely to be reported to the revenue authorities or to be included in the national accounts estimates from the income side.^{9/}

7/ This judgement has to be qualified. While the incentives to evade taxes and earn illegal incomes may be powerful in these sectors, the extent to which the associated suppression of incomes and output is reflected in national income data depends crucially on national income estimation methods - a point made earlier.

8/ A school teacher may undertake private tuition; a PWD carpenter may take up remunerative projects on his own account, etc.

9/ Many wage and salary earners are also reported to accept bribes. In national accounting terms bribes may be classified as transfers, and therefore excluded from the estimates. But from the viewpoint of the tax authorities non-reporting of bribe incomes constitutes tax evasion. On the other hand payment of bribes reduces the payer's income, without altering his tax liability. Where bribes have to be payed often and regularly it may be reasonable to assume that the payor makes such payments out of tax-evaded income.

TABLE 1

Chopra's Estimates of Unaccounted Income

Year	Unaccoun-	Unaccoun-	Column	Column	Column	Column
	ted income: "Wanchoo method" (Rs crore)	ted in- come: "Own method" (Rs crore)	(1) as GNP at current factor cost	(2) as NNP at current factor cost	(1) as percentage of NNP at current factor cost	(2) as percentage of GNP at current factor cost
	(1)	(2)	(3)	(4)	(5)	(6)
1960-61	747	916	5.6	6.9	5.3	6.5
1961-62	801	716	5.7	5.1	5.4	4.8
1962-63	897	837	6.1	5.6	5.7	5.3
1963-64	1008	1452	5.9	8.6	5.6	8.1
1964-65	1132	1564	5.7	7.8	5.4	7.4
1965-66	1231	1539	6.0	7.5	5.6	7.0
1966-67	964	1685	4.0	7.1	3.8	6.7
1967-68	1563	1816	5.6	6.5	3.9	4.6
1968-69	1651	1318	5.8	4.6	5.5	4.4
1969-70	2104	2714	6.7	8.6	6.3	8.1
1970-71	1908	2002	5.6	6.0	5.2	5.7
1971-72	2208	1392	6.0	3.8	5.7	3.6
1972-73	1897	1795	4.7	4.5	4.4	4.2
1973-74	2869	4757	5.7	9.4	5.4	8.9
1974-75	4110	8611	6.9	14.5	6.5	13.7
1975-76	4107	7292	6.6	11.7	6.2	11.0
1976-77	4551	8098	6.8	12.1	6.4	11.4

Source : 1. Chopra (1982).

2. Government of India,
Economic Survey, 1982-83.

Third, Chopra's application of the Wanchoo methodology assumes that the ratio of evaded income to non-salary, assessable income remains constant. As Chopra notes, this is a strong assumption, which he proceeds to relax in his alternative, "own" estimate. However, Chopra feels that even his weaker assumption (quoted earlier) is subject to criticism, since, he notes, it implies "an unchanged efficiency of tax administration". Actually, it is not at all clear that this implication follows from the assumption underlying his "own", modified estimate. What his assumption appears to accomplish is to give him a device to go from published information on non-salary incomes assessed in a given year (but pertaining to several years) to an estimate of assessed non-salary incomes attributable to the given year. But the basis for his assumption is not supported by argument or evidence.

Fourth, the methodology assumes that the ratio of non-salary income to total income of a sector remains constant. Chopra finds some support for this assumption in the observation that the ratios are the same for the two years for which data is presented in the Wanchoo Report. This may be rather cold comfort, since the observed constancy is more likely to be the result of extrapolation of the ratios observed in one year to the other than a product of independent estimates. Certainly, over the seventeen year period covered by Chopra's work, there is little reason to believe, a priori, that these ratios would stay constant.

Fifth, it is also assumed that the ratio of non-salary income above the exemption limit to total income originating in a sector remains constant. There are severe problems with this assumption. To begin with, the empirical basis for the

base year (1961-62) values of these ratios is absent from both the Wanchoo Report and Chopra's article. It is noteworthy that Kaldor (1956) characterized the corresponding, and similar, assumptions in his estimates as being "based on very slender foundations". Furthermore, even if one could give credence to the base year estimates, there is no reason to believe that these proportions would remain invariant to changes, over time, in the structure and organization of production within each sector, to inflation, or to changes in tax laws which have altered the effective exemption limits.^{10/} Chopra contends that "on balance there may not be a significant change", but he does not marshall arguments in support of this claim.

There are other problems with this methodology which do not appear to have been fully appreciated by Chopra. First, the national income estimates, do not, by deliberate convention, include estimates of income earned in illegal occupations. But, for estimation of tax-evaded income, such income ought to be included, since the tax laws require the declaration of all earnings, including those from illegal activities. So, quite apart from the possible under-estimation of sectoral incomes discussed earlier, the exclusion of illegal incomes imparts a further downward bias to the estimates of assessable income, and hence, tax evaded income, presented in this exercise.

^{10/} In fact, a significant weakness of the Kaldor/Wanchoo/Chopra approach is its failure to distinguish between corporate and non-corporate income earners, when exemption limits, deductions, evasion possibilities (and incentives to evade) are likely to vary substantially across these categories.

Second, in computing non-salary incomes actually assessed to tax, Chopra relies on the data published in the All India Income Tax Statistics (AIITS), various issues. But, owing to delays in reporting and other reasons, the information contained in AIITS is far from complete. Some indication of the extent of under-reporting may be had from Table 2 which presents relevant information by year of assessment. Column (1) records the number of assessments carried out in the relevant assessment year and for which information is collated in the AIITS. Column (2) shows the total number of assessments conducted in that year according to the annual Reports of the Comptroller and Auditor-General. The same reports have been used to compile column (3) which gives the total number of assessees on the rolls of the revenue department at the end of each assessment year. If the assessments in column (1) related solely to the years indicated, then the ratio of column (1) to column (3) [shown in percentage terms in column (6)] would be an adequate indicator of the degree of underreporting.^{11/} Unfortunately, a substantial proportion of the assessments in column (1) relate to previous assessment years. In recent years a new series of AIITS publications has been issued which gets around this problem and provides for each assessment year the total number of assessments pertaining to that year, which (a) have been conducted in all years,

11/ It should be emphasised that the difference in total assessments recorded in the AIITS, as compared to the Reports of the Comptroller and Auditor-General, may not be wholly attributed to underreporting. The totals in the AIITS also exclude assessments which did not result in either demand or refund. To the extent these exclusions are significant, the interpretation of the percentages in columns (5), (6) and column (7) as indicators of underreporting is weakened.

TABLE 2

Number of Assessments and Assessees Reported in Alternative Sources
and Derived Indicators of Underreporting in AIITS

Assess- ment year	Number of assess- ments (AIITS)	Number of assess- ments (C.&A.G.)	Number of assessee (C.&A.G.)	Total assessments tabulated in AIITS for given assessment year	<u>Indicators of underreporting</u> <u>(percentages)</u>		
					Column (1) (2)	Column (1) (3)	Column (4) as per cent of column (3)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
1967-68	1585187	2556554	2708464	62.0	58.5		
1968-69	1892620	3421282	2673461	55.3	70.8		
1969-70	1934654	3557890	2910341	54.4	66.5		
1970-71	NA						
1971-72	2109103	3844219	3208516	54.4	65.7		
1972-73	2158970	3598057	3388259	60.0	63.7		
1973-74	NA						
1974-75	2367275	3840846	3637434	2518000	61.6	65.1	
1975-76	2426322	4007644	3796258	2374000	60.5	63.9	
1976-77	2440899	3948879	3758753	2194000	61.8	64.9	
1977-78	2536224	4043813	3955244		62.7	64.1	
1978-79	1932815	3310327	3969965		58.4	48.7	
1979-80	1819575	3489790	4175615		52.1	43.6	

- Sources: 1. Directorate of Inspection, All India Income Tax Statistics (AIITS), various annual issues.
2. Directorate of Inspection, All India Income Tax Statistics, Assessment Year, various annual issues.
3. Government of India, Report of the Comptroller and Auditor-General (C. & A.G.), various annual issues.

and (b) are reported through the AIITS information system. However, these numbers, shown in column (4), are only available for 3 years. But, at least for these years, the ratio of column (4) to column (3), shown in column (7), can be argued to be a better indicator of underreporting than the percentages in column (6).

In any case, the main point to be drawn from Table 2 is that the assessments analysed and tabulated in AIITS publications do not cover all assessees, and there are strong grounds for believing that the extent of underreporting is substantial. Therefore, Chopra's estimates of assessed non-salary income, which are based on the AIITS, are likely to be serious underestimates. This source of error imparts a strong upward bias to Chopra's estimates of unaccounted (tax evaded) income. Moreover, the degree of bias may fluctuate from year to year with the extent of underreporting in the AIITS data.

To sum up, there are serious problems with the estimates of tax evaded income obtained by Chopra. Some of the principle sources of error have been touched on here. It is not possible to hazard whether the different sources of bias cancel out or have a discernible net impact upwards or downwards. Nor is it justifiable to take the position that the estimates correctly indicate the broad orders of magnitude of tax-evaded income and its rough trend over time. Finally, given the dubious nature of the estimated time series of unaccounted income, Chopra's econometric efforts to "explain" his series in terms of other causal variables have to treated with considerable skepticism. At best, Chopra's study provides a point of departure for further explorations along the fiscal approach.

Before concluding this section mention should be made of some estimates of tax evasion published by Kabra (1982). Unfortunately, Kabra does not compute a series for unaccounted income. He only estimates a series for personal income tax evasion. He begins with national income estimates of total personal income earned each year, estimates the proportion of this accruing in the non-primary sectors of the economy, and nets out estimates of tax exempt income to obtain his series of taxable income. For this last step he uses household data on income distribution, notably the results of a survey by the National Council of Applied Economic Research for 1964-65. He applies observed average effective income tax rates to his derived series of taxable income in order to estimate the tax revenue that should have been collected in each year. Subtracting actual income tax collections yields the estimates of tax evasion. It is difficult to evaluate the quality of these estimates, since Kabra does not provide sufficient detail on how the intermediate steps were carried out. In particular, one needs to know more about how the income distribution data was used, along with other information, to obtain estimates of the amount of non-primary sector personal income exempt from taxation. On the face of it there is reason for serious doubt since Kabra's estimates of the ratio of taxable to total personal income in non-primary sectors turn out to be implausibly high, nearly 90 per cent in most years.^{12/} One would

12/ Thus for the four most recent years, Kabra's estimates (reported in Chapter 7, Table IV) are as follows (in Rs crores):

	<u>Non-primary sector Personal income</u>	<u>Taxable non-primary sector personal income</u>
1975-76	34381.7	30898.99
1976-77	38044.7	33759.35
1977-78	42790.5	38417.31
1978-79	48122.9	43661.82

have thought that the various personal income tax exemptions would have operated to yield much lower estimates of taxable personal income. Over-estimation of taxable personal income would help to account for Kabra's unusually high estimates of tax evasion.

5. Monetary Approach: Estimates by Gupta and Gupta

a. The Method and the Results

Feige's method relies on the standard Fisherian identity, $MV = PT$, where M is the stock of money, V is its transactions velocity and PT is the total value of monetized transactions in the economy. Further, the method assumes that there is a constant proportional relationship between the total value of monetized transactions in the economy, PT , and total nominal income of the economy, Y . PT includes the value of monetized transactions in the black or unreported economy, just as Y includes the value of income originating in the unreported economy. Application of the method involves the following steps:

- (i) Compute the total value of monetized transactions \tilde{PT} ($=\tilde{M}\tilde{V}$) for a base year when the unreported economy is assumed to be non-existent;
- (ii) Observe the ratio of \tilde{PT} to officially measured GNP in the year (since, by hypothesis, there is no unreported economy, GNP will be equal to Y);
- (iii) Compute the value of total monetized transactions in subsequent years, and by applying the ratio computed from (ii) estimate the total nominal income, Y , for the corresponding years;

- (iv) For each year the difference between the computed value of Y and officially measured nominal GNP yields estimates of the unreported economy. Looked at another way, whenever the ratio of PT to measured GNP exceeds the base year value, the presence of a black economy is signalled.

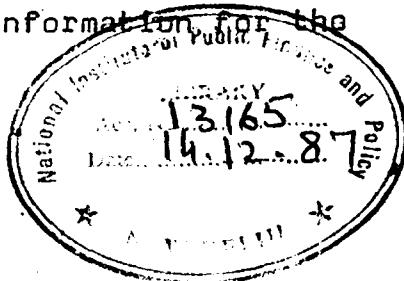
The computational burden of this method rests with calculating the total value of monetized transactions in each year. Following Feige, Gupta and Gupta (henceforth GG) subdivided the task into two parts: estimating the value of transactions supported by cheques and that by currency. They estimated the value of chequing transactions by multiplying the average stock of demand deposits by their turnover rate. Data on demand deposits were readily available, and information on their turnover rates was available for certain years.

Estimating the value of currency transactions required some bold assumptions. In principle, the value of currency transactions can be obtained by aggregating, for all currency denominations, the product of the value of the currency with the public and its turnover rate (per year) per unit. The value of currency with the public, by different denominations, was readily available. It was in computing their respective turnover rates per unit that assumptions had to be made. Like Feige, GG estimated the turnover rates per unit of currency by recourse to the following identity:

$$\text{Turnover rate per year} = \frac{\text{Lifetime transactions of currency note}}{\text{Average life of currency note}}$$

For life-time transactions, that is, the total number of times a currency note can change hands before it has to be retired, GG followed Feige in taking Robert Laurent's (1970) estimate of 125 for the United States. For average length of life, they could only obtain indigenous information for the

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Re 1 note, and they assumed the same length of life for the Rs 2 note. For denominations Rs 5 through Rs 100, they used estimates pertaining to Canadian dollars of denominations ranging from \$ 1 to 100. For Rs 1,000 and Rs 5,000 notes, they used Feige's estimate of 22 years for the US \$ 100 bill.

Based on these assumptions GG obtained the time series for currency transactions, demand deposit transactions and the black economy (Table 3). In obtaining the last series they used the average transactions to income ratio for the years 1949/50 to 1951/52 as their base period norm on the assumption that the black economy was of negligible dimensions during these years.

b. A Critique

A crucial assumption in the Feige/GG method relates to the constancy of the ratio of total monetized transactions to total nominal income, that is the ratio of PT to Y. If this ratio changes over time, for reasons other than the growth of a black economy, then the estimates for the black economy are undermined.

In fact, there are some good reasons to expect the ratio of transactions to income to change with economic development. First, with increasing monetization of the economy the ratio can be expected to increase since monetization will tend to increase the numerator without affecting the denominator. Second, with development, the density of inter-industry transactions normally increases, or, in other words, the input-output matrix for the economy gradually fills up. Thus the growth of inter-industry transactions, and hence of total transactions (the numerator) can be expected to be

TABLE 3

Size of Black Economy

Year	Currency transac- tions (Rs crore)	Demand deposits (Rs crore)	Total transac- tions (Rs crore) columns (1)+(2)	Ratio of transac- tions to official GNP	Size of the black economy (Rs crore)	Black economy as per cent of official GNP	Currency transac- tions as per cent of total transac- tions column (2)/(4) x 100
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
1967-68	127974.5	82272.4	210246.9	6.56	3034.4	9.50	60.8
1968-69	133399.3	91582.0	224981.3	6.81	4504.2	13.64	59.2
1969-70	145252.8	106770.0	252022.8	6.89	5458.8	14.92	57.6
1970-71	158738.7	135479.9	294218.6	7.32	8900.3	22.15	53.9
1971-72	171925.9	161520.9	333446.8	7.70	12354.8	28.56	51.5
1972-73	182731.7	194626.6	377358.3	7.90	15195.5	31.82	48.4
1973-74	214030.9	234142.5	448173.5	7.61	15894.9	27.00	47.7
1974-75	230685.7	274531.2	505217.0	7.24	14518.1	20.81	45.6
1975-76	237077.4	309402.7	546480.1	7.52	18458.0	25.39	43.3
1976-77	268784.9	372391.4	641176.3	8.33	30014.8	39.01	41.9
1977-78	284537.1	442028.0	726565.1	8.37	34335.2	39.53	39.1
1978-79	315284.3	541782.2	856966.4	8.92	46866.9	48.78	36.7

Note: Average value of the ratio of total transactions to official GNP for 1949-50 to 1951-52 ratios is 5.995. Divisions of yearly figures in column (3) by 5.995 and then subtraction of measured GNP gives column (5).

Source: Gupta and Gupra (1982).

more rapid than the growth of nominal value added (the denominator). So, once again, the ratio of transactions to income can be expected to increase. Third, as GG themselves note, economic development will normally be associated with disproportionately higher growth in purely financial transactions, reflecting growing diversification and sophistication in financial and capital markets.^{13/} This too would tend to increase the ratio of transactions to income over time. On the other side of the coin a growing proportion of economic transactions may be conducted within vertically integrated production units. This would tend to reduce the transactions/income ratio, though its effect is likely to be much less than the three factors, noted above, working in the opposite direction. On balance, a priori reasoning would suggest that the transactions/income ratio will increase as development proceeds. But if this is the case, then the observed increases in the ratio of transactions to nominal, measured GNP cannot be wholly attributed to the development of an unreported economy. It may, at least partly, reflect the effect of the influences cited above.

A second set of doubts regarding the GG estimates relate to their use of proxy values (from the United States and Canada) for their estimates of lifetime transactions of currency notes and the average life of different denomination notes. One can sympathize with their need to make some assumptions, without suspending doubts about the specific ones they have used.

^{13/} Gupta and Gupta suggest some evidence to the contrary in India, but it is not compelling.

Quite apart from the issue of the actual values assumed (for lifetime transactions and average length of life), their method freezes the currency turnover rates for the entire period. Thus, on their assumptions, intertemporal variations in the value of currency transactions are attributable solely to variations in currency stocks (of different denominations) held by the public.

Fourth, the method makes no allowance for possible differences in velocity of transactions in the reported and unreported economies. The same turnover rates for demand deposits and currency are implicitly assumed to be applicable irrespective of the nature of the transactions.

None of the last three considerations allows one to deduce the possible direction of bias in the estimates of the unaccounted economy; they simply underline the fragility of their basis.

A fifth reason for doubting the GG estimates derives from the time profile of the ratio of currency transactions to total transactions, which is implied by their estimates. Table 3, column (7) shows the evolution of this ratio from 1967-68 to 1978-79. There is a marked and steady decline from 61 per cent in 1967-68 to 37 per cent in 1978-79. This decline occurs during a period, when, according to GG, the unreported economy grew rapidly in relation to officially measured GNP from under 10 per cent of (officially measured GNP) in 1967-68 to nearly 50 per cent in 1978-79. In absolute nominal terms the scale of the black economy is estimated to have increased by more than 1,500 per cent over this period. These opposing trends do not co-exist.

comfortably. It is one thing to admit that black economy transactions may not be wholly financed through cash. It is quite another to reconcile a rapid growth in the black economy with a declining share of cash transactions in total transactions. This is so because both reasoning and casual empiricism strongly suggest that black economy transactions are likely to be mainly financed through cash.^{14/}

Finally, what of the results obtained by GG? A careful scrutiny of the national accounts suggests that about half of officially measured GNP in 1978-79 was in sectors such as "agriculture", "public administration and defence", "electricity, gas and water supply", "banking and insurance" and "railways", sectors in which the incidence of the unreported economy is generally believed to be negligible. It follows that virtually all of the Rs 46,867 crore of unreported income estimated for 1978-79 by GG was in the remaining sectors for which the total of officially measured GNP was less than Rs 42,000 crore. This, in turn, implies that those responsible for constructing India's official national accounts were underestimating value added by a factor of more than 100 per cent in those sectors where the black economy is believed to flourish. While this implication is not impossible, it is certainly implausible.

^{14/} Tanzi (1982a) levels a similar criticism against Feige's estimates of the underground economy for the United States.

To sum up, there are serious methodological reasons to doubt the validity of the Feige approach as applied to India by GG. These methodological concerns are compounded by the prima facie implausibility of the results obtained through this approach. Furthermore, as in the case of Chopra's estimates, doubts about the methods and results pertaining to any single year are reinforced when it comes to considering the plausibility of the estimated time series, not to mention the regressions advanced to "explain" the series.

6. Physical Input Approach: Estimates by Gupta and Mehta

a. The Method and the Estimates

Gupta and Mehta (henceforth GM) generate estimates of the unreported economy based on trends in the consumption of electric power in the economy. As noted earlier the basic approach is to identify a stable relationship between the use of electric power and national output (with due allowance for changes in output-mix and technology) and then see if the growth of officially measured GDP can account for the growth of electricity consumption; to the extent it cannot, unreported economic activity is inferred. The main steps and assumptions of their method are summarised below:

- (i) They start with the assumption that there is a fixed linear relationship between total value added (reported plus unreported) in the economy and the consumption of electric power, which can be represented by the following equation:

$$a = \frac{\text{Input of electric power}}{\text{Total value added in economy}} = \frac{IN_t}{TY_t}$$

(ii) In any year, t , a variable b_t is defined such that,

$$b_t = \frac{\text{Total GDP}}{\text{Reported GDP}} = \frac{TY_t}{RY_t},$$

(iii) This allows one to write:

$$IN_t = a \cdot b_t RY_t = \beta RY_t,$$

where, $\beta_t = ab_t$.

In order to allow for changes in technology and output-mix, GM define the proxy variables IT_t and IP_t to represent these phenomena. The resulting form of the equation to be estimated is:

$$IN_t = \alpha + \beta_t RY_t + \gamma_1 IT_t + \gamma_2 IP_t.$$

(iv) Recognising that the value of β_t can change over time (because of underlying changes in b_t), GM experiment with alternative functional forms of β_t , such as:

$$\beta_t = \beta_0 + \beta_1 t + \beta_2 t^2 \dots$$

(v) The equation which is finally chosen to derive the scale of the unreported economy incorporates estimates for β_0 and β_2 , and is as follows:

$$\begin{aligned} IN_t = & - 7782.27 + (0.7909 + 0.001203 t^2) RY_t \\ & \quad (1.75) \quad (3.40) \\ & + 2637.72 t + 11856 IP_t \\ & \quad (6.33) \quad (0.86) \end{aligned}$$

where, $R^2 = 0.996$; $F = 1238.08$; t -values of coefficients are in parentheses; and

IN_t = Gross electricity generation in million Kwh;
 RY_t = GDP at factor cost in 1970-71 Rs crores;
 t = Time trend (it is also the proxy for technology change);
 IP_t = Ratio of gross value added in the secondary sector to gross value-added in the primary sector of the economy.

On the basis of this equation GM obtain the following estimates for the unreported economy (they present their results as per cent shares of total GDP; here they have also been converted into per cent shares of reported GDP):

	<u>As per cent of total GDP</u>	<u>As per cent of reported GDP</u>
1964-65	2.7	2.8
1974-75	12.1	13.8
1978-79	16.4	19.8

b. A Critique

The first point that needs to be made about GM's methodology is that their write-up does not seem to be complete. Their estimated equation yields values for β_t for any given year. But β_t is a product of two parameters, a and b_t ; and it

is only the latter which yields a numerical measure for the unreported economy. To go from β_t to b_t requires either independent knowledge of the value of a , or, alternatively, the value of a can be derived by assuming that the unreported economy is non-existent in some base year (in which case b becomes unity by hypothesis and $\beta_0 = b_0$ gives an estimate of a). Presumably GM adopted the latter approach, but it is not spelt out in their paper.

Aside from this apparent omission, GM's methodology is questionable on a number of grounds. Most of these relate to GM's assumption of a fixed-coefficient relationship between power consumption and national output (abstracting from changes due to technical change and output-mix). While this assumption may be plausible for a technical process or even an industrial plant, it is much less so at the economy-wide level.

First, value-added (whether accounted or not) in service sectors, such as trade, can expand (or contract) greatly with relatively little change in the demand for electricity. The same is true for much of agriculture. Note that the issue here is not of the output-mix of total value-added; rather it is a denial of any fixed-coefficient, or linear relationship between power consumption and value added in certain major sectors of the economy. Once this is admitted, not much significance can be read into the observed changes in the ratio of total electricity consumption to measured GDP.

A second reason for doubting the significance of changes in this ratio is that electricity is not just an intermediate input in production. Much of residential demand, and perhaps some of commercial demand, falls into

the category of final consumption. Such consumption can vary with changes in income, the relative price of electricity, the spread of electricity-using consumer goods and so on. The simple point is that changes in final (that is, as a consumer good) consumption of electricity can powerfully influence the aggregate ratio of total electricity consumption to measured GDP, and thus undermine the interpretation of that ratio as an input-output production relation. Sometimes the growth of final consumption of electricity may be the result of deliberate government policy. The period 1960-61 to 1978-79 witnessed massive increases in rural electrification; while much of this increase could be classified as intermediate consumption of electricity associated with higher production, much could also be categorised as final consumption, which improved the quality of rural life.

A third weakness of GM's method is that it assumes total electricity production to equal total electricity consumption (except for transmission losses which are assumed to be a constant proportion). In fact, there are widespread reports of the theft of power, which caution against this assumption.

Fourth, while GM allow, in principle, for changes in electricity demand due to technology change and shifts in the composition of output, their actual modelling of these factors is unconvincing. Technical change is modelled through a simple time trend, which could just as well be interpreted as a proxy for any number of factors ranging from the growth of rural electrification to secular increases in final electricity consumption, stemming from growth of per capita incomes and generalised "electrification" of society. As for the output-mix variable, IP_t , its role in explaining changes in electricity consumption turns out to be statis-

tically insignificant. This may be more a comment on the variable used than on the underlying theory. It leaves the tertiary sector wholly out of the account. Moreover at its high level of aggregation the variable is incapable of reflecting the effect of output shifts within the broad sectors, primary and secondary.

Finally, for those who fall credulous prey to high values of R² and F statistics, it is worth emphasizing that GM's estimated equation permits alternative interpretations to the one that they have used. GM interpret the estimated coefficients as indicators of the unreported economy. They could just as easily be interpreted as indicators of electricity-intensification in the economy as it modernises over time and adopts more power-intensive techniques of production in all sectors. Or the coefficients may be interpreted to represent growing final consumption of electricity commensurate with increasing per capita income, rapid rural electrification and the spread of electricity-using consumer goods. The point is that statistical "goodness of fit" cannot substitute for weaknesses in the underlying assumptions and theory.

To sum up, GM have made a novel and intriguing attempt to apply a physical input approach to estimating the size of the unreported economy. Unlike the estimates of Gupta-Gupta, the results obtained by GM are not, in themselves, implausible. But, as the preceding pages have tried to show, GM's efforts to identify "residual" power consumption and thence to gauge the size of the unreported economy are vulnerable to too many questions and doubts to merit confidence.

8. National Accounts Approach: Estimates by Ghosh et. al

a. The Estimates

As the title says, the main purpose of the paper by Ghosh, Bagchi, Rastogi and Chaturvedi (1981) is to analyse and explain "Trends in Capital Formation, Growth of Domestic Product and Capital-Output Ratios (1950-51 to 1978-79)". In particular Ghosh et. al. dwell on the "intriguing phenomenon of the high observed rates of capital formation not being reflected in higher output growth....". As one of the possible explanations to the puzzle Ghosh et. al. consider the possibility that the official data for GDP may reflect significant under-estimation. It should, thus, be clear that Ghosh et. al. do not make estimation of the unreported economy the central object of their study, but rather are led to this issue in their search for solutions to the investment-output puzzle.

In providing guestimates of unreported GDP, they do not deploy any complicated "methodology", in the normal sense of the word. They simply examine the national accounts, by sector, and suggest some orders of magnitude by which output and value-added may be underrecorded in certain key sectors. Thus, they hazard that the gross value of output from manufacturing is understated by 10 per cent, principally to further the goal of tax evasion. For similar reasons they suggest that gross value added in trade and other services is under-estimated by 15 per cent. For rental from housing they note that the national accounts rely on municipal valuations, which may be grossly understated because of, primarily, the prevailing rent control laws. Combining these assumptions they estimated unreported GDP to have been about 7-9 per cent of current market price GDP in the years 1970-71 to 1977-78.

b. An Assessment

The estimates by Ghosh et. al. are the most informal of all the ones reviewed thus far. Indeed, part of the reason for including them in this survey is that they serve as a contrast to the more "technical" methods. Nor are they quite in the category of single number guesses that crop up frequently in newspapers and magazines. These estimates are more in the nature of "three number guesses" (.) - corresponding to the three rates of undervaluation, in different sectors, which they assume.

The fact remains that these three percentages are guesses, unsupported by any independent quantitative information. True, they may reflect informed judgement, since all the authors are well-versed in the strengths and weaknesses of India's national accounts. But they are guesses nonetheless. Aside from suggesting possible (and plausible) orders of magnitude their principal virtue may lie in provoking other researchers to tackle the issues of under-estimation at a sectoral level and confirm (or controvert) the guesses they have advanced.

8. Estimates of Unaccounted Income: A Numerical Overview

In Table 4 the estimates reviewed in this paper are brought together for easy reference and comparison. The latter activity should be prefaced with the repetition of an important warning, namely, the concept of unaccounted income is not the same in all the studies. Specifically, Chopra's estimates are based on the notion of tax-evaded income, while the others reviewed in this paper refer to

income, which is not reported or measured in official estimates of national income and output. It is not entirely clear which concept of unaccounted income underlies Rangnekar's estimates: in his note of dissent to the Wanchoo Report, he appears to adhere to the concept of tax-evaded income, but his recent paper (Rangnekar, 1982) updating these earlier estimates is somewhat ambiguous on this score.

It should be said that no attempt has been made to evaluate Rangnekar's estimates in this paper as it proved impossible to obtain a clear understanding of his "expenditure" methodology from the description provided in both the sources mentioned above. Nevertheless, since his estimates are frequently cited, they have been included for purely numerical comparisons.

A few points emerge from inspection of Table 4. First, except for the estimates by Ghosh *et. al.*, all the other others point towards an unaccounted economy which is growing both in absolute value and in relation to officially estimated GNP.^{15/} How much should be inferred from this common characteristic is not clear. True, the rising trend accords well with conventional anxieties about a growing black economy. But, given the dubious nature of the underlying methodologies, it would be unwise to infer anything more than a weak presumption of a growing trend. And even that judgement may be more firmly based on casual empiricism than on the estimates reviewed here.

^{15/} And the principal reason underlying the relatively static estimates by Ghosh *et. al.* is that their assumptions about the percentage of under-reporting in various sectors are held constant over time; the changes in the aggregate percentage are attributable wholly to changes in the composition of GDP.

TABLE 4

Alternative Estimates of Unaccounted Income
(As Per Cent of GNP or GDP)

Year	Chopra's estimates "Wanchoo method"	Gupta and Gupta's estimates	Gupta and Mehta's estimates	Ghosh et. al.'s estimates	Rangnekar's estimates	
	(1)	(2)	(3)	(4)	(5)	(6)
1960-61	5.0	6.1	-	-	-	-
1961-62	5.0	4.5	-	-	-	-
1962-63	5.3	4.9	-	-	-	-
1963-64	5.2	7.4	-	-	-	-
1964-65	4.9	6.8	-	2.8	-	-
1965-66	5.1	6.4	-	-	-	9.8
1966-67	3.5	6.1	-	-	-	-
1967-68	4.9	5.7	9.5	-	-	-
1968-69	5.0	4.0	13.6	-	-	8.6
1969-70	5.8	7.4	14.9	-	-	8.4
1970-71	4.8	5.2	22.3	-	7.6	-
1971-72	5.1	3.2	28.7	-	7.8	-
1972-73	4.0	3.8	31.9	-	7.8	-
1973-74	4.9	8.1	27.1	-	7.4	9.9
1974-75	5.9	12.4	20.9	13.8	8.1	9.3
1975-76	5.6	9.9	25.0	-	8.4	10.0
1976-77	5.7	10.2	37.6	-	8.7	11.3
1977-78	-	-	38.4	-	8.7	12.1
1978-79	-	-	48.1	19.8	-	13.5
1979-80	-	-	-	-	-	14.4

Note: Column (1), (2), (3), (5) and (6) are computed as percentage of GNP at current market prices. Column (4) is computed as a percentage of GDP at factor cost and 1970-71 prices.

Source: Chopra (1982), Gupta and Gupta (1982), Gupta and Mehta (1982), Ghosh et. al. (1981) Rangnekar (1982) and Government of India (1982).

Second, and this highlights the fragility of the various exercises, the estimates of unaccounted income for any given year vary widely across the different studies. Thus, for the year 1976-77, they range from a low of 9 per cent of GNP according to Ghosh et al., to a high of 38 per cent estimated by Gupta and Gupta.^{16/} About the only thing these numbers have in common is that they are all positive. And even this virtue would have become a casualty if the results of Sandesara's critical application of the Gutmann method had been included (for 1976-77 it gave an estimate of black income of minus 55 per cent of GNP).

9. Concluding Remarks

What is one to make of all this? The first and most obvious lesson to draw is that the enterprise of estimating the size of the unaccounted economy is still in its infancy. It has a long way to go before the methods and results can persuade the agnostics, let alone the sceptics. This need not be construed as a counsel of despair. In any new field of empirical enquiry it is quite natural for the early efforts to be highly vulnerable to criticism. But it is only by beginning, and then responding to legitimate criticisms, that progress can be achieved. Of course, there is no guarantee that this particular field of empirical effort will yield increasingly acceptable results. What one can guarantee is that without some effort there can be no improvements in the quality of methods and estimates.

^{16/} Actually, Chopra's estimate by the "Wanchoo method" is even lower, 6 per cent of GNP, but his preferred, "own series" yields a higher estimate of 10 per cent of GNP. Furthermore, the concept of unaccounted income underlying Chopra's (and Rangnekar's?) estimates is not comparable to that used by other authors.

Second, in judging the quality of studies in this area it would be unreasonable to expect standards of accuracy that may be prevalent in other applied economic work. The very nature of the phenomena under study defy direct measurement. In principle, attempts could be made to mount direct surveys of unaccounted income and its disposition. But the credibility of such survey responses is likely to be extremely low. Hence, there is likely to be a continuing need to rely on indirect methods and circumstantial evidence.

Is this sort of prospect of uncertain empirical foundations a fatal weakness characterising all efforts at estimating the dimensions of the unaccounted economy? To answer this question one needs to be clear about the principal objectives which motivate such enterprises. First, it is important to establish - even if not beyond reasonable doubt - whether the black economy is a quantitatively significant phenomenon in India. If it is not, then concern about its causes, its nature and its consequences for the economy and economic policy-making, loses much of its steam. Second, it is desirable to form some reasonable judgement about the trends in the black economy: is it static, declining or growing? Both of these are perfectly valid reasons for pursuing efforts at quantification, even if, for the foreseeable future, such estimation exercises are bound to be open to considerable questioning and criticism.

Finally, an excessive preoccupation with the estimation of the size and trends of the unaccounted economy has its dangers. It can detract from serious exploration of its causal origins, its functioning characteristics, as well as the economic and social consequences of the

phenomenon. True, such enquiries will be bedevilled by some of the doubts that plague the estimation efforts. But such doubts should not preclude the deduction of qualitative conclusions backed by piecemeal empirical evidence. For example, often it may be possible to form a sound judgement about whether a particular measure will reduce or increase black economic activity. In particular markets one may even be able to substantiate such judgements with empirical evidence. Such evidence is likely to be more accessible and better grounded for a small segment of the economy than for the economy as a whole. Indeed such sector or market-wise studies might yield insights about how to improve the macro estimation efforts. Put simply, the attempts to estimate the dimensions of the black economy should complement, and not substitute for, analyses of its causes, nature and consequences.

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