CHAPTER 2

MEASURING TAX EVASION

2.1 Introduction

It has long been recognised that tax evasion and a hidden economy exist both in developed and developing countries. As mentioned in Chapter 1 (section 1.1) a measure of the hidden economy is a proxy for the total amount of tax evaded, as shall be explained later.

Detailed study of the hidden economy was first carried out in industrialised countries, and this area of research has been subject to considerable development, mainly during the last two decades. See, for example, the studies by Cagan (1958), Gutmann (1977), Feige (1979), Klovland (1980), Tanzi (1983a), Bhattacharyya (1990) and Hepburn (1992). Measurement of the hidden economy in developing countries has proved more difficult for many reasons. Most importantly, better data are available in developed countries. While for Malaysia, the measure of the hidden economy is not necessarily a measure of tax evasion, the two estimates are closely related.
This chapter examines the nature of tax evasion and non-compliance, and explores their relationship to the hidden economy. The work of major researchers is summarized, in particular the methods employed to estimate the size of the hidden economy and the magnitude of tax evasion in several industrialised countries. Well-recognised deficiencies in the methods employed are elaborated. The chapter concludes with a discussion of the measures employed to estimate tax evasion in five developing countries, namely Malaysia, India, Argentina, Columbia and Tanzania.

2.2 What is the Hidden Economy?

Hidden, black or submerged economy is a useful catch phrase but what makes up a reasonable definition of the economic reality underlying the phrase is far from obvious. The common perception is that the hidden economy refers to those activities that go unreported or are unmeasured by the available current techniques for monitoring economic activity. For the purpose of this section, unreported or unmeasured activity is defined as consisting of economically productive activity which is not properly and directly recorded in official measures of output and income (Cowell, 1990, p.16). Figure 2.1, adapted from Cowell (1990, p.15), outlines the relationship among different types of economic transactions, indicating the link between the hidden economy and other types of economic transactions.
Figure 2.1
The Scope of the Hidden Economy

Boundary I

Boundary II

Boundary III

Key

- Production
- Officially defined production
- Hidden economy

α  Employing oneself in housework
β  Measured production
δ  Hidden economy not allowed in official accounts
γ  Hidden economy allowed for in official accounts
ε  Cuts and kickbacks

There are three boundaries: I, II and III. Boundary I represents the borderline that distinguishes production from non-production. This fine borderline is, however, a contentious one. This is because there is a difference between the use of time in ways that contribute to the national income and those that do not. Employing oneself to paint a house absolutely has to be inside the boundary; but lending within the family would be outside. Another example would be when one pays his wife for reading manuscripts, the income would constitute an appropriate return to a productive factor; paying her monthly household expenses does not.
The inner circle (boundary II) is the official production boundary. This circle has been drawn within boundary I because official government statistics ascertain what constitutes production more restrictively than most economists would.

Boundary III, which intersects the other two boundaries, is important because it demarcates the hidden economy. It encompasses three distinct types of economic activity that constitute the hidden economy. Two portions labelled $\gamma$ and $\delta$ may contain income from illegal gambling, the narcotics trade, the illegal extraction of logs and so on. They are within boundaries I and II because data on national accounts are normally collected and cross-examined from numerous sources. This means that certain activities which escape the notice of tax authorities and are consequently absent from the conventional income measure, may still surface however in, say, estimates of expenditure. The third portion ($\varepsilon$) lies outside the boundary and might constitute activities such as cuts, kickbacks and embezzlements. Although these three boundaries would suffice to explain the hidden economy it would, of course, be possible to include other boundaries. For example, traditional criminal activities such as loan-sharking, prostitution and the like could be within or outside boundary I. A non-monetary sector in which real goods and services are produced but are directly consumed by the producing unit (for the household) could pose a similar problem of identification.

Having reviewed the relationship among different types of economic transactions, the hidden economy, more specifically, could be thought of as comprising the following activities:
(i) production of goods and services that are legal in their own right but which are intentionally concealed from the public authorities to avoid paying taxes or similar charges or to escape regulations.

(ii) production of illegal goods and services which is hidden both for these reasons [(i) and (ii)], and to avoid criminal prosecution.

(iii) organised non-cash transactions, such as exchange of goods and services through bartering

Not to measure the activities (i) to (ii) will result in measured GDP falling short of the ideal concept of GDP. Such a shortfall will, in turn, lead to national accounts aggregates which underestimate the size and potentially the growth rate of the economy. Furthermore, a misleading picture of the structure of the economy may be portrayed to the public authorities.

The definition of the hidden economy, however, has two limitations. First, the inclusion of illegal activities can make international comparisons of data problematic. For instance, what is illegal in one country can be tolerated in another. Secondly, escaping from paying taxes or government charges is not the sole aim of the hidden activities. The principal reason to participate in hidden economic activities is the desire of people to increase real income (Klatzmann, 1979). To increase real income, people can engage in both legal and illegal activities in the hidden economy.
2.2.1 The Hidden Economy and Taxation

According to Tanzi (1982), the two main factors that create the hidden economy are taxes and government restrictions. Since the hidden economy refers to those activities that go unreported or are unmeasured by the available current techniques for monitoring economic activity, this portion of income will by definition be precluded from any form of taxation. Therefore, these funds become a major portion of the total amount of tax that is evaded. As mentioned in Chapter 1, since the measurement of tax evasion per se is often very approximate, and also because estimates of hidden economies are more readily available, the size of the hidden economy is used as a proxy for tax evasion.

Assuming that there are no government restrictions, taxes alone will induce some activities to go underground so that they go unrecorded and escape the payment of taxes. In every fiscal system, however, there are several forms of taxes of varying importance, meaning greater stress is applied to various types of tax such as personal and corporate tax. In the US, for instance, the discussion on estimating the hidden economy has almost exclusively centred on income tax which is a major form of direct tax. Conversely, in Europe there is a greater concentration on measuring the base of value added tax, which is a form of indirect tax. This study confines the discussion to measuring tax evasion of income tax in Malaysia.

One other aspect of evasion that is often ignored by researchers is its counterpart on the expenditure side of the budget (Tanzi and Shome, 1993). While income tax evasion means payment of less tax than the law requires on one’s true taxable income,
the equivalent on the expenditure side is the unwarranted receipt of payments made by the government. It is true that these unwarranted receipt may involve illegal practices. Examples of such receipts includes cuts and kickbacks on government contracts, financial malpractices as a result of poor management controls and claims for wages as costs, where the wages are paid to fictitious or redundant workers. This is the other side of tax evasion: the government is deprived of funds when taxes are not fully paid, but funds are also depleted when it makes payments it should not. This study does not examine the expenditure side of the budget because it is not considered important in the Malaysian context.

The rest of the chapter is concerned with illustrating various methods of measuring evasion, and particular examples of the methodological usages.

2.2.2 Definitions and Implications for Measuring Tax Evasion

Both direct and indirect approaches are used to estimate the hidden economy. These approaches are specified in Section 2.3. The direct approaches mainly look at tax evasion, while the indirect approaches mainly look at the hidden economy. As mentioned earlier, the term hidden economy is used interchangeably with ‘underground’, ‘subterranean’, ‘irregular’, or ‘unofficial’ economy with its corollaries of ‘black’ or ‘grey’ labour. In such an economy, transactions are primarily paid for in cash or by barter to avoid detection, with the result that a large hidden economy manifests itself with a correspondingly large demand for cash. The estimation of the cash economy, and hence income tax evasion, can therefore be based on the traces it leaves in the monetary sphere. This insight has led to numerous studies focusing on
the demand for currency as an index of the size of the hidden economy. Other things being equal, an expansion in unrecorded activity will increase the demand for currency. Therefore, fixing a particular base year during which the hidden economy is assumed to be nil (or negligible) enables one to estimate the size of the hidden economy by observing the growth of currency in excess of the base year. This is because a starting point (base year) is needed to commence computation.

Spiro (1994) examined the reliability of using one of the indirect approaches, namely the monetary approach, in estimating the size of the hidden economy. He found that the Tanzi (1983a) model of employing the tax rate to predict growth in the demand for currency produced meaningful results when Canadian data were used (This model is discussed in Chapter 6, section 6.2.2.1). According to Spiro’s (1994) findings, there is a significant causal effect of the tax rate on the demand for currency; that is the demand for currency is a useful indicator of growth in the hidden economy. In this regard, it is assumed that the activities in the hidden economy are the direct consequence of high taxes and that the principal medium for carrying out such transactions is cash. However, the assumption that cash is the sole medium of transaction in the hidden economy is not acceptable to most economists. This is because transactions can be conducted via barter or cheque accounts. Despite the importance and far-reaching implications of non-monetary economic activity (Eisner, 1978; Kendrick, 1979), this study concentrates on the monetary portion of the hidden economic activity.

Several monetary variants have been developed by different researchers to estimate the magnitude of the hidden economy. These monetary variants are discussed in Chapter 6 (section 6.2).
2.3 Estimating Tax Evasion

Several approaches have been made to measure tax evasion. These approaches can be divided into two broad categories; namely direct and indirect approaches (Figure 2.2). The direct approach to measuring tax evasion is sub-divided into four categories:

(i) fiscal or gap approach,
(ii) sampling approach,
(iii) direct survey of taxpayers, and
(iv) amnesties.

The indirect approach is sub-divided into five categories:

(i) monetary approach,
(ii) expenditure-income discrepancy approach
(iii) physical input approach,
(iv) the soft modelling approach, and
(v) labour market approach.

As mentioned earlier, the direct approaches that are discussed below, namely, fiscal or gap, sampling, direct survey of taxpayers and amnesty mainly look at tax evasion. The indirect approaches which are monetary, expenditure-income discrepancy, physical input, soft modelling and labour market look at the hidden economy. Nevertheless, as highlighted earlier, the estimates of tax evasion and hidden economy are closely related. The overlap between the concepts of tax evasion and the hidden economy has been well documented, among others, by Feige (1989b) and Cowell (1990).
Figure 2.2
Estimating Tax Evasion

Indirect Approaches
- Soft Modelling
- Labour Market
- Physical Input

Direct Approaches
- Monetary
- Expenditure-Income Discrepancy
- Direct Survey of Taxpayers

Fiscal or Gap
- Amnesties
- Sampling
2.3.1 Direct Approaches

(a) Fiscal or gap approach

This method examines the discrepancy between the income reported in tax returns-adjusted for differences in the concepts of taxable income and national accounts income-and the independently estimated income from the national accounts statistics. This discrepancy, commonly referred to as the ‘tax gap’ is presumed to be the tax-evaded income. This type of information (tax gap) is not readily available in Malaysia. However, studies based on the same underlying idea have been conducted in West Germany [Petersen (1981)], the United States [(Park (1981, 1983) and Kenadjian (1982, 1988)] and in the United Kingdom [O’Higgins (1980, 1981)]. The fiscal approach has also been used by Chopra (1982) to estimate a time series of unaccounted income in India from 1950/61 to 1976/77.

There are however several shortcomings in this approach:

- The personal income concept of the national income accounts includes all income accrued to persons whether taxable or non-taxable. However, income reported in tax returns is only taxable income that exceeds the basic threshold. Hence, part of the gap may be due not to evasion but to income that is legally unreported.

- The ‘tax gap’ between the base as reported to the tax authorities and the base as estimated by the expenditure estimates of national income provides some indication of unreported income. Since income tax rates are progressive, the estimation of evaded taxes on this unreported income is problematic. This is because, one would have to
make assumptions about the effective tax rate at which the unreported tax base would have been taxed. Furthermore, when one uses the statutory rate to estimate tax evasion, one exaggerates the size of evasion, since the rates would have been lower if the evasion has not been there (Tanzi and Shome, 1993).

- There are discrepancies in the treatment of depreciation that makes it difficult for time-series comparison. However this problem is normally circumvented by concentrating on gross national income.

(b) Sampling approach

This method involves an intensive audit of a sample of taxpayers by the tax authority. Researchers in the US have used information from the Taxpayer Compliance Measurement Program (TCMP) of the Internal Revenue Service (IRS), to estimate possible tax evasion. The sample (TCMP data) consisted of detailed audits of roughly 50,000 randomly-selected individual tax returns conducted on a three-year cycle. As a result of these audits, the amount of tax for which the taxpayers will be liable if they fully comply with the tax laws is determined. Consequently, from these amounts, the IRS would be able to estimate the taxpayer's evaded income. This sample is designed scientifically to generate global estimates.

A major drawback of the sampling approach is that non-filers\textsuperscript{4}, as well as filers who claim no tax liability, are not included in the population of tax returns. Therefore, the IRS audits are likely to miss substantial amounts of unreported income, especially from the self-employed and individuals who are not registered. Income from illegal
activities such as drug trafficking and private money lending, would also not be included in the sample. Thus, tax auditing does not allow estimation of the actual size of the understated income for particular sectors where high tax evasion prevails though auditing of non-filers is possible. It also relies on the assumption that auditors get it right.

Aside from estimating tax evasion, TCMP data have also been used by Alm et al. (1992) to estimate the determinants of taxpayer compliance. A somewhat different approach was attempted by Feinstein (1991) who used TCMP data (individual-level data drawn from the IRS for the years 1982 and 1985) to present an econometric analysis of income tax evasion and its detection (see the modelling approach discussed in Section 2.3.2 (d)).

Despite the shortcomings of the sampling approach, this approach was used by the General Income Board for the Tax Council to estimate tax evasion in France. Its first study appeared in 1972, and since 1978 regular publications have appeared with the aim of evaluating the reliability of income declarations (Barthelemy, 1989). The choice of the sample was determined by two criteria: (i) level of taxable income declared, and (ii) category of prevailing income. On the basis of these criteria, the sample survey subjected 4,165 respondents to a rigorous audit in order to determine an aggregate estimate of French tax evasion. Income tax evasion in France was estimated to be 14 per cent of the declared income tax for 1971. The major drawbacks of the sampling approach were highlighted earlier.
The sampling approach is also used by the auditing profession who accept the proposition that careful examination of a few transactions selected at random would give a reliable indication of the accuracy of other similar transactions (Meigs, 1964, p.3). In this respect, one technique of auditing applied selectively by Malaysian tax investigation authorities is the use of the capital accretion method (See below). This method determines the tax evaded by individuals over specific periods. Other Commonwealth countries such as the United Kingdom, Singapore and New Zealand also use the same technique to determine omitted income of individual taxpayers.

The capital accretion method is employed to determine the understated income of individuals, viz. sole proprietors, directors of companies, partners in a partnership or even salaried employees. The method involves the collection and examination of taxpayer’s expenditure records to obtain particulars of assets and liabilities and establishing their lifestyle. It entails study and verification of the detailed movement of taxpayer’s assets. In Malaysia, the Inland Revenue Department will compare increments in wealth with known income on an annual (calendar year) basis to determine whether there has been any omission or understatement of income which is shown by discrepancies in the comparison.

Finally, it should be noted that due to the confidential nature of the data, Revenue authorities in most countries are reluctant to provide taxpayers’ data to researchers. Therefore, any progress on empirical work to measure tax evasion would pose particular challenges.
(c) Direct survey of taxpayers

In this approach, questionnaires are distributed to taxpayers on a random basis to obtain information on their income, a source different from and independent of the tax returns. The survey income is then compared with the declared income in the tax returns, thereby allowing an estimate of tax evasion. Smith (1986) used a telephone interview technique to establish the level of involvement in the black economy (an alternative term for hidden economy) in the US. Respondents were asked to report amounts spent on various goods and services over the previous 12 months. They were also asked about ways of making extra income, although they were not specifically asked as to whether these were ‘black’ or ‘official’ sources. From the responses, Smith (1986) estimated that the black economy in the USA is in the region of $42 billion, that is less than 1.5 per cent of GNP in 1981. However, such a method has several well-recognised deficiencies. For instance, the estimated evasion of income tax based on this technique depends upon whether individuals involved in the concealment of income are willing to reveal all personal details. Tax evasion is a sensitive topic and taxpayers may feel uncomfortable admitting to evasion behaviour. Both honesty and perfect recall are required if an answer is to accurately reflect the actual activities in relation to income that has been received.

Another important aspect of survey research is defining the relevant population and selecting an unbiased sample representative of the population. In this respect, a high response rate is vital to ensure representativeness. For instance, Westat (1980) offered persuasive evidence that personal interviews, where the respondent has not been contacted in advance, afforded the highest response rate (an 80 per cent response).
When subjects were called in advance for an appointment, the response rate is 40 per cent and a 60 per cent response rate is observed when they were contacted by telephone. This suggests that one-to-one contact, for survey methods, yields more responses.

The next issue lies in obtaining honest answers, if the response is to be accurate. However, due to the highly sensitive nature of the compliance information, the technique used to solicit responses and the manner in which the question is framed, both appear to have a significant impact on the respondents’ sincerity. Despite the several drawbacks in this approach, survey studies in Scandinavian countries by Isachsen and Strom (1980, 1985) in Norway and Warneryd and Walerud (1981) in Sweden have both examined the reporting behaviour of taxpayers in their annual returns. These surveys, however, generally provide only qualitative information on taxpayer attitudes toward income reporting behaviour.

Other than the questionnaire approach, there are several survey variants that could be carried out. They differ in the medium of communication between the researcher and respondent (mail, telephone and face-to-face) and in the interview design (direct approach, gradual approach and free-form conversation). Finally, additional procedures to complement research by survey include the random response technique (Kitine, 1993), experimental methods (Alm, 1991, Webley et al., 1991) and surveys of convicted tax evaders (Wallschutzky, 1984).
(d) Amnesty

It is generally felt that a tax amnesty would induce taxpayers to declare their actual income in exchange for a withdrawal of their liability to penalties, and in certain instances, for a special low tax rate (Perera, 1995). Therefore, it is possible for countries offering tax amnesties to measure the size of tax evasion by examining tax returns filed during the amnesty period.

In the US, the state of Illinois initiated a tax amnesty in 1982 and since then more than 30 American states have conducted a similar amnesty. Illinois collected $121 million which was 3.4 per cent of its total annual tax revenues [Leonard and Zeckhauser (1987), cited in Hasseldine (1989), p.509]. The New Zealand Inland Revenue Department (IRD) operated a tax amnesty for two months in 1988. The response resulted in an additional tax collection of $23.6 million in that year. This figure amounted to 0.14 per cent of total tax revenue collected by the New Zealand IRD. It is important to note, however, that the Pay-As-You-Earn deduction system in New Zealand enjoys a very high compliance level, hence a low yield result was to be expected (Hasseldine, 1989).

Various developing countries have also granted amnesties, including Pakistan in 1958, the Philippines in 1962, Brazil and Italy in 1966 and Malaysia (on specific income) in the years 1960, 1986, 1990 and 1991. India has had eight tax amnesties, including the Voluntary Disclosure Scheme, the Bearer Bond Scheme and the Gold Bond Scheme. Amnesties preceded by a vigorous anti-evasion drive have generally been found to be successful with respect to the collection of more evaded taxes (Pepper, 1986).
Sri Lanka, too, has had eight tax amnesty schemes between 1964 and 1993. Nevertheless, Perera (1995) argues that the actual collections in Sri Lanka do not reflect, even remotely, the real size of the black economy. For example, when an amnesty scheme operated in 1989, it was estimated that 100 million Sri Lankan Rupees (SL Rs) should have been collected. However, only eight million SL Rs. was in fact collected from nine taxpayers. Perera (1995) estimated that the hidden economy in Sri Lanka for the year 1992 was in the region of 15 billion SL Rs or 4.3 per cent of GDP in that year. His paper, however, did not disclose the method used to estimate the size of the hidden economy.

The case against amnesties is quite convincing. In spite of the generous terms of an amnesty, some taxpayers still prefer not to make use of it and the resulting estimates are consequently likely to be low. In this respect, reference can be made to the economic deterrence model of tax evasion. This model assumes that evasion is a consequence of rational decision-making and suggests some expected characteristics about amnesty participants (Fisher, Goddeeris and Young, 1989). These authors regard hard-core tax evaders as least likely to participate as this group perceives large benefits to be realised from the practice. For this reason, one might expect a small number of participants to be involved in amnesties, depending on the offer made by the government, resulting in understated estimates of tax evasion.
2.3.2 Indirect Approaches

(a) The monetary approach

The use of monetary indicators is the most popular of the indirect approaches. The common monetary indicator used is the amount of currency in circulation. A principal reason for employing this variety of indicator is because the data is readily available. The studies are based on the belief that an increasing amount of cash held by individuals indicates a flourishing hidden economy dominated by cash transactions. The increased circulation of high denomination notes has also been cited as further evidence. From the individual perspective, cash transactions are preferred because currency in the form of cash would not leave easily observable traces for Revenue authorities to probe the activities of tax evaders. Therefore, by measuring the difference between the amount of cash actually in use and the amount that one would expect to be in use on the basis of income declared to tax authorities, it is possible to make some estimation of the size of hidden economy.

Weaknesses of the monetary approach

Any move to measure a phenomenon which by its very nature is intended to be untraceable creates serious methodological problems. Illegal activities of the hidden economy such as smuggling, gambling and drug-trafficking can safely be assumed to be cash-based. Likewise, income from legal activities such as independent contracting jobs, casual work, receipt of tips and income generated from money-lending activities would also be cash-based. However, it is less convincing to argue that the medium of
exchange for the hidden economy is strictly currency based. For example, a taxable receipt in a hidden economy could be endorsed and used as payment to third parties.

The assumption that the hidden economy is solely cash-based when, in fact, cheques are often used as well, tends to indicate a conservative bias in estimates based on monetary methods. Likewise, the inability to impute a value for barter, biases the estimate downward. This view is supported by the results of the investigations by Eisner (1978) and Kendrick (1979) for the United States. Their studies suggested that the non-monetary sector may be large and showed a dramatic growth relative to the official economy over the period 1949 to 1969. Presumably, new forms of payment that are introduced, such as electronic funds transfer at point of sale (EFTPOS) and automated teller machines (ATMs) would decrease the demand for cash; hence increases in cash usage would be even more likely to be associated with concealed income.

Several variants of the monetary approach have been used to estimate the size of the hidden economy. As mentioned earlier, details of these variants are given in Chapter 6 (section 6.2), since this study also utilizes a monetary approach in estimating the size of the hidden economy in Malaysia. Table 2.1 highlights the principal monetary variants used to estimate the size of the hidden economy in various countries.

The monetary approach is based on the assumption that there is a stable relationship of various money stock aggregates to each other and to the total of income (or transactions) in the economy. Consequently, it attributes departures from the ‘norm’
values to the existence and growth of the hidden economy. The three well-known variants of this approach are: (i) currency-money ratio, (ii) currency-demand deposit ratio and (iii) the transactions method. The fourth variant, known as the error component method, is a modified version of the currency money ratio.

Table 2.1  
Principal Monetary Variants Used to Estimate the  
Size of the Hidden Economy

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Period of Analysis</th>
<th>Methodology Used</th>
</tr>
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</table>
(b) The expenditure-income discrepancy approach

This method assumes that the unofficial income in the hidden economy will eventually show up as final expenditure. Hence the discrepancy between the national accounts measured from income flows and the national accounts measured from expenditure flows can indicate the size of the hidden economy. Moreover, looking at year-to-year changes in the relative size of these discrepancies, it may be argued that this is an indication of the trend of the hidden economy. This method has been applied in the United Kingdom by Macafee (1980) who claimed that the black economy may have been 3 to 3.5 per cent of Gross Domestic Product (GDP) in the late 1970’s. Using a similar approach, Blades (1982) investigated the Swedish economy. The results show `undeclared legal production’ amounting to about three to four per cent of GDP between 1970 and 1979.

The expenditure-income discrepancy method can be applied to the entire economy (aggregative level) or on a disaggregated basis. A major drawback of this approach, at an aggregative level, is that large measurement errors exist both on the income and expenditure estimates (Ahsan 1995). Consequently, there is a considerable risk of confusing these measurement errors with the real phenomenon of hidden economic activity.

At a disaggregated (household or individual) level, the position may be more encouraging, since indication of excessive expenditure (relative to income) can be used to identify those groups of individuals that may be active in the hidden economy. The expenditure of these groups can then be further analysed and used to derive an
estimate of hidden income. Such an approach at the disaggregated level was applied in the United Kingdom by Dilnot and Morris (1981). They extracted data from the 1977 Family Expenditure Survey records on incomes and expenditures for some 7,200 households. The discrepancies that were determined were then ‘grossed-up’ for the whole population and this produced estimates for tax-evaded income of between 2.3 to 3.0 per cent of GNP in 1977. A major weakness of this disaggregated approach is that tax evaders will falsify their survey responses so as to minimise any obvious income-expenditure differences.

(c) Physical input approach

This method is based on the notion that there is an expected relationship between the use of certain inputs, such as units of electricity, and the value of the output. Assuming a constant relationship, any shortfall in the output, given a fixed usage of input, would indicate the estimated omission. The nature of the input, again, varies from one sector to another. The use of an input such as electricity is a good yardstick to measure the value of output in the manufacturing sector. In the case of medical practices, the cost of drugs ‘consumed’ would give an estimate of the actual revenue, that is, fees collected for a specific period.

There is yet another way of looking at the physical input method. For instance, patterns of growth in the consumption of electricity for generative use have been compared to those relating to industrial production. The discrepancy between variations in growth of electricity consumption and variations in industrial production tends to be noticeably greater, especially in typically decentralised industrial sectors.
such as textile and engineering industries. This can be construed as proof that the actual rate of growth in these sectors has been higher than that expressed by the index of industrial production, and this discrepancy may be due to the concealment of the output (Lizzeri 1979). This method has been used to estimate the hidden economy of India (Gupta and Mehta, 1982) assuming a stable relationship between electricity consumed and national output.

The main weakness of the physical input method is its basic assumption that there is a fixed relationship between some input and aggregate output. For instance, in the case of under-reported national income in India, the stable link between power consumption and national output is difficult to justify. This assumption may be plausible for industrial output but is much less at the national output level due to the following two reasons. First, national output can obviously be increased in a number of ways without increasing electricity input such as by using other sources of power and increasing total factor productivity in the economy. A second reason for doubting the significance of changes in this ratio is that value added in service sectors, such as trade, can expand (or contract) greatly with relatively little changes in the demand for electricity (NIPFP, 1986). The same is true for much of the agricultural sector.

(d) Soft-modelling approach

This non-monetary approach to measure the hidden economy owes a great deal to the pioneering work of Frey and Weck-Funneman (1987). It is based upon the statistical theory of unobserved variables. The approach treats the hidden economy as an unobservable variable. However, certain “observable determinants” or causes of the
activities in the hidden economy are identified along with various “observable indicators” of such activities. These proxies are then employed in estimating the size of the hidden economy.

The researchers used the soft-modelling approach to estimate the relative size and development of the hidden economy of 17 OECD countries from 1960 to 1978. The method differs from those encountered previously in that it focuses upon multiple causes leading to the development of the hidden economy as well as the multiple effects of such activity. Unlike this approach, previous methods have ignored the causes or merely concentrated on a single factor, that is, taxation. Some of the observable determinants used in this study are indices of tax attitudes, burden of regulations and tax rate parameters. Using these relative magnitudes, an estimate of the size of a country’s hidden economy relative to other countries’ hidden economies is made. This means that this approach does not produce an estimate of the absolute size of the hidden economy but rather only a listing of relative magnitudes.

The soft-modelling method is highly sensitive to the model specification and to the assumptions of similarity between the economy under consideration and the economy on which the estimates of the parameters are used. For instance, does it make sense to compare a figure for the hidden economy of, say, 10 per cent of the GNP in the US with, say, 50 per cent in India? The answer probably lies with the definition of the perceived problem which varies with different types of communities.