

The Size of the Underground Economy: A Review of the Estimates

Stephen Easton
Professor of Economics
Simon Fraser University

With the assistance of
Niels Veldhuis, MA.

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The Size of the Underground Economy: A Review of the Estimates

Introduction

This is a review of the literature pertaining to the underground economy. It encompasses literature relevant to Canada and many other countries. It describes both the methods used to estimate the size of the underground economies and the estimates themselves. It is not an exhaustive review although it draws from a wide range of techniques and countries for many years. A practitioner would have more work to do to actually implement the estimations. The review does not examine every study that has been done on the underground economy around the world. It is focused on studies that are credible and selected to emphasize different issues raised in the pursuit of reasonable estimation in systematic ways, and describes studies that are used as the basis for current research methods.

Measurements of “the” underground economy are wildly diverse. Some of this is attributable to the different underlying phenomena that are being defined as the underground economy. Some is attributable to different methods of assessing the size of the phenomenon. In all cases, however, the authors are inferring size from footprints left in the sand rather than from direct observation, and this too causes reasonable people to differ.

The Review has five parts. Part I discusses various definitions of the underground economy and some of the implications for the size of the estimates. Part II reports on the methods and estimates used to estimate the size of the underground economy. Part III turns to a discussion of estimates in different countries at different times and is a synopsis of both methods and estimates in context. In Part IV Canadian estimates are highlighted and developed more thoroughly. The final section, Part V, summarizes the points raised in earlier sections and introduces a table that is a summary of the national estimates and methods.

1.0 Part I: Defining the Underground Economy

The underground economy is a general name for many kinds of economic activity, and it means different things to different people or agencies. The “underground economy” is an inexact term.¹ In the broadest sense it is economic activity that is sufficiently hidden so that it is untaxed and may be unmeasured. The activities themselves may be legal or illegal. The presumption is that the economic agents are at least passively aware that bringing their activities to the attention of the authorities would have tax (and possibly other legal) ramifications.²

There are a number of different ways to classify the activities in the economy. One of the more popular ways in the current spate of estimates of the Canadian underground economy is to divide transactions into the categories of “market” and “non-market” and to cross categorize them with the classes of “legal” and “illegal”. The yellow highlight indicates the kinds of activities that are usually captured in the national income statistics - had they been legal and reported in the normal sort of way. Although elements in some of the other categories are probably included in measured national income, most are excluded. In general barter is not captured.

Figure 1: Defining the Underground Economy

Type of Activity	Monetary Transactions			Non Monetary Transactions	
ILLEGAL ACTIVITIES	Trade in stolen goods; drug dealing And manufacturing; prostitution ; gambling; smuggling and fraud			Barter: drugs, stolen goods, smuggling, etc. or produce/grow drugs for own use. . Theft for own use.	
	Tax Paid Normally	Tax Evasion	Tax Avoidance	Tax Evasion	Tax Avoidance

¹ Among other terms used in a general way to describe the bundle of phenomena identified as the underground economy are terms such as: black, subterranean, shadow, informal, hidden, parallel, clandestine, second, household, or unobserved.

² Activities done in the household such as handiwork by the homeowner are obviously not at risk for tax, but potentially they could be thought of as production that should be counted in some estimate of the economy. As is discussed later, many of these estimates are implicitly picked up in other parts of the national income accounts.

LEGAL ACTIVITIES	The Usual Measures of the National Income: Wages, Salaries, Profit and all other income from current production	Unreported income from self-employment, Wages, salaries and assets from unreported work related to legal services and goods	Employee discounts, fringe benefits	Barter of legal services and goods	All do-it-yourself Work and neighbor help
Some elements of this table are drawn from Smith (1997) and Schneider and Este (1999).					

The most common measured tend to focus on the national income implications of the underground economy. There are also of activities that while not part of the national income accounts nonetheless are potentially important aspects of economic activity. The table gives a sense of some of these kinds of activities.

To use the measures of the underground economy sensibly, the reader should know for each and every discussion of “the” underground economy, which activities are the target for the measurement: a precept that was seldom followed in the early literature. The terms of reference for this survey limit the discussion to the “profit driven” hidden economy. This rules out a study of home production for home consumption, yet the line between home production and third-party consumption depends upon the alternative opportunities for the two parties. Home production will become profit-making production when the price is right. At present, statistical agencies measure some aspects of home production, but usually do not include these measures in the national accounts. The outstanding exception to this is owner occupied housing.

1.1 For what purpose are the estimates being compiled?

One of the important pieces of information about estimates of the underground economy is recognizing the agency or agent that is making the estimates. For example, Statistics Canada has a very different interest than Revenue Canada that in turn has a different slant than the Ministry of Justice or the Ministry of Finance. Consequently their emphasis may be different explicitly or, more awkwardly, implicitly.

Consider a couple of examples to illustrate the point. As will be described at some length in below, Statistics Canada’s definition of the underground economy emphasizes the uncounted contributors to the GDP – the gross domestic product. Yet such a measure may be of only marginal interest to the law enforcement agencies. The GDP, to

foreshadow the discussion, is concerned with current production of *final* good and services. Statistics Canada is not particularly interested in activity that does not give rise to final product. Yet crime can occur throughout the stages of production. Flea markets and sales of second hand goods do not appear in the national accounts, but their magnitudes may well be of significance to crime fighters. Sharp changes in this kind of economic activity may well be a better forecast of conditions for law enforcement than changes in the value of the GDP arising from unmeasured *final* production.

The Ministry of Finance may also be concerned with macroeconomic indicators of underground activity. During 1970s, the United States (like many other countries) was treated to the spectre of rising inflation and rising unemployment.

Among the first studies of the underground economy was that by Phillip Cagan (1958) which used the currency ratio technique (a technique discussed below) which revealed adjusted gross income estimates that were 23% higher than those that were reported to the Internal Revenue Service – the US tax collection agency. Guttman (1977) extended the analysis to argue that US production was 10% higher than reported in official statistics. Feige (1979, 1980) argued that whatever the actual value of the unobserved sector of the US economy, it was growing rapidly during the decade of the 1970s.

This stimulated concern that the national income and product accounts (NIPA) were not accurately reporting economic activity in the US during the 1970's which was a decade characterized in part by simultaneously increasing inflation and rising unemployment (Feige, 1989). From the perspective of the fiscal authorities in the US, this was a very unsatisfactory state. Efforts to deal with “stagflation” would be entirely misguided were measured unemployment simply a creation of unmeasured growth in the underground economy.

1.2 Using the GDP as a benchmark

In most of the studies that are reviewed, the gross domestic product (or the gross national product which is very similar in most cases) is used as a benchmark of the size of the underground economy. It is one important measure of market activity. For the reader who is comfortable with the idea of the GDP, the next section may be skipped. It describes what the GDP is and how it is calculated. This is important because many of the techniques used to measure the underground economy are based on the process of measuring the GDP.

Before discussing each of the methods, however, there is one preliminary matter that underlies most of the subsequent discussion: understanding what it is that is measured when we talk about the gross national product (or gross domestic product.) The first section of this part of the report explains some relevant aspects of the GNP (GDP) in detail.

1.2.1 Why measure the GDP?

The GDP is one of the touchstones of economic activity and is important to the private sector and many agencies within government as well as to the international economy. Characterizing economic activity in a systematic way has been one of the hallmarks of progress in the twentieth century. Concern about the integrity of the national accounts has led Statistics Canada to attempt to identify the way in which the underground economy impinges on the national product. Were it to be the case that large and highly variable amounts of current production were taking place and was unmeasured, this would be a source of great concern.³

The national income accounts which generate values for the gross domestic (and national) product, national income, disposable income, exports, imports and the like, all flow from the same sources. The gross domestic product is the measure that is often used to characterize Canada's well being domestically over time, across regions, and among countries. The GDP is commonly in the news. When we speak of per capita income or per capita gross national product, it is the system of national accounts that is the foundation upon which distinctions are made. To fully appreciate the estimates of the underground economy, especially those done by Statistics Canada and other agencies, it is important to understand what the GDP is and how it is measured.

1.2.2 Common uses of the GDP

The gross domestic product measures the market value of all *final* goods and services produced in the economy during a period of time. It is a measure of our society's richness, a measure of our command over resources that are allocated across innumerable goods and services.⁴ Most frequently we speak of the annual GDP or the quarterly GDP. In Canada in the third quarter of 2000, the GDP was \$1.052 trillion measured at an annual rate. For understanding the issues in measurement that are important for the underground economy, annualized measures are most common.

There are several important distinctions with respect to the GDP. If the GDP is measured year after year, the significance of "real" versus "nominal" GDP becomes very important. Nominal GDP refers to the value of GDP each year and is simply the money value of the gross domestic product. The "real" value of the GDP adjusts the gross domestic product for inflation – the general increase in prices of some basket of goods and services. For

³ Generally the interest is in market production, but the line between market and non-market is not that precise. The key is the variability of the unmeasured activity. If the unmeasured activity is stable, that is less worrisome than if there are substantial fluctuations. Large fluctuations mean that resources are being transferred from the measured to the unmeasured activities. This leads to measured instability in national income that is not reflected in real economic activity.

⁴ There are other measures of richness having to do with wealth. Income measures are flow measures that measure each year's economic activity. Wealth measures are typically measures of what are called "stocks". For example, GDP is measured as \$1 trillion per year. The stock of wealth in the economy is \$12 trillion dollars. It does not have a dimension of time. It is the current level of wealth, not the flow of dollars each year. Both of these measures are used to measure richness, but the flow measure of GDP is more common for measuring the level of activity.

example, the GDP today may be measured in terms of 1992 prices. This permits a comparison of the GDP in 1992 with the GDP today as if prices had not changed between the two periods. Measuring real GDP lets us characterize the level of economic activity without worrying that higher prices account for the increase in GDP. With real GDP, a higher value of GDP means that more goods and services have been produced in one period than in another independent of the level of prices in the two periods.

A second characterization of GDP is on a per capita basis. India may have a large GDP, but it is not true that the average Indian is as rich as the average Canadian. Like the idea of real GDP, the concept of per capita income (or per capita GDP) permits comparisons among countries or comparisons in a single country over a period of years when the population is changing. GDP per capita is frequently used, and is derived by dividing GDP by the population. Sometime GDP per worker is calculated – by dividing GDP by the number of workers. The per capita GDP speaks to the average command over resources, embodied as the GDP, and is one very common measure of our richness. Per worker GDP is often used in the development of measures of productivity. It measures the economy's output relative to the number of people producing it. More output per worker is synonymous with higher labour productivity.

1.2.3 Measuring GDP in Canada

Canada provides a good illustration of how the GDP is measured. Statistics Canada is well known internationally as being particularly thorough.

Statistics Canada measures the GDP in three ways: through surveys of expenditures; through tracking income; and by measuring value added. The final reported value of the GDP is a reconciliation of the three methods.

1.2.3.1 Calculation of the GDP based on expenditure

The expenditure method looks at the detailed ways in which expenditures are made for the purchase of final goods and services. That is, it includes only sales to final users. It does not include expenditures on intermediate outputs. The expenditure-based approach is based on survey data about amounts spent on individual commodities. Consequently it provides detailed information about commodity level spending. Further, although people are frequently willing to tell surveys what they buy, they may be less willing to talk about their income. As a result, the expenditure data provides extensive information about category spending and since the sum of spending is closely related to the flow of income provides an independent estimate of income. Some expenditure items may not be reported, but overall levels of spending may give some bounds on what is left out.

1.2.3.2 Calculation of the GDP based on income

The income-based approach adds-up the incomes from all sources: wages, salaries, profits, etc. It excludes transfer payments since these are not reflective of current productive activity. Since GDP is the value of final goods and services produced in the

current year, to count transfer income would be to double count, and the income approach calculates the value of GDP through the sums of income used to produce (new) goods and services during the year. Because income is taxed and relatively regular, estimates of income flows are comparatively easily obtained with well-understood properties.

1.2.3.3 Calculation of the GDP based on value added

At each stage of production, the value-added approach takes the value of production and subtracts from it the value of inputs. This is a technique that uses the input-output tables for the economy and is well suited for describing the economy on a sector-by-sector basis. The value of the GDP is the sum of the value added for each good at every stage of production.

1.2.3.4 Reconciliation

Each of these techniques complements the other and each has specific strengths and weaknesses. The Income and Expenditure Accounts are the reconciliation of the expenditure and income based measures of the GDP, and the Input-Output Accounts are based on the value added method.

The importance of the three methods is that they each pick-up kinds of activities that the other may miss or under represent. Statistics Canada in generating estimates for the size of the underground economy uses the estimates of the complementary methods to place bounds on the size of the underground economy. This “triangulation” is one of the advantages of the combined approach. Many features of the underground economy can be bracketed if not estimated directly.

1.2.3.5 An Accounting Identity

The basic framework that Statistics Canada has at its disposal is an accounting identity that reveals that the GDP is equal to the flows of income on one side and expenditures on the other. To keep it simple, people receive income and make expenditures.⁵ In the national income accounts whatever is spent has to be paid as income to someone. Consequently, income, which is the sum of all wages and salaries and payments to owners of the other factors of production (such as capital or natural resources), is equal to expenditure, which is equal to the sum of consumption spending plus investment spending plus government spending plus the net of exports spending less import spending:

$$\begin{aligned} \text{Income} &= \text{Wages} + \text{Salaries} + \text{Profits} + \text{Payments to other Productive Factors} \\ &= \text{Consumption} + \text{Investment} + \text{Government Spending} + (\text{Exports} - \text{Imports}) = \text{Expenditure} \end{aligned}$$

⁵ In the pursuit of clarity, there are many other divisions within income and expenditure that are being suppressed in this discussion. How taxes are added to the accounts is an obvious omission, but it would not affect our understanding of the basic issue of how the accounts fit together. At the most basic level, $\text{Income} = \text{Consumption} + \text{Saving} = \text{Expenditure}$.

Because foreigners spend on our goods and services and we spend on foreign goods and services, the value of exports less the value of imports is the net expenditure that is added to the domestic economy (and finds its way into domestic wages and salaries on the other side of the identity.) Properly specified, both sides of the equation equal the GDP that reflects the value of final goods and services produced in the economy during the year.

The GDP and its corollaries are the most important benchmarks for understanding the literature associated with the underground economy. Later in the discussion we indicate some alternatives. Nonetheless most are based in some way or another on national income accounting.

2.0 Part II: Methods by Which the Underground Economy is Estimated

We have identified eight methods that have been used to identify the underground economy. These are: (1) the national accounts reconciliation method based on statistical discrepancies; (2) the audit method; (3) the labour market and household survey method; (4) the monetary aggregates or currency ratio method; (5) the transactions method; (6) sensitivity analysis; (7) electricity consumption estimates; and (8) econometric modeling. Each of these will be discussed in turn.

2.1 Methods based on Statistical Discrepancies

2.1.1 National Accounts Discrepancies

The first method of measuring the underground economy compares the difference in the value of gross national product measured using expenditures with the estimates obtained using income. GNP or “National Income” can be measured by calculating total expenditures in goods and services by all individuals of a country or by adding the total payments the individuals receive in the form of wages, salaries, rents and the like.

Theoretically, as we have seen in our discussion of the techniques used to produce the GDP, these two methods should produce similar estimates of a country’s GDP. A positive difference between the income and expenditure of a country indicates that purchases have been made in the underground economy and a negatives difference indicates that income may have been produced in the underground economy.

The Table below indicates the range of estimates found for different countries using this kind of methodology. (The Canadian estimates are more developed than the others and are described in detail in Part IV.)

Table 1: Estimates: National Account Discrepancies Method

Estimates of the Underground Economy using the Discrepancies Between Income and Expenditure (% of GDP)					
	1970-75	1976-80	1981-85	1986-90	1991-95
Canada			3.25	2.7	2.7
Germany	16.7	11	10.2	13.4	
Italy	3.2	4.3		9.3	
United Kingdom	2.5	3.6	4.2		
United States	3.2	4.9	6.1	10.1	
Sweden	5.3	5.3			
Sources: Schneider (1999), Hansson (1989), Langfeldt (1989), Ethier (1985), Berger (1986), Gervais (1994).					

2.1.2 Tax Form and National Account Discrepancies

A second and similar method of estimation involves comparing income data from taxation statistics with data derived from the National Accounts.⁶ Park (1981) estimates the US underground economy to be 5.5 percent in 1955 and 4 percent in 1977, similarly, O’Higgins (1981) employed this methodology on the underground economy in the United Kingdom and found that, between 1970 to 1978, its growth was three times greater and its absolute level was between 2.5% to 3% of GDP.

The major problem with these two methods is that taxation data and national accounting data are interdependent. For example, in Canada employment income that is used in national accounting has been drawn from the taxation statistics since 1966. In addition, low-income households do not always file income tax returns. This poses an additional problem for using taxation data.

2.2 Audit Methods

Audit methods use personal tax returns for income groups, and audits them to identify those who are misreporting or hiding their actual income. This method drastically understates the underground economy as it only measures tax evasion and does not include production of illegal goods and services. In the US, the United States General Accounting Office and the IRS examined 50,000 households in 1979 and the estimated level of the underground economy was between 5.9 to 7.1 percent of GNP.⁷

The Table below indicates the range of estimates found for different countries using the audit method.

Table 2: Estimates: Audit Method

Estimates of the Underground Economy using the Audit Method (as a percent of GDP)				
	1970-75	1976-80	1981-85	1986-90

⁶ O’Higgins, Michael. 1981. “Aggregate Measures of Tax Evasion: An Assessment.” *British Tax Review* 5: 286-302.

Park, Thae. 1981 “Reconciliation between Personal Income and Taxable Income, 1947-78.” *Survey of Current Business* 61 (11): 24-28, 46.

⁷ IRS. 1979. *Estimates of Income Unreported on Individual Tax Returns*. Washington, D.C.: Government Printing Office.

GAO. 1979. *Who’s Not Filing Income Tax Returns? Report of the Auditor General to the US Congress*. Washington, D.C.: Government Printing Office.

Canada			2.9	
Italy	3	3.9		10
United States	4.9	6.3	8.2	10
Sweden		3.4		
Sources: Schneider (1999), Hansson (1989)				

2.3 Methods Based on Household Surveys and Labour Market Statistics

This method compares the official rate of participation of individuals in the labour force with that obtained through surveys. It compares the two estimates to determine the rate of participation of those individuals in undeclared sectors of activity. However the underground economy cannot be measured as a percent of GDP using this method. The second method compares the official participation rates in several countries for a given period or comparing corresponding rates at different periods. The hypothesis is that official participation fall when the underground economy experiences periods of growth. It assumes that there is a normal rate of participation. These methods of course do not take economic conditions or cycles into account. They also are unable to correct for a changing demographic makeup or changes in productivity.

Another method using household surveys bases its estimates on questions about their expenditure patterns. Both interview and a diary surveys are usually undertaken. Typically households are asked questions about their principal source and amount of income, their expenditure and demographics. They are also asked to keep a detailed record of smaller items purchased such as food, supplies etc for a short period of time. Since reported expenditure is typically larger than reported income, the difference between the two gives an indication of the potential size of the underground economy. Surveys, which make it possible to question individuals about income earned in the underground economy do not guarantee that they will declare such income.

The table below indicates the range of estimates found for different countries using this kind of household survey methodology.

Table 3: Estimates: Household Survey Method

Estimates of the Underground Economy Using Household Surveys (as a percent of GDP)				
	1970-75	1976-80	1981-85	1986-90
Canada			1.3	1.4
Germany	3.6			
United Kingdom	1.5	2.7		
United States	3.7	4.5	5.6	8.1

Sweden	1			
Sources: Schneider (1999), Paglin (1994), O'Higgins (1989)				

2.4 Methods Based on Monetary Aggregates

The monetary aggregates method is based on the fact that cash is usually thought to be the sole medium of exchange in the underground economy. Three monetary aggregate methods are described below. This theory also underlies the rationale for the transactions method of section 2.5.

2.4.1 The Quantity Theory of Money and Currency Ratio Models

The basis for this approach is standard fare in economics. From the late 19th century the distinguished economist Irving Fisher hypothesized a relationship between the value of transactions and the amount of money needed to carry out these operations. The well-known relationship, $MV=PT$ provides an accounting identity between money and the value of transactions. The quantity of money, M , multiplied by its velocity of circulation (the average value of transactions for which each dollar will be used), V , will be equal to the value of transactions – the price, P , multiplied by the number of transactions, T . Fisher argued, and the economics profession has subsequently extensively tested, the usefulness of this approach as a theory of prices.

Velocity is the ratio of the value of transactions to the stock of money. The heart of the approach is the assumption that velocity is stable. That is, velocity is known to be stable in the sense that its value moves slowly compared to other economic magnitudes. If this is the case – that velocity is predictable – then knowing the stock of money tells us about the value of transactions.

Currency models assume that there is a systematic relationship between the amount of currency necessary to consummate a given value of transactions. Estimates of changes in the amount of cash in the economy give an indication of changes in the value of cash transactions. Cash transactions are assumed to constitute the bulk of transactions in the underground economy, and some fraction of cash transactions are then attributed to the underground. Variables like the ratio of cash to (easily recorded) chequing deposits are used to distribute the proportion of transactions between the underground economy and the “above ground” economy we normally observe.

For the US, estimates of currency models are complicated by the recognition that the US dollar (cash, typically \$100 bills) is used extensively around the world as a medium of exchange.⁸ Estimates of US cash holdings in the US are necessary to estimate the

⁸ The US dollar is also used as the numeraire in any number of transactions around the world. Many international transactions are done in US dollar units. This fact alone does not necessarily give rise to cash holding of US currency outside the US. Electronic transactions may be denominated in dollars. The

relationship between cash and transactions in the underground economy. This is difficult since the US has primarily a record of notes distributed and notes returned. The outstanding note issue does not permit a simple inference about how much is held in the US and how much is held abroad.⁹ Feige (1998) develops a formal model of US banknote holding overseas. This leads to an estimate that approximately 40% of US printed currency is held abroad.

Using the estimated cash holding in the US, Feige estimates the relationship between the share of income unreported as a fraction of average gross income reported to the IRS. This ratio fluctuates from 15% in 1972 to 30% in 1980, 16% in 1984, 24% in 1990 and 20% in 1993. These ratios appear to fluctuate with both the average tax rate and a measure of dissatisfaction with the government.

2.4.2 Currency to Demand-Deposit Ratio

Growth in the underground economy can be detected through changes in the currency-demand deposit ratio. It assumes a reference period in which there is no underground economy. Guttman in 1977 chose the period of 1937-1941 as the reference period. To measure the scope of the underground economy the ratio in two periods is calculated, one for the reference year and another for a certain future date. The ratio is multiplied by total demand deposits to obtain a demand for money in both periods. The difference between these totals is the demand for money in the underground economy. If we multiply this demand by the velocity of money we arrive at an estimate of the value of all transactions of the underground economy. Gutmann in 1977 and 1979 estimated using this method that the underground economy in the United States was 12 percent of GNP.

The Table below indicates the range of estimates found for different countries using this kind of methodology.

Table 4: Estimates: Currency to Deposit Ratio Method

Estimates of the Underground Economy using the Currency to Demand Deposit Ratio (as a percent of GDP)				
	1970-75	1976-80	1981-85	1986-90
Canada	13.8	15.9	11.2	18.4
Italy	23.4	27.2	29.3	
United Kingdom	14	7.2	6.2	
United States	8.8	11.2	14.6	
Sweden		10		

usefulness of US cash is that it is an acceptable, available medium of exchange. It has been so since well before the Second World War.

⁹ In fact there are many ways to estimate US note issue held abroad. Cash of more than (now) \$10,000 is to be reported if it moves across the US boarder. Various surveys are run to estimate cash holdings. None however is definitive.

Sources: Schneider (1999), Hansson (1989)

2.4.3 Transactions Ratio

The number of bank notes in circulation reveals the scope of transactions attributable to the official economy. By subtracting the value of the bank notes from the total value of transactions attributable to the official economy we can obtain the transactions that can be attributable to the underground economy. Using this method Fiege puts the underground economy in the United States at 22 percent of GDP in 1976 and 33 percent in 1979.

2.4.4 Demand for Money

This method is a modification of Guttman's method and examines changes in the currency to demand deposit ratio to establish to what extent monetary forecasts differs from actual rates.

The Table below indicates the range of estimates found for different countries using this kind of methodology.

Table 5: Estimates: Currency Demand Method

Estimates of the Underground Economy using the Currency Demand Method (in percent of GDP)									
	1971-75	1976-80	1981-85	1986-90	1989-90	1990-93	1994-95	1996-97	1997-98
Australia					10.1	13.1	13.8	13.9	
Austria					5.1	6.0	7.0	8.6	8.9
Belgium					19.3	18.1	21.5	22.2	
Canada	5.1	6.3	8.8	12.0	12.8	11.8	14.8	14.9	
Denmark			8.6		10.8	12.2	17.8	18.2	
France		6.9			9.0	12.1	14.5	14.8	14.7
Germany	4.5	7.8	9.2	11.3	11.8	11.5	13.5	14.8	14.7
Greece						9.2	29.6	30.1	
Ireland					11.0	27.2	15.4	16.0	
Italy	11.3	13.2	17.5	21.3	22.8	11.0	26.0	27.2	27.3
Japan						22.2	10.6	11.3	
Netherlands					11.9	8.5	13.7	13.8	
New Zealand					9.2	12.3	11.3		

Norway					14.8	9.0	18.2	19.4	
Portugal						11.3	22.1	22.8	
Spain			19.0		16.1	15.6	22.4	23.0	23.1
Sweden		7.5	13.0		15.8	16.7	18.6	19.5	19.8
Switzerland					6.7	13.8	6.7	7.8	
United Kingdom	4.3	7.9	8.5	9.7	9.6	6.9	12.5	13.0	
United States	3.5	4.6	5.3	6.2	6.7	11.1	9.2	8.8	
Sources: Schneider (1999), Schneider (1994a, 1998a), Hansson (1989), O'Higgins (1989), Ischsen and Strom (1989), Barthelemy (1989), Bajada (1999)									

2.4.5 The Transactions Method

As with the currency ratio models discussed above, the transactions method of estimating the underground economy is ultimately based on Fisher's equation of exchange. Fisher's equation of exchange equates the total volume of payments (MV) to the total volume of transactions (PT). If estimates of the volume of payments were in some way independent of the volume of transactions, then the difference between the two would provide a measure the extent of the underground economy. However estimates of the total volume of transactions are difficult to obtain. As a proxy, there are estimates of the total volume of payments, which can be used to estimate the total volume of unrecorded income.

The Table below indicates the range of estimates found for different countries using this kind of methodology.

Table 6: Estimates: Transactions Method

Estimates of the Underground Economy using the Transactions Method (as a percent of GDP)				
	1970-75	1976-80	1981-85	1986-90
Canada		26.5	15.4	21.2
Germany	17.2	22.3	29.3	31.4
Italy	19.5	26.4	34.3	
United Kingdom	17.2	12.6	15.9	
United States	17.3	24.9	21.2	19.4
Sources: Schneider (1999)				

2.5 Sensitivity Analysis

This is a technique that assumes that each sector of the economy is likely to face specific risk of underground transactions. Two things are assumed. First, the author is able to identify the sectors likely to be contaminated by underground transactions. Certain sectors of the economy are assumed to be unlikely candidates – typically government dominated sectors. Investment in residential construction, personal expenditures on goods and services, and some small underreporting in imports and exports of goods are examples of sectors likely to display some underreporting. Second, on some basis – intuition and experience, survey, collateral evidence from a variety of other sources, a number is assigned as the likely fraction of transactions that are in the black market.

2.6 Electricity Consumption Method

In the underground economy literature it is often assumed that electric power consumption is the best estimator of overall economic activity. That is, economy activity and electricity consumption have been observed worldwide to be highly correlated. Using electricity consumption as a proxy for total economic activity, observed and unobserved, the unobserved portion of the economy can be estimated. Subtracting the growth of official GDP from the growth of electricity consumption yields an estimate of the growth of the underground economy. While this method is empirically appealing, especially for countries whose data collection lags behind the rest of the world, it can lead to both under and over estimation depending on the development of the economy in question. For example, not all economic activities use electricity thus leading to underestimation of the underground economy. In addition, over time the developed countries have experienced substantial technical progress that increases the efficiency of electricity, which again possibly underestimating the underground economy.

Another electricity consumption method involves household electricity consumption. It is assumed that when household electricity consumption is high, the underground economy will flourish. Part of the household consumption of electricity is assumed to be used for the unobserved economy. Household electricity consumption is estimated as a function of per capita real consumption, the price of consumption of 1 kilowatt hour of electricity, the relative frequency of months that require heating, the ratio of other household energy sources to the total of all energy sources and the per capita output of the hidden economy.

In addition, per capita output of the hidden economy, is thought to be a function of the ratio of personal income tax to GDP, the ratio of public welfare expenditures to GDP minus the tax ratio and the number of dependants over 14 years and of inactive earners. Using econometric analysis countries are ordered according to electricity use in the unobserved economy.

The Table below indicates the range of estimates found for different countries using this kind of methodology.

Table 7: Estimates: Physical Input Method

Physical Input Method (as a % of GDP) |

1989-1990			
OECD		Former Soviet Union	
Australia	15.3	Azerbaijan	21.9
Austria	15.5	Belarus	15.4
Belgium	19.8	Estonia	19.7
Canada	11.7	Georgia	24.9
Denmark	16.9	Kazakhstan	15
Finland	13.3	Kyrgyzstan	13.9
France	12.3	Latvia	15.6
Germany	14.6	Lithuania	15.2
Greece	13.1	Moldavia	18.1
Ireland	21.8	Russia	14.7
Italy	20.6	Ukraine	16.3
Japan	19.6	Uzbekistan	12.7
Netherlands	13.2		
New Zealand	13.4	South America	
Portugal	9.3	Brazil	29
Spain	16.8	Chile	37
Sweden	22.9	Colombia	25
Switzerland	11	CostaRica	34
United Kingdom	10.2	Guatemala	61
United States	10.5	Mexico	49
		Panama	40
Asia		Paraguay	27
Cyprus	21	Peru	44
Hong Kong	13	Uruguay	35.2
Israel	29	Venezuela	30
Malaysia	39		
Philippines	50	Eastern Europe	
Singapore	13	Bulgaria	25.1
South Korea	38	Croatia	22.8
Sri Lanka	40	Czech Republic	14.7
Thailand	71	Hungary	26.3
		Poland	22.5
Africa		Romania	19.5
Botswana	27	Slovakia	15
Egypt	68	Slovenia	26.8
Mauritius	20		
Morocco	39		
Nigeria	76		
Tunisia	45		

Sources: Schneider (1999)

2.7 The Economic Full Modeling Approach

Economic modeling of the underground economy involves more subtle problems than the methods described thus far. Most of the techniques developed that systematically estimate the underground economy from “above ground” variables -- the currency-deposit ratio, or the transactions ratio, etc., emphasize a small number of known variables that are assumed to be correlated with the underground economy. From the mid 1980s there were efforts to build an economic model of the underground economy (Frey and Weck-Hannemann, 1984) in which the actual parameters of the underground economy were inferred from the behaviour of the above ground economy. A full model permits a much wider range of economic behaviours to be included than the simple ratio approach. Consequently the estimates of the underground economy that are “backed-out” of the model simultaneously associate the growth of the underground economy with rising marginal rates on income, higher indirect taxation, greater regulatory intrusions, and (even) changing “tax morality” (Schneider, 1999 p. 39). Monetary indicators, labour market developments and unexpected changes in the observed economy may be included as indicators of the underground economy. Giles (1999a) explores many of these issues and in a series of papers develop a dynamic multiple-indicators multiple-causes model (MIMIC) for both New Zealand and Canada (Giles, 1999b, and Giles et al., 1999).

The Table below indicates the range of estimates found for different countries using this kind of methodology.

Table 8: Estimates: MIMIC Method

Estimating the Underground Economy using the MIMIC Method (as a percent of GDP)			
	1970-75	1976-80	1981-85
OECD			
Canada		8.7	
Germany	5.8	6.1	8.2
Italy		8	
United Kingdom		10.5	
United States		8.2	
South America	1990-1993		

Argentina	21.8		
Bolivia	65.6		
Brazil	37.8		
Chile	18.2		
Colombia	35.1		
Costa Rica	23.2		
Ecuador	31.2		
Guatemala	50.4		
Honduras	46.7		
Mexico	35.1		
Panama	62.1		
Peru	57.4		
Venezuela	30.8		
Asia			
South Korea	20.3		
Taiwan	16.5		
Sources: Schneider (1999)			

3.0 Part III: Country Estimates of the Size of the Underground Economy

This section of the paper reviews a number of country estimates in detail. The studies that are discussed are those that best exemplify the techniques being used. A summary of the estimates by country and method is provided elsewhere in Part IV.

3.1 Australia

Christopher Bajada, Estimates of the Underground Economy in Australia, *Economic Record*, 75(231), December 1999, Pages 369-84.

Bajada loosely defines the underground economy to be all economic activity that contributes to value added and “goes unreported by a society’s measurement technique”. Bajada outlines several different activities that would lead to a distorted measure of national measurements: moonlighting -- failure to report income from a second job; profit -- businesses that are paid in cash and do not report this additional income i.e. hair dressers may report fewer clients than they really service; expenditures -- over reporting to decrease the amount of taxable income; the failure to report interest earnings and barter; and the exchange of goods and services for each other. Since most of these activities involve cash as a medium of exchange Bajada examines the demand for currency in order to estimate the size of the underground economy for Australia.¹⁰

Bajada, is “concerned only in capturing the extent by which fiscal income is evaded or under-reported. This does not include illegal activities....” Thus his estimates do *not* capture the full measure of the underground economy as we have defined it.

Bajada finds that currency holdings have been steadily increasing from (all figures here in current Australian dollars) \$100 per capita in 1960 to \$1100 in 1995 that reflects a growth in the demand for currency. He also finds considerable growth, 8.8%, of the stock of currency in the hands of the public between 1991 and 1996 while technology has been reducing the need for currency.

Bajada models the demand for currency by examining the sensitivity of real currency holding per capita to changes in tax rates and government welfare benefits. To model this Bajada begins with a specification of the demand for currency.

The demand for currency depends on many economic variables. First it depends on the level of disposable income and the rate of inflation. These two variables reflect the increase in currency holdings that are proportional to income. Higher income usually increases money holdings. An increase in the rate of inflation makes money less valuable. That is, for a given level of income, increases in the inflation rate means that

¹⁰ It should be noted that Bajada abstracts from overstating expenditures and failure to disclose income as both as likely to be detected by tax authorities. In addition, his estimates will be conservative as he fails to take the Barter economy into account.

the cash that is being held erodes more quickly. Consequently, other things being equal, higher rates of inflation are associated with smaller cash holdings.¹¹

Second, Bajada uses private consumption expenditure (as a percentage of GDP), as an additional independent variable influencing cash holding. He argues that this captures cash holdings better than income alone. Lastly, technology changes the demand for money as alternative methods of payment are found.

To summarize, Bajada uses the following specification for the demand for money and cash balances:

$$C = f(YD, R, \pi, E, Tr, Tx, Wf)$$

Where C is the real currency per capita (currency is defined as the total stock of notes and coins held by the public), YD is the real disposable income per capita, R is the interest rate, π is the inflation rate, E is the private consumption to GDP ratio, Tr is a trend variable used to approximate technological progress, Tx is the average income tax rate and Wf is welfare benefits as a percentage of GDP. Bajada obtains values for the effect of each variable on cash holdings by using multiple regression analysis -- a statistical technique that allows the influence of each of the variables to be identified on the amount of cash being held.¹²

The two variables we expect to see identified with the underground economy are taxes and welfare. Using the coefficients of these two variables to identify the change in cash holding resulting from changes in taxes and welfare, Bajada calculates the size of the underground economy. He does this by taking the measure of the economy without welfare and taxes – statistically by removing the tax and welfare payments – to see what cash holding would have been in their absence. He takes the difference between the actual cash holdings that are observed, and the calculated amount of cash that would be held were there no taxes or welfare payments, and measures this as the size of the underground economy.

3.1.1 A Summary of Recent Estimates for Australia

Table 9 Underground Economy Estimates for **Australia**

Australia					
Average over					
	1970-75	1976-80	1981-85	1986-90	1990-95
Currency Demand				10.1	13.5
Physical input Co-variation				15.3	
Sources: Appendix 1;					

¹¹ Cash holding are measured in real terms. That is they are adjusted for the price level.

¹² Bajada uses an error correction model for currency demand.

3.2 France

Philippe Bathelemy, The Underground Economy in France, in Edger L. Feige, ed. *The underground economies: Tax evasion and information distortion* (Cambridge University Press, 1989):281-294.

Barthelemy reviews two aspect of the research on the underground economy in France: a survey of the empirical estimates of the level of tax evasion, and an estimate of the size and growth of the underground economy in France using money demand (or velocity) estimates.

3.2.1 Estimating tax evasion

The General Income Board for the Tax Council uses surveys to evaluate the reliability of reported income. Using the Audit Method the council surveyed 400 individuals and performed audits to determine an aggregate estimate of French tax evasion. Of those surveyed whose income came from salaries, wages, and pensions 18.2% would have had their reported income corrected after an audit, and 85% of those whose income was comprised of profits from non-commercial activities would have been subject to correction. From these estimated figures, tax evasion in France was estimated at 4.4 billion Francs or 14% of reported income tax.

3.2.2 Currency ratio based estimate of unreported income in France

Barthelemy employs the money demand method for 1959-1979 using 1959 as the base year. This assumes no tax evasion took place in 1952. Barthelemy does not use only currency to M2, as is done in most studies, because this ratio includes savings deposits which must first be converted into currency or demand deposits before they can be used for transactions. Since the currency to M1 ratio for France does provide satisfactory econometric relationships, Barthelemy uses the currency to demand deposit ratio.

Currency to demand deposits have dropped sharply since the Second World War as, the use of credit cards, increasing real income and the efforts of banks to multiply the number of accounts has risen. Variables thought to affect the ratio of currency to demand deposits are real GDP per capita (a proxy for the above factors), the proportion of wages and salaries in gross disposable income (a proxy for the increase in the number of wage earners and the growing use of monthly payments), and the ratio of personal income tax plus value added tax (TVA) to gross household income. Since Barthelemy is unable to find a proxy to represent drug trafficking, smuggling and prostitution, he focuses on the effects of tax evasion on the currency to demand deposit ratio.

Barthelemy first derives the amount of currency induced by changes in the tax rate between its initial level in 1959 and its value in 1979. The tax induced currency holdings are then multiplied by income velocity to derive the income generated by the currency holdings. The estimate of unreported income is 6.3% of GDP for 1979. Barthelemy treats

this estimate as a lower bound since it neglects all other factors that affect unreported activity other than changes in tax rates.

3.2.3 A Summary of Recent estimates for France

Table 10 Underground Economy Estimates for **France**

France					
Average over					
	1970-75	1976-80	1981-85	1986-90	1990-95
Physical input Co-variation				12.3	
Currency Demand		6.9		9	13.4
Sources: Appendix 1;					

3.3 Federal Republic of Germany

Enno Langfeldt, “The Underground Economy in the Federal Republic of Germany: a preliminary Assessment”, in Edger L. Feige, ed. *The underground economies: Tax evasion and information distortion* (Cambridge University Press, 1989): 197-217.

Langfeldt defines the underground economy to include all economic activities that are not measured by the current official measurement system. Before presenting new estimates for Germany, Langfeldt reviews estimates obtained using the discrepancies between income report to tax authorities and income in the national accounts. Peterson (1981) measures the discrepancies between independently measured income and that from the national account for 1961, 65, 68 and 74. Illegal underreporting of income was 16.7% in 1961 decreasing to 4.8% in 1974.

Langfeldt uses the Money Demand method using three different ratios, currency to demand deposits, M1 and M2, to estimate the underground economy for Germany. Real GDP per capita, the three-month money market rate (a rate of interest that reflects the tradeoff associated with holding money rather than interest earning assets and is a cost to holding money which might otherwise be held in interest earning assets like a bond), the ratio of the cost-of-living index to the implicit GNP deflator, and total taxes were thought to influence the three ratios mentioned above. Langfeldt simulates the increase in currency holding attributable to the rise in the tax burden.. Multiplying the tax induced currency holdings by the income velocity. The results indicate that in 1980 3.7% of GNP was attributed to the increase in tax burden since 1950.

3.3.1 A Summary of Recent Estimates for Germany

Table 11 Underground Economy Estimates for **Germany**

Germany					
Average over					
	1970-75	1976-80	1981-85	1986-90	1990-95

Household Surveys	3.6				
National Accounts Discrepancy Between Income and Expenditure	11	10.2	13.4		
Difference Between Official and Actual Employment	23	38.5	34		
Physical input Co-variation				14.6	
Currency Demand	4.5	7.8	9.2	11.3	12.8
Transactions	17.2	22.3	29.3	31.4	
MIMIC	5.8	6.1	8.2		
Sources: Appendix 1;					

3.4 Italy

Bruno Contini, “The irregular economy of Italy: a survey of contributions” in Edger L. Feige, ed. *The underground economies: Tax evasion and information distortion* (Cambridge University Press, 1989):237-250.

Contini reviews estimates of the “irregular” economy in Italy using the labour market approach which is the common framework used in most Italian studies. Irregular labour is defined as semi-hidden all in productive activities that pays wages typically lower than market rates. It is all activities outside the social security system including overtime work paid under the table, personal services, illegal building activities and unregulated apprentice work. Contini outlines the many different types of workers that constitute the irregular economy including those not working (drawing unemployment benefits), those holding temporary work while looking for permanent positions, those officially employed (multiple job holders) and the non-active population. This definition of the irregular economy is much narrower than other definitions examined in this report.

There have been many approaches to measure the irregular worker in Italy. Through surveys it was estimated that 5.5% of the official labour force held two or more jobs in 1974. Many of the estimates of irregular activities have been done by QSLF, *Quarterly Survey on the Labour Force*. In 1978 it was estimated that the participation rate in the irregular sector was 44.7%. This estimate is thought to be even higher as many unemployment people are also active in the irregular economy. Contini (1979 and 1981) studied the irregular economy and its determinants by estimating the relevant variables. The potential labour force was determined by permanent employment in industry, agriculture and services, official unemployment and the irregular labour force. Using surveys to estimate the potential labour force, Contini estimated the ratio of the irregular labour force to total employment to be about 16 to 18 percent in the late 1970’s. Contini estimates the effects of changes to the determinants of the ratio, the flight from agriculture, new unit labour cost and the exchange rate between the Italian Lira and the

Eurodollar. Using estimates from 1965-1977 Contini found that the flight from agriculture accounts for 55% of the variation in the ratio of the irregular labour force to total employment.

Most of the research on Italy, as indicated above, focuses on the size, in terms of the number of workers. To estimate the size of the irregular GNP both the number of workers and their estimated productivities are used. Contini estimates that irregular workers can account for 7.5% of official GNP in 1977. In 1977 ISTAT's, Italian National Income and Product Accounts Authority, revised their GNP estimates to better account for unrecorded activities to include irregular positions in each sector and updated their estimates of per capita value added. After the improvements in estimation, Italy's GDP increased by 8.9% in 1976 and 9.8% in 1977.

3.4.1 A Summary of Recent Estimates for Italy

Table 12 Underground Economy Estimates for **Italy**

Italy					
Average over	1970-75	1976-80	1981-85	1986-90	1991-97
Tax Audit	3	3.9		10	
National Accounts Discrepancy Between Income and Expenditure	3.2	4.3		9.3	
Difference Between Official and Actual Employment		18.4			
Physical input Co-variation				19.3	
Currency Demand	11.3	13.2	17.5	21.3	27.3
Cash to deposit Ratio	23.4	27.2	29.3		
Transactions	19.5	26.4	34.3		
MIMIC		10.5			
Sources: Appendix 1;					

3.5 Netherlands

G.A.A.M. Broesterhuizen, "The Unobserved Economy and the National Accounts in the Netherlands: A Sensitivity Analysis" in Edger L. Feige, ed. *The underground economies: Tax evasion and information distortion* (Cambridge University Press, 1989): 159-174.

Broesterhuizen studies the influence of fraud on the GDP of the Netherlands for 1979 . He considers fraud as the non-reporting or underreporting of income to tax authorities. "Income generated by illegal activities that are known to tax authorities are not considered as fraud here." The components of GDP are grouped into six categories based on the method of estimation used or on the part of the economy to which the data relates.

An assumed range of distortions from fraud is introduced for each category. When the categories are aggregated an “upper bound” for the distortion of GDP due to fraud is found.

An “indirect” production method is used to estimate the components of GDP. The production method involves collecting data from producers who provide information about their production and intermediary inputs. An input-output table is then constructed which is then used in the process of forming national account estimates. This production method however cannot be employed for all industries. Statistics are not always available. In these instances certain indirect methods need to be employed. For example, Trade Sector statistics are calculated by multiplying the value of goods by an estimated trade margin that is different for each good. These types of indirect methods are however not subject to distortions, as the information does not originate from producers thus the element of fraud is eliminated.

Broesterhuizen divides GDP into six categories. The first category comprises those activities that must be calculated using an indirect method. Agriculture, the petroleum industry, and the operation of real estate, are examples of industries belonging to the first group. Group two represents government production, which is the gross value-added of the government sector. It includes general government (sum of compensation of employees and indirect taxes paid to the government), public utilities, railways, communication, banking and insurance – including services provided by the central bank and Chamber of Insurance, and hospitals welfare services.

Both of the first two groups are assumed to be unbiased by fraud since, as explained above, the first group uses indirect methods and the second group includes sectors of the economy that are not characterized by the type of fraudulent practices that cause distortions in GDP.

The third category consists of large firms while the fourth category consists of small firms. The subjects in the respective groups report the estimates of the third and fourth groups. Firms are split into large and small based on the number of people employed. Small firms employ fewer than 100 persons and large firms employ more than 100 persons. The gross value added of each of these two groups is estimated using surveys sent to the firms. Using the value added reported by these firms, an aggregate is found.

The fifth category contains includes the estimates of “non-covered” firms: those not covered in the previous two groups. Since the previous two groups only use firms with 10 or more employees, estimates of the covered firms must be increased to reflect uncovered firms. Sensitivity analysis treats small and large firms differently for a number of reasons. In large firms fraud is usually known by a large number of individuals therefore decreasing the possibility of fraud. Also, in the Netherlands, firms with more than 100 employees must submit their statements for approval by a certified accountant. Finally, large firms enjoy more possibilities offered by fiscal regulations those decreasing the need for fraud.

The final category is the value added estimates that are from fiscal data, that being, own-account workers such as business services, private households with wage earning staff and repairs of consumer goods. The lower numbered groups 1 and 2 are thought to be the least susceptible to distortion through fraud while the highest numbered group are the most susceptible. For 1979 54% of GDP was attributed to the first and second groups.

A sensitivity analysis of the vulnerability of GDP to fraud is performed using five possible scenarios of fraud percentages for each group. The scenarios are ordered from the lowest percentages to the highest. For example, in the first scenario, the range is from 0 for the first group to 20 percent for the last group; and in the fourth scenario, from 0 to 60 percent. Broesterhuizen claims the fifth scenario of 0 to 40% to be an acceptable upper bound. He claims that the input-output ratio provides checks on the percentages used in the different scenarios. Since data on the production of goods that are used, inputs into other goods cannot be distorted to a large extent as underreporting which is beneficial for the producer do not exist for the users. The range of possible distortions using the different scenarios is from 1.8% to 9.1% of GDP. Since scenario five is an upper bound Broesterhuizen claims that GDP is not likely to be distorted more than 5%.

3.5.1 A Summary of Recent Estimates for the Netherlands

Table 13 Underground Economy Estimates for **Netherlands**

Netherlands					
Average over					
	1970-75	1976-80	1981-85	1986-90	1990-95
Physical input Co-variation				13.2	
Currency Demand			11.9	13	
Sources: Appendix 1;					

3.6 Norway

Arne Jon Ischsen and Steiner Strom, The Hidden Economy in Norway with Special Emphasis on the Hidden Labour Market, in Edger L. Feige, ed. *The underground economies: Tax evasion and information distortion* (Cambridge University Press, 1989):251-266.

Ischsen and Strom estimate the hidden economy in Norway using both a micro and marco approach. Their definition of the hidden economy is one that includes all tax-evading activities.

Ischsen and Strom's macro approach focuses on the stock of currency: currency held by the public, and assumes that higher taxes will increase the incentive for tax evasion which in turn increases the demand for currency since it is the primary medium of exchange in the hidden economy. Variables thought to affect the real demand for currency are real

GDP, the rate of return on demand deposits, the rate of inflation, private consumption as a share of GDP, the gross marginal tax rate and a stock adjustment parameter.¹³

To estimate the size of the hidden economy, 1952 is used as a base year thus implying that no tax evasion, or hidden economy was present in that year. Ischsen and Strom then estimate what the currency demand would have been had the tax rate remained at its 1952 level.

The difference in estimated currency holdings of the current year and the currency holdings of that year at the 1952 tax rate then estimates the increase in currency needed in the hidden economy. Using the velocity of M1,¹⁴ as an estimate of the velocity of money in the hidden economy, an estimate of the hidden economy as a percent of GDP can be obtained. The currency needed in the hidden economy is multiplied by the assumed velocity to obtain an estimate of 6.3 percent of GDP in 1978.

The micro-approach uses surveys to estimate the hidden economy and focuses on unreported income. Using a survey conducted in 1980 data were collected to test the effects of marginal taxes, probabilities of detection and demographic factors on the supply of labour in the hidden economy. The main conclusions of the survey were that, in 1979-1980, 18% had acknowledged income earned from unreported work and 26% reported that they had paid for unregistered services. Using market wages Ischen and Strom estimate the size of the hidden labour market to be 3.5 percent of GDP in 1979. About 80% of this work is paid in cash, which in turn justifies the macro approach taken above using the velocity approach. In addition, it was found that people in lower income groups overestimated the probability of detection.

Finally, the survey also included many demographic and socioeconomic indicators. Using economic variables such as marginal wage rates and penalty charges, demographic factors, place of residence, education, occupation, and the probability of being detected, Ischen and Strom estimate the probability that a participant will evade taxes. The main results indicate that as the probability of detection increases the probability of evading taxes decrease significantly, and as marginal tax rates increase, so too will the probability of evading taxes.

¹³ This is a parameter that permits the researchers to assume that changes take place systematically over time. It is estimated statistically along with the other parameters of the system.

¹⁴ Variations in this footnote appear when different estimates of the money stock are mentioned. M1 is one measure of the money stock. Although noneconomists may be stunned to discover that there is no single measure of the “quantity” of money in the economy, different measures of the money stock include assets with different characteristics. For example, currency and chequing account deposits are typically included in what is called M1. These are assets that are available immediately for a transactions. You present your cash or give your cheque and the receiver has the money in hand or as a deposit. For other measures of money, such as M2, which includes M1 plus some other types of deposits, the additional deposits that are included in the definition are those that require (at least as a formal matter) notice to be given before they can be realized. Technically, you might have to wait some period of time before you are permitted to realize your deposit. Consequently, M2 is a “broader” definition of “money” than M1. Different definitions of money are useful for different purposes.

3.6.1 A Summary of Recent Estimates for Norway

Table 14 Underground Economy Estimates for Norway

Norway					
Average over					
	1970-75	1976-80	1981-85	1986-90	1990-95
Currency Demand				14.8	15.1
Sources: Appendix 1;					

3.7 Sweden

Ingemar Hansson, “The Underground Economy in Sweden” in Edger L. Feige, ed. *The underground economies: Tax evasion and information distortion* (Cambridge University Press, 1989):219-236.

Since Sweden’s marginal tax rate is among the highest in Europe there is strong motivation to carry out transactions in the underground economy. Hence Hansson focuses on the unobserved economy in the form of tax evasion in Sweden. Hansson surveys and evaluates the available studies of tax evasion, which leads to the best estimate of the size of the underground economy.

3.7.1 Survey Studies

Many survey studies have been undertaken by the Swedish Institute for Public Opinion Research (SIFO). Typically these surveys ask direct questions based on whether or not the participants have ever received black money for a job or service and questions on the amount of unreported income. According to these surveys approximately 10-30% of the population has received “black” money and 12 % admitted to underreporting. According to questions on the amount of underreported income, typically asked in ranges, this amounts to a maximum of 1% of GDP for 1966. However survey estimates typically underestimate the scope of the underground economy as respondents most likely to not state or understate their involvement in the underground economy. Hence survey estimates are typically though to be lower bound estimates.

3.7.2 Discrepancy in the National Account Statistics

This method entails estimates of tax evasion as the discrepancy between households’ total expenditure on consumption, saving, taxes and the like and total income estimated from income reported on tax returns. For 1978 the estimated discrepancy lies between 4 to 6.7% of GDP, a range that is constant throughout most of the 1970’s. Since most of the expenditure data comes for the Survey of Family Expenditure underreporting of goods and services bought in the underground economy is usually understated. In addition since these method involve the difference between two large sums, a small error in one of the two sums may produce large errors in the estimates of the underground economy.

3.7.3 Discrepancy between reported and actual hours worked

Industries such as Construction and Maintenance tend to face largest competition from the underground economy. Myrsten (1980) estimates the amount of underreported hours in these two industries using the difference between the estimated number of total hours worked to the number reported by the sector. Myrsten estimates the total hours of unreported work to amount to 15% of the reported hours for these sectors. Hasson converts the unreported hours into a measure of the share of value-added by assuming that the price per hour of work in the underground economy is 60% of that in the official economy, which yields an estimated range of 6-9% of value added. Since according to the SIFO, the construction industry well exceeds the average share of underground hours. This estimate is considered to be an upper bound. Hansson however claims that this method contains substantial errors as estimated hours worked in these sectors are in essence “educated guesses” and that unreported work is not only done by registered employees but also by retired people and those moonlighting.

3.7.4 Estimates based on Currency-deposit ratio

Veckans Affärer, a Swedish business magazine, estimates the size of the underground economy to be 10% of GDP using the simple currency ratio method. That is, it uses the ratio between currency and demand deposits. Hansson rejects this estimates as the assumption upon which it is based do not hold for Sweden. The main assumption of a fixed currency to demand deposit ratio is refuted because Sweden has seen a major shift away from cash payments. In addition cash should not be considered the only medium of exchange in the underground economy, and the assumption that the underground economy was negligible from 1922-1933 does not hold for Sweden. Finally variables such as changes in inflation, interest rates and tax rules may influence the currency to demand deposit ratios, which were not included in the *Veckans Affärer* study.

3.7.5 Revealed Underreporting and the Central Bureau of Police estimates

The Swedish tax authority adjusts the data collected on a number of sectors of the economy. For example, farmers, architects, the lumber industry and other various types of taxpayers are adjusted by approximately 8-16% of reported income for these sectors. Hansson claims that these adjustments may contain serious errors as they focus on sectors with high expected underreporting. Finally, The Central Bureau of Police provides, “a largely supported estimate of the detection probability” of tax crimes, which amount to 1.4% to 5.4% of GDP in 1977.

Hansson through criticism of most of the estimates of the underground economy for Sweden claims the discrepancy estimates using the National Accounts to be most reliable. He uses the estimated range of 3.8 to 6.4 per cent of GDP as a starting point for his estimation. To further establish this estimate Hansson finds three activities that have possibly understated the above range, those being: tax evasion, through illegal activities such as the sales of drugs and services of prostitution; through barter and arrangements made outside the household sector. Thus the range must be adjusted upward to account

for these activities. However most of the estimates presented above suggest that the underground economy is much smaller than the range of 3.8% to 6.4 % of GDP. While the results are consistent with the lower bound of 3.8%, Hansson suggests that the upper bound be adjusted downward to 3.8 to 5.5 percent of Sweden’s GDP for the late 1970’s. This estimate is loosely based on previous estimates, which in themselves have large potential errors. It does lend support to an estimate that, as Hansson claims, still has a large possible margin of error.

Finally, Hansson uses the estimates of tax evasion to infer estimates of the unobserved portion of the Swedish economy. The unobserved portion of the economy, activities not included in the National accounts, is divided into non-taxable activities such as cooking your own food and educating your children, and those activities that should be taxed according to law. Hansson claims that since GDP is calculated from the expenditure side, “the discrepancies between the expenditure side and the income side is included in the observed economy”. Since tax evasion is the sum of the taxable unobserved economy and the discrepancy in the National Accounts, the taxable unobserved economy is calculated as tax evasion minus the discrepancy.

Comparing the methods of estimation presented above, excluding the Discrepancy Method since it is not independent of National Account statistics, to the discrepancy in the National Accounts reveals the size of the unobserved economy. Hansson finds that a reasonable estimate of the unobserved economy is unlikely to exceed 10% of GDP since methods 1,3,4 and 5 all yield tax evasion that is lower than the discrepancy in National Accounts.

3.7.6 Summary of Recent Estimates for Sweden

Table 15 Underground Economy Estimates for **Sweden**

Underground Economy Estimates for Sweden					
Average over	1970-75	1976-80	1981-85	1986-90	1990-95
Household Surveys	1.0				
Tax Audit			3.4		
National Accounts Discrepancy Between Income and Expenditure		5.3	5.3		
Currency Demand			7.5		19.8
Cash to deposit Ratio			10		
Sources: Appendix 1;					

3.8 The United Kingdom

Micheal O'Higgins, Assessing the Underground Economy in the United Kingdom. in Edger L. Feige, ed. *The underground economies: Tax evasion and information distortion* (Cambridge University Press, 1989):175-198.

The CSO, Central Statistical Office, defines the hidden economic activity that generates factor incomes that cannot be estimated by the regular sources used to measure gross national product. Using the National Account Discrepancy method it is estimated that the hidden economy is 2-3% of GDP. Income estimates of national income are generally lower than expenditure estimates. This reflects the fact that income that is unreported frequently is believed to show up in expenditure estimates in the official statistics. The CSO considers the expenditure estimate to be unbiased estimate for expenditures on illegal activities while the income measures, which are supplied by the Inland Revenue authorities, fall short of true levels. Estimates of the fraction of GDP in the hidden economy are illustrated by highs of 3.5 % in 1976 to 1980 at 0.54%. This suggests remarkable variability year over year.

The Household Survey method is used to more accurately measure and quantify the participation in the hidden economy by matching the income and expenditure of individual households. Dilnot and Morris (1981), using Family Expenditure Survey data, isolate those households whose income did not match their expenditure. They assume that any household whose expenditure was more the 20% higher than its income had unreported income. Next, using average discrepancies they calculate the range of unreported income as a percent of GNP to be 2.3% to 3.0% in 1977. A serious criticism of Dilnot and Morris (1981) is that they assume that the 30% of the households that did not respond to the survey had similar averages for unobserved activity as those who replied. That is, those who do not respond are considered more likely to be involved in the hidden economy. Correcting for this assumption by assuming that a half of those who did not respond have hidden income of twice the value of that of the respondents, the estimates increase to 6.7%-8.2%.

Mathews (1981) attempts to relate the demand for currency to the hidden economy, by assuming that, "an individual's preferred currency-deposit ratio was governed by certain qualitative uses and function which are themselves responsive to economic variables". The choice of currency or deposit depends on the rate of inflation, the rate of interest, average income taxes, average sales tax, unemployment, and household income.

Mathews calculates the hidden economy from the coefficients of the unemployment and income tax variables using 1973 as a base year. The range for the hidden economy is 3% to 10.9% of GDP for 1979.

In addition to currency ratio estimates of the hidden economy in the United Kingdom, estimates by Feige have used the Transactions method. Feige estimates the hidden

economy to be 0% in 1960 to 15% in 1979. Considering the range in estimates from 2-3% using the National Accounts Discrepancy method to 15% using the transactions method, O’Higgins considers a hidden economy of 5% of GDP to be a reliable guess.

3.8.1 A Summary of Recent Estimates for the United Kingdom

Table 16 Underground Economy Estimates for **United Kingdom**

United Kingdom					
Average over	1970-75	1976-80	1981-85	1986-90	1990-95
Household Surveys	1.5	2.7			
National Accounts Discrepancy Between Income and Expenditure	2.5	3.6	4.2		
Physical input Co-variation				13.2	
Currency Demand	4.3	7.9	8.5	9.7	10.3
Cash to deposit Ratio	14	7.2	6.2		
Transactions	17.2	12.6	15.9		
MIMIC		8		10.2	
Sources: Appendix 1;					

3.9 United States

3.9.1 US (1977)

Edgar L. Feige. “How Big is the Irregular Economy?” *Challenge* 22 (November-December, 1977): 5-13

Feige’s method of estimating the underground economy arises from Fisher’s equation of exchange. As discussed above in the earlier section on methods, Fisher’s equation of exchange equates the total volume of payments (MV) to the total volume of transactions (PT). If accurate estimates of each were obtainable then the *difference* between the two would accurately measure the extent of the underground economy.

$$MV-PT$$

Although we cannot get estimates of the total volume of transactions, we can obtain estimates of the total volume of payments which can be used to estimate the total volume of unrecorded income. With suitable manipulation of the equations of exchange, Feige argues that unreported transactions are proportional to the value of unrecorded income, $(PY)u$. Transactions, and thus total income (including both measured and unmeasured income) are proportional to k^* and the sum of the (known) value of cash and demand deposit payments: CVc and DVd . Measured (or recorded) income $(PY)r$, and unmeasured income is calculated as:

$$(PY)u = \frac{(CVc + DVd)}{k^*} - (PY)r$$

An estimate of k^* is obtained by either i) assuming that there is a year in which all income is properly recorded, or ii) from an independent estimate of the proportion of total income that is unrecorded in any given year. Adding $(PY)u$ to the standard measure of income yields the value of calculated estimate of income including underground transactions. This estimate is 19.1 percent in 1976 and 26.6 percent in 1978.

3.9.2 US (1994)

Morton Paglin, "The Underground Economy, New Estimates from Household Income and Expenditure Surveys", *The Yale Law Journal*, 103(8), June 1994, pages 2157-77.

Morton Paglin develops estimates of the size of the underground economy in the United States by using the household reports of income and expenditures published by the Bureau of Labor Statistics. Paglin reviews two conceptual approaches to the underground economy, the economists view and the law enforcement view. The central concern for economists is not whether the activities are legal or illegal but whether or not they are reported in the national income accounts. In economic terms the underground economy is then all economic activities that go unrecorded in the national income and product accounts of the United States. This definition includes legal and illegal activities such as the sale of illegal goods (drugs mostly), unreported regular household income, the value of unpaid housework, income paid to illegal aliens, etc.

The law enforcement view is simply one in which the government, through elected politicians, sets laws to prohibit certain activities. If these laws are not upheld there will be an erosion of the confidence of the democratic institutions. Since law enforcement and tax collections agencies do not typically concern themselves with the value of unpaid housework or other do-it-yourself projects a narrower definition is outlined. The legal definition of the underground economy used by the Internal Revenue Service of the United States is gross income not reported according to income tax codes. The value of the underground economy according to the IRS definition is then the difference in reported and actual gross income.

Typically the IRS estimates national income through wages, salaries, rents, dividends, interest and undistributed profits filed by both large and small businesses. The personal

income totals in US national accounts are calculated using figures of the total income paid out by businesses. The personal income totals in national accounts should then correspond with the aggregate income reported by households. However many households fail to file returns or underreport their total earnings. Households fail to report for many reasons, namely, because this income comes from, illegal activities such as drugs, prostitution and gambling, self-employed people that receive payment in cash for services, and undocumented aliens or household help. This “concealed” income is therefore used as a measure of the underground economy.

To measure the underground economy Paglin uses household statistics from the US Bureau of Labour Statistics annual Consumer Expenditure Survey (CES) and the Bureau of the Census Current Population Survey (CPS). The CES is based on a sample of 5000 households questioned every three months about their expenditure. Both an interview survey and a “diary survey” are undertaken. Typically households are asked questions about their principal source and amount of income, their expenditure and demographics. They are also asked to keep a detailed record of smaller items purchased such as food, supplies etc for a short period of time. Since reported expenditure is typically larger than reported income, the difference between the two gives an indication of the potential size of the underground economy. To derive total income, the average income of “complete income reporters” is multiplied by the number of such households. For the 1992 survey 14% of households were “incomplete income reports”, that is they failed to report the amount of their income but reported substantial expenditures. These households that do not add to total income but add to total expenditures as most do reveal their purchases of consumer goods.

Paglin estimates the difference in aggregate income and expenditures to be approximately \$315 billion in 1991, which is a rough estimate of the size of the underground economy. Paglin claims that this result is too small as households also save a portion of their disposable incomes, approximately 4 % in 1991. To adjust his estimate Paglin divides the reported expenditures by 1 minus the savings rate, which would reflect the total disposable income of households. This figure is then subtracted from reported income to get better estimate of “concealed” income. The underground economy estimates using household surveys of income and expenditure total to 460 billion dollars or about 8.1% of GDP in 1991. Paglin also find that the underground economy has decreased from 10.2% of GDP in 1984 to 8% in 1992.

3.9.3 A Summary of Recent Estimates for the United States

Table 17 Underground Economy Estimates for **United States**

United States					
Average over	1970-75	1976-80	1981-85	1986-90	1990-95
Household Surveys	3.7	4.5	5.6	8.1	
Tax Audit	4.9	6.3	8.2	10	

National Accounts Discrepancy Between Income and Expenditure	3.2	4.9	6.1	10.2	
Physical input Co-variation			7.8	9.9	
Currency Demand	3.5	4.6	5.3	6.2	10
Cash to deposit Ratio	8.8	11.2	14.6		
Transactions	17.3	24.9	21.2	19.4	
MIMIC		8.2			
Sources: Appendix 1;					

4.0 Part IV: Estimates of the Size of the Underground Economy *for Canada*

4.1 Mireille Ethier

“The Underground Economy: A Review of the Economic Literature and New Estimates for Canada” in Francois Vaillancourt, ed., *Income Distribution and Economic Security in Canada* (University of Toronto Press, 1985): 77-109.

Ethier estimates the underground economy in Canada using two methods: discrepancies between income estimated in national accounting and in taxation data; and methods based on monetary analysis.

4.1.1 Discrepancies Method

The discrepancies method disregards illegal activity not accounted for in the calculations of national output, but concentrates on estimating the level of tax evasion. Ethier compares gross national income reported in National Accounts to the income reported to Revenue Canada by individuals and corporations. The following table presents the results from 1969 to 1980, which indicates that the level of tax evasion has been steadily *decreasing* over this time period.

Table 18: The Discrepancy Between Income and Expenditure

The Discrepancy Between Income and Expenditure (% of GNP)	
Year	

1969	29.4%
1970	30.4%
1971	30.5%
1972	25.7%
1973	23.1%
1974	20.4%
1975	19.6%
1976	21.3%
1977	21.4%
1978	18.3%
1979	16.4%
1980	15.5%

4.1.2 Monetary Aggregates

Ethier’s methodology is a variant of Tanzi (1980) where the currency-M2 ratio is related to number of variables such as the tax rate, the share of wages declared in income, short term interest rate sand real per capita income. Tanzi hypothesized that the since the underground economy primarily uses cash as a medium of exchange and since he believed that most underground activity was designed to avoid taxes, there ought to be a statically significant relationship between currency holdings and the personal tax burden. Running an ordinary least squares regression of the currency-M2 ratio on the above-mentioned variables, Tanzi simulates what currency holdings would have been at historically low tax levels. Tanzi then subtracts the simulated level of currency from the official data to get an estimate of the national currency due to tax evasion. This estimate of additional currency holdings due to tax evasion is then multiplied by M2-velocity to get an estimate of the “tax-induced” underground economy.

Ethier expands the number of variables that explain the currency to M2: multiple tax variables, the ratio of total taxes collected to personal income less transfers, the maximum marginal tax rate and the average marginal tax rate. The following table reports the estimates of from 1973-1981 that shows that the underground has been a constant percent of GDP throughout much of this period.

Table 19: Currency Demand Estimates for the Underground Economy

Year	Underground Economy (% of GDP)
1973	6%
1974	7.1%
1975	7.2%
1976	7.3%
1977	8.4%
1978	7.8%
1979	7.7%
1980	4.8%

1981	5.9%
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Table constructed from Tanzi (1980): 101

4.2 Berger, Seymour

“The Unrecorded Economy: Concepts, Approach and Preliminary Estimates For Canada, 1981”, in *Canadian Statistical Review*, Statistics Canada Catalogue 11-003E, April 1986.

Berger outlines a definition of the underground economy to focus on the unrecorded sector of the economy: those activities that are not reported to or recorded by the government in its national accounts. Berger estimates the underground economy using both the income and expenditure sides of the national accounts for 1981.

Berger outlines economic activities associated with the unrecorded economy. Those being: employees working off the books, earnings from tips, covert rentals, skimming (owners pocketing some part of receipts of legitimate businesses), selling homegrown or produced items, barter, unpaid work of homemakers, volunteer work, unreported capital gains, smuggling, illegal gambling, trade in illegal drugs, illegal prostitution and theft.

Although the list contains a broad assortment of activities, Berger concerns himself with only those activities that conform to the same principles by which the estimate of GNP is developed. The activities that constitute economic production of goods and services that are exchanged for money in the market economy. Therefore non-market work such as volunteer work are excluded. Berger also excludes all criminal activities since they do not fall under the definition of economic production by the Canadian system of National Accounts. Only the first six activities in the above list are considered as economic activities that are market exchange and legal.

4.2.1 Estimates using the Income side of the National Accounts

4.2.1.1 Unrecorded Wages

Berger defines the supply of unrecorded labour to be those individuals that are employed and working in the unrecorded economy, unemployed and working in the unrecorded economy, those not in the labour force and working in the unrecorded economy, and lastly illegal immigrants working as unrecorded employees. Estimates of unrecorded labour are made for each of forty occupations selected from the Standard Occupational Classification (1980) (SOC). The Standard Industrial Classification (SIC) groups were selected as industries in which those in the above classification may find unrecorded work. These are manufacturing, construction, trade and business and personal services. It is assumed that only small businesses with 20 or fewer employees employ unrecorded labour. By assuming a certain percentage of each of the SOC group is involved in the unrecorded economy, boundaries are drawn for economy-wide unrecorded labour. For example, small businesses in manufacturing and construction employ 10 percent of the total number of employees in these industries as unrecorded. Illegal immigrants are estimated to be about 50,000 workers in 1981.

Unrecorded wages are calculated using the following formula:

Unrecorded Earnings = (The number of individuals working in the unrecorded economy) X (Hours worked per week) X (Average hourly unrecorded wage) X (Weeks worker per year).

It is estimated that the impact of unrecorded wage is about 2.3 percent of national GNP in 1981.

4.2.1.2 Concealed Net Income of Unincorporated Business

Berger considers only those unincorporated businesses with annual sales of less than half a million dollars per annum. The same industries, manufacturing, construction, trade, community and business and personal services were selected as industries that may conceal income. The concealed income is estimates by finding the share of sales of unincorporated businesses with sales of less than 500,000 dollars for each industry.

This percentage is then multiplied by the total net income of unincorporated businesses from the National Accounts. Berger assumes that these businesses may be understated by as much as 25 percent, which is his upper limit. In total the concealed net income of unincorporated businesses may represent around 11% of total unincorporated business income that is about 0.5 percent of GNP.

4.2.1.3 Concealed Corporation Profits

The estimates for corporations followed the same approach as for unincorporated businesses. It is estimated that concealed corporation profits may have been about 1.3 percent of total corporation profits or 0.1 percent of GDP.

4.2.1.4 Rental Income

Berger states that although there is suspicion of large amounts of money paid to landlords in a tight rental market, the estimates of residential income does not depend on landlord reporting. "Rental income is typically based on the number of dwelling units and average rent paid by tenants from the Labour Force Survey."

4.2.1.5 Interest and Miscellaneous Investment Income

Berger claims that since the largest portion of interest income of individuals is estimated residually from business and government records, therefore an understatement due to the unrecorded income is not possible.

In conclusion the income based estimates of the underground economy through unrecorded wages, concealed income from unincorporated businesses and corporate profits amounts to approximately 3 percent of GNP in 1981.

4.2.2 Estimates using the expenditure side of the National Accounts

Berger outlines the possible sources of unrecorded expenditures in the same fashion as the income based method. That is he outlines two categories: personal expenditure on goods and services and business gross fixed capital formation comprised of purchases by businesses with annual sales of less than \$500,000. Berger also provides reasons why the Gross National Expenditure (a part of the national accounts) may not be greatly understated: viz., some commodities outlays have already been adjusted upward to reflect for under coverage.

Underreporting can arise from understatement of sales by business and from the non-reporting of outlays made by individuals outside businesses such as babysitting, domestic services and the like. For these types of outlays a sensitivity test was applied to the National Account estimates of certain series such as food, clothing, daycare, jewelry and recreation.

Berger includes residential construction, non-residential construction and machinery and equipment as categories that may be underreported. Comparing the Family Expenditure Survey data for 1982 estimates for capital improvements with the GNE indicated an underreporting maximum of \$3 billion. All data for the second category, non residential construction, are derived from *Private and Public Investment in Canada, Outlook and Regional Estimates* which Berger considers to be complete, and he claims that it is unlikely that there is an unrecorded economy in machinery and equipment.

By assuming understatement of 5 to 50 percent of the amounts reported in the National Accounts for the first category, and \$3 billion for the second, means an average of approximately 2.1 percent and a maximum 3.5% of GDP is underreported. This estimate corresponds to the income based estimates.

4.3 Rolf Mirus, Roger S. Smith, Vladimir Karoleff

“Canada’s Underground Economy Revisited: Update and Critique.” *Canadian Public Policy* 20 (3) 1994: 235-252.

David Mirus et. al. are concerned with the underground economy from the perspective of tax evasion. Their definition of the underground economy includes income generated from activities such as employees who are working for firms off the books, rental income not reported, tips, childcare earnings not reported, barter activities, home-produced items, illegal gambling, drug dealing, some construction activities, and underreporting of revenues. It excludes household production: gardening, home repairs, cooking and other home production. Mirus et al. provide an examination of the forces that have contributed to the growth of the underground economy in Canada over the 15 years 1979-1994: such things as rising personal income taxes, a rise in indirect taxes as a share of GDP, GST, continued concern over the efficiency of the

government, the integration of the global economy including increased international flows, immigration, increases in unemployment and the growth of small (often) self-employed businesses

The authors update earlier estimates of the underground economy in Canada by Mirus and Smith from 1981. They use three different monetary aggregates approaches commonly used to estimate the underground economy.

The first approach analyses the currency to demand deposit ratio. Increases in this ratio indicate the need to hold additional cash for underground transactions. An estimated velocity for this currency is then used to yield the size of the underground economy. Mirus et al. reports that the ratio of currency to demand deposits has been steadily increasing for the past 25 years. Using this ratio and estimated velocity, Mirus et al. claim that the underground economy is 13.5% of GDP in 1980, 25.9% in 1985 and 29.7% in 1990. Mirus and Smith previously estimated the underground economy to be at 16.9% for 1976. However, they believe it unlikely that the underground economy grew this rapidly and suggest that the increase in the currency-demand deposit ration was due to the fact that demand deposits ratio to GDP declined faster than currency. Currency fell from 3% of GDP in 1980 to 2.9% in 1990 while demand deposit fell from 6% to 3.2%.

The second approach used by Mirus et al. is Feige's transactions approach. Updating the estimate for in 1976 of 28% of GDP Mirus et al find that the underground economy is about 23.9% in 1984 which shows a decrease and is contrary to the method used above.

The third approach used by Mirus et al. is a modification of the method used by Tanzi in 1980. Tanzi developed an econometric approach to estimating the underground economy. Tanzi found that the ratio of currency to M2 (a measure of the overall stock of money including currency and various deposits like chequing and some saving accounts¹⁵) is a function of the tax rate, share of wages and salaries in personal income, real per capita income, and the interest rates on time deposits. Tanzi hypothesized that the since the underground economy primarily uses cash as a medium of exchange and since most underground activity is designed to avoid taxes, there ought to be a statically significant relationship between currency holdings and the personal tax burden. Statistically associating the currency-M2 ratio on the above-mentioned variables, Tanzi

¹⁵ M2 is a measure of the money stock. Although noneconomists may be stunned to discover that there is no single measure of the "quantity" of money in the economy, different measures of the money stock include assets with different characteristics. For example, currency and chequing account deposits are typically included in what is called M1. These are assets that are available immediately for a transactions. You present your cash or give your cheque and the receiver has the money in hand or as a deposit. For other measures of money, such as M2, which includes M1 plus some other types of deposits, the additional deposits that are included in the definition are those that require (at least as a formal matter) notice to be given before they can be realized. Technically, you might have to wait some period of time before you are permitted to realize your deposit. Consequently, M2 is a "broader" definition of "money" than M1. There are also other aggregates. Why? Different definitions of money are useful for different purposes. The touchstone of all the aggregates is to find the measure of money that best predicts the behaviour of money-holders for specific purposes. For example, M2 growth is frequently found to be a good predictor of future inflation. (when associated with other parts of the quantity theory of money that has already been discussed.)

simulates what currency holdings would have been at historically low tax levels. Tanzi then subtracts the simulated level of currency from the official data to get an estimate of the national currency due to tax evasion. This estimate of additional currency holdings due to tax evasion is then multiplied by the usual M2-velocity to get an estimate of the “tax-included” underground economy.

Mirus et al. use additional variables to explain three ratios (the currency to M2 ratio, the currency to demand deposit ratio, and currency to all chequeable deposits). They use direct and indirect taxes as a share of GDP, real per capita income, 91-day T-bill rates, the GDP implicit price deflator, contributions to the social insurance systems, share of wages and salaries in personal income, real disposable income, and personal income taxes.

The currency to M2 ratio provides the most reasonable statistical results. Five billion in currency can be attributed to the rise in taxation from 1965 to 1990. When they multiply this estimate by the velocity of M2, they find the tax induced underground economy to be approximately 14.6% of GDP in 1990. This result is much higher than that of 1976, 7.2%.

Mirus et al. conclude by examining a study performed by the International Monetary Fund who hypothesize that new technology would decrease real per capita currency holding as the use of debit and credit cards increase. The IMF study finds an increase in cash-based underground economic activity since 1970 of about 11% of GDP which is slightly more than is found by Mirus et al using method one and three.

4.4 Gylliane Gervais

Statistics Canada, *The Size of the Underground Economy in Canada* Cat. 13-602E, Occasional, 1994

Statistics Canada is primarily interested in the size of the underground economy in the context of the national income accounts. These are the basic accounts that describe the Canadian economy. Should the underground economy be large and unmeasured, the national income accounts would be vulnerable to erratic fluctuations and would not systematically reflect changes in economic activity. This would be a major source of concern.

Table 20 describes the simple tableau classifying economic activity used by Statistics Canada. This tableau distinguishes between legal and illegal production of market and non-market activities to make a number of points about measurement of the underground economy.

Regardless of its legality, any current production of market oriented goods and services should be counted in the national income. Many activities are not market activities and

are not counted.¹⁶ Volunteer work and household work are conspicuous examples of activities that are not included in national income accounting, while the (estimated) value of owner occupied housing is included.

Statistics Canada distinguishes between measured and unmeasured, and taxed and untaxed. A key concept is the distinction between unreported and unmeasured transactions. Many transactions are unreported (for any number of reasons), but are partially or wholly measured. Many transactions that are perfectly legal may not be measured directly. This does not mean that they are ignored in the national accounts. Even if they are not directly measured, their values may be picked-up by using indirect recording techniques.

Table 20: Classifying Economic Activity

Classifying Economic Activity		
Economic Activities	Legal	Illegal
Market Activities	Production of the usual goods and services	Production and sale of drugs
Non-market Activities	Household work, rental on owner occupied housing,...	Growing marijuana for personal consumption
Statistics Canada, (1994) p.3.		

For Statistics Canada finding the underground economy is an effort to identify how much current economic activity is likely to be “missed” when calculating the Gross Domestic Product.

As noted above, the GDP can be measured through income flows or through expenditures. Although an income based measure would seem to be ideal for following the flow of funds in the underground economy, many categories of income are estimated by Statistics Canada as a residual – net business income being the most important for these purposes. Consequently, Statistics Canada primarily estimates the underground economy through the expenditure-based accounts which provide value and quantity data.

Statistics Canada suggests that specific categories are most likely to display under reporting. Investment in residential construction, personal expenditures on goods and services, and some small underreporting in imports and exports of goods and services are considered to be the most likely sources of underreporting and that could be significantly underestimated. Other categories are less likely to display underground activities.

4.4.1 Imports and Exports of goods and services

Imports are understated by the amount of goods smuggled into the country. The most commonly smuggled products are thought to be alcohol and tobacco although jewelry and cross boarder shopping are also of interest.

¹⁶ There is always an ongoing discussion about every nation’s national accounts to try to resolve what activities are to be included.

Tobacco smuggling is seen as a major source of illegal activity. However, even though some \$1.057 billion (1992) of tobacco sales were of illegal product, much of this was counted in the GDP. As is common knowledge, most of the tobacco smuggled into Canada is originally produced in Canada and subsequently exported from Canada for illegal re-import. Consequently the export value of Canadian cigarettes is counted in the GDP, and there is no underestimate of GDP. Where there is an underestimate of GDP is in the distribution and retailing of the (illegal) cigarettes – the smuggler’s markup. Of the \$1,057 million in final sales, imports were \$635 million leaving the mark-up at \$423 million or 0.06% of GDP. Recall that the value of GDP includes the term (X-M), exports – which have already been counted – from which we subtract (uncounted and smuggled) imports. In 1993, the figures were \$1.87 billion in sales, \$1.1 billion in imports and a mark-up of \$747 million or 0.1% of GDP.

The cost of alcohol smuggling is estimated at approximately \$800 million although this figure is not directly estimated but is a grossed-up value of an Ontario Liquor Control Board (1993) report. From Statistics Canada’s perspective, however, this is an overestimate as it (i) would be worth far less (wholesale) if bought through the appropriate legal outlets; and (ii) would add to GDP insofar as the retailing and distribution functions are undercounted by omitting the mark-up on the liquor.

The third specific category of good smuggled is precious jewelry. Estimates in this category are by association. It is highly taxed very portable. Hence it is likely to be smuggled. The market for jewelry is (1992) 10% of that for tobacco and alcohol, consequently Statistics Canada believes that the likely value of illegal imports is in the range of \$100 million rather than in the trade association’s estimates of \$700 million.

Cross border shopping is another possible source of smuggling. But as far as the national accounts are concerned it is a wash. That is, goods purchased outside the country understate imports and, simultaneously, expenditure.¹⁷ But since they do not give rise to any local sales commissions or production, they do not enter the GDP. Even though there is undoubtedly a tax evasion issue, this is not of particular interest to Statistics Canada insofar as it does not lead to an over or under estimate of the GDP.

Statistics Canada believes that exports are not likely to be underestimated through business under-valuation of the goods sold abroad. About 70% of merchandise exports are to the US and are valued on the basis of US Customs import documents that are likely to overestimate rather than underestimate value. Similarly, Canadian imports from the US are not likely to be underestimated since Canadian Customs does the valuation.

¹⁷ Statistics Canada is interested primarily in the national accounts and the impact that the underground economy has on their estimates of economic activity within the accounts framework. Consequently, they have less interest in the simultaneous understatement of imports and expenditure as neither would be of particularly significance to the measured GDP and related sub-aggregates. Obviously there are revenue issues and law enforcement issues that go beyond the accounting issues.

Without export duties there is little incentive for business to underestimate or hide exports. Most Canadian commodity exports are valued at international prices since a large proportion are commodities like petroleum, natural gas, lumber, pulp and paper, metals for which Statistics Canada believes there is little evidence of improper reporting. The various categories account for 90% of commodity exports. In 1992, if the remaining 10% were understated by 5%, this would amount to \$800 million. There is no basis for the 5% assumption in the text.

Service trade is a growing and potentially likely area for under-valuation and non-reporting. Travel, freight and shipping, business services, government transactions, and other services are the major categories of expenditure. The business services, a very eclectic mix of economic activities, is the largest category (40%) and most amenable to potential under-reporting. Of business services 70% arise from services related to a wide range of activities: insurance, air transport, computers, communications, brokerage, gold refining, royalties and patents. Statistics Canada believes that these industries are sufficiently well regulated that there is little opportunity for under-reporting or fraud. If there were to be a 10% under-valuation of the rest of services, this would amount to \$300 million. As before there is little rationale for the size of the underestimate of 10 percent except for the observation that services are easier to manipulate than goods so that the degree of under-reporting is probably greater than then goods under-valuation.

Underground merchandize trade amounts to 0.2% of GDP or \$1.1 billion.

4.4.2 Residential Construction

This category is frequently mentioned as a source of under-reported employment and activity. However, since anything spent on repairs and maintenance of old housing (as distinct from new construction) is being spent on intermediate rather than final output. This means that the actual problem from a national accounts point of view is that net rental income is overstated since too little is subtracted from gross rental income. The accounts problem is only with respect to “new” improvements to “old” property and anything that is understated with respect to new investment in housing.

The Statistics Canada approach to testing their own estimates of residential construction and renovation is to compare building materials and lumber sales to measured residential construction. Looking at the ratios of different inputs such as lumber and building materials that are comparatively well-measured to residential housing, they find some evidence of under-reporting. The ratio is increasing during the 1990-92 recession that suggests that some home reconstruction which does not get reported is nonetheless using lumber. Statistics Canada has introduced imputations to capture much of the missing activity leading to estimates that are as much as \$2 billion above what would be estimated from Revenue Canada sources (*Ibid.*, Table 2).

4.4.2.1 How does Statistics Canada actually do their estimates of new residential construction?

Their approach begins with the number of housing starts from Canada Mortgage and Housing Corporation, the value of building permits and prior knowledge of the length of time it takes for normal construction to take place. Take the number of starts and multiply by the value of permits to get the total value of starts. Now assume that 50% of the work is done in the quarter in which the work is begun, 40% in the subsequent quarter, and the remainder in the third quarter after commencement. Use estimates of various other costs associated with building (fees, plans, etc.) and sum each quarter's starts with work in progress from the previous quarters.

Although it is in the interest of the builder to underestimate the value of construction, municipalities benefit from higher values and limit the underestimates by builders. Although builders may show too low costs by having work done "off the books", the selling price will reflect the value of the final product. Even so, Statistics Canada adjusts the data by increasing costs by 9% to 19% depending on the type of unit being constructed and suggests that as much as \$1.9 billion remains underestimated once conversions (assumed to reflect 2 unreported conversions for every reported one) and other underground fees are taken into account.

4.4.2.2 Improvements in Existing Homes

Existing homes are altered and improved. A survey of 25,000 households (*Homeowner Repair and Renovation Expenditure in Canada, 1992*, Catalogue No. 62-201) provides the basis for data. The reported as the cost of these improvements is \$10.4 billion. Statistics Canada conjectures that about 20% may be under-reported. They argue that the ratio between the monthly building permits survey and HRRES provides a check on real spending, when combined with a third source, the *Initial Data Release from the 1992 Social Survey on Time Use*, (uncatalogued document), which measures the time spent by homeowners on repairs adds up to a maximum estimate of \$1.4 billion. Together with other miscellaneous costs, Statistics Canada suggests that for all residential construction, including renovations as well as new construction, perhaps \$3.6 billion is unreported. This is about 11.6% of a recorded \$30.9 billion. Statistics Canada considers this to be an upper bound as far as activity being missing from the GDP accounts. Much of the unreported activity may be picked up in the flows of income from the participants.

4.4.3 Personal Expenditures on Goods and Services

Personal expenditures are about 60% of GDP and are divided into 140 categories. Among the categories, "sales to households" is considered by Statistics Canada to be potentially a source of substantial activity in the underground economy. Alcohol, tobacco and domestic services (meals in restaurants, repairs, etc.) can be underestimated through "skimming" receipts or purchased "under the table". Statistics Canada assumes that sectors such as universities and other non-profits are not likely to be involved in hiding transactions. Categories – gas, electric and water, telephone and postage are also likely to involve little unreported activity. Other categories like owner-occupied dwellings and various farm-related activities are imputed rather than directly assessed.

None of these is likely to be a source of significant underestimation through illegal activities on the part of the participants.

Some 46% of the GDP is associated with categories unlikely to involve hidden transactions.

4.4.4 Skimming

This is the process by which legitimate businesses under report their income. This may lead to small underestimation of the GDP according to Statistics Canada. The limit on the underestimation of the practice comes from the cross-referencing of the national income accounts: the supply of a commodity must equal the demand from the input-output tables. If, for example, retailers are systematically under stating sales by, say 25%, then total demand would be much lower than total supply. Inventories can absorb some of the production, but large amounts would be noticed and the accounts reconciled. It is important to note, however, that this is considered a statistical/reporting problem not a source of criminal concern.

Statistics Canada asks the question, “How widespread is skimming?” (p.20) To get an upper bound measure of skimming the answer is derived by assuming that for those activities not elsewhere calculated (like residential construction), between 25% of gross receipts in services are underreported, and 15% for direct sellers and repair shops.

Skimming is assumed not to take place in government retail activities like government liquor stores; it is assumed not to take place in business to business sales (intermediate sales) – one firm’s skim is taxable income in the hands of the other. Large firms are also assumed not to skim. Using tax files of small business selling to households, on total retail trade¹⁸, the \$37 billion in reported receipts amounts to skimming of between \$6.2 and \$4.2 billion. For services¹⁹ that total \$18 billion of gross receipts, skimming is estimated to amount to between \$4.6 and \$3.7 billion. The differences between the high and low estimates arises from assumed differences in the rate of skimming: 15 to 10 percent, and 25 to 20 percent generally.

These estimates are considered an upper bound. If skimming were this prevalent, then the ratio of skimming to net income (that is declared net income plus the skimmed income) would be about 70%! Declared net income relative to declared gross receipts is about 6.8%. If skimming were as widespread as suggested by the calculations, then the ratio of declared net income plus the skim to gross sales (including skim)²⁰ would be in the order of 19% in retail and 37% in services.

¹⁸ For example, supermarkets and grocery stores; pharmacies, shoe, fabric and apparel stores; furniture stores, appliance stores, motor vehicle sales (excluding new vehicle sales), bookstores, musical instrument stores, jewelry stores, camera stores, vending machine operations, among others.

¹⁹ Taxicab services, transport, child care and day nurseries, driving schools, hotel and motels, restaurants, taverns, bars, laundries, barber and beauty shops, photography, vehicle rental and leasing, illustrate some of the categories.

²⁰ That is: (declared net income+calculated skim)/(declared gross sales+ calculated skim).

4.4.5 Tobacco

Statistics Canada incorporates the production of cigarettes into the GDP whether appropriate taxes are paid on the consumption or not. The markup from smuggling -- that is the underestimate in the GDP since production is already counted -- amounts to about \$750 million in 1993. Statistics Canada's interest is less in the illegality than in appropriate counting of the production and consumption for the purposes of measuring national output. A benchmark date for cigarette smuggling is 1986 at which time it is assumed that no smuggling took place.

By 1993 some 31% of the total cigarette market in Canada is deemed to have consisted of contraband re-imports in a total marketplace of 50 billion cigarettes. The data on contraband cigarettes are generated from Canadian production data and an assumed rate of domestic consumption. More recently the Family Expenditure Survey has been used to support the estimates. The issue for Statistics Canada is really whether the valuation that people give to illegal purchases of cigarettes is to be measured at tax inclusive prices or at contraband retail. At a contraband price of \$24 per carton (although there is also a value of \$18 per carton assumed elsewhere), personal expenditure estimates of contraband amount to about \$1.9 billion (in 1993).

4.4.6 Alcohol

Data from the Liquor Control Board of Ontario (LCBO) and the Association of Canadian Distillers (ADC) provide the basis for Statistics Canada's estimates of illegal alcohol production. To provide an estimate of Canada-wide production, the Ontario estimates are scaled-up by the ratio of Canada's population to Ontario's population.

Smuggling of wine and beer is not seen as a problem. Taxes are relatively low and it is expensive to ship. Consequently, manufacturing is local rather than imported. Illegal wine is sold as cooking wine and as "house" wine in restaurants. Scaled up for Canada, some \$515 million of illegal sales take place each year.

Spirit sales are also grossed-up from Ontario estimates. Canada wide, smuggled liquor amounts to 51 million litres. Valued at a street price assumed to be 57.7% of Ontario's retail price (or \$15 per litre), this leads to total illegal spirit sales of \$768 million in 1992. Legal sales were of 126 million litres.

Because of adjustments such as mark-ups on and imports of illegal liquor that are assumed to take place, the estimated effect of all illegal alcohol on the GDP is lead to about \$1.4 billion being missed.²¹ This is seen as very much an upper estimate as it assumes that any gaps in consumption of alcohol from trend is filled by illegal volumes rather than being a true measure of lower consumption.

²¹ These adjustments net to a slightly different sum than the obvious one of \$768 and \$515 million.

4.4.7 Tips

These are calculated as a fixed percentage (3% to 15% by activity) of gross business receipts. Estimated tips from the underground economy are assumed to be the same fraction of estimated underground activity in each of the areas described by skimming. This leads to an estimate of \$312 million in unreported tips. In the GDP recorded tips constitute \$2.1 billion.

4.4.8 Professional Services

With a wide variety of services tabulated under the rubric of professional services, Statistics Canada simply assumes that 5% of the category (\$201 million) could be underreported.

4.4.9 Food

The basic calculation of underreporting in the food industry comes from the assumptions of general skimming allocated to the retail trade. This amounts to \$1.5 billion in 1992. In addition, direct sales by farmers to consumers are deemed to be the most likely to be underreported. Because of the small volume of sales, even at an assumed 20% rate of underestimation, the total underreported is (only) \$50 million. The direct data on farm to consumer sales (in BC) is supplemented (and is consistent with) implied values for farm to consumer sales drawn from the Family Food Expenditure Survey.

4.4.10 Childcare

For formal childcare expenses, there is a substantial discrepancy between the amounts deducted for income tax purposes (\$4.3 billion) and the amounts recorded in the family expenditure survey (\$2.6 billion). Some of this is due to subsidies to day care, but Statistics Canada estimates that there is \$137 million in skimming and perhaps \$1 billion in unreported income. Some of this spending is unlikely to reach the threshold of taxation. Casual babysitting services are one obvious example of this activity.

4.4.11 Domestic and Household Services (DHS)

There are three sub-categories of this broad category: pet care, domestic services, and miscellaneous household services. Including some childcare, they total to \$2.6 billion as the reported amount. An alternative figure is calculated using the fraction of households employing some domestic services (10%), and an assumption about spending, \$30 per week for 50 weeks multiplies out to \$1.5 billion while only \$0.815 billion is recorded from survey data. For all of DHS, the difference between \$1.5 and \$0.8 billion is added to the recorded total of \$2.0 billion. Adding skimming (\$203 million) and other adjustments increases the total to \$3 billion. But to be clear, unreported services are \$250 million. All the rest are included elsewhere (e.g. skimming).

4.4.12 Summary

Statistics Canada calculates what it measures as an upper bound measure of the amount of money missing from Personal Expenditure Accounts

Table 21: Underground Transactions Missing from Personal Expenditures

Underground Transactions Missing from Personal Expenditures	
Category	Value of Underground Transactions
	(Millions of 1992 dollars)
Skimming by businesses selling to households	10,836
Contraband tobacco	1,057
Contraband spirits	768
Illegally manufactured wine	515
Mark-ups on illegal alcohol	565
Rental accommodations	269
Tips	312
Professional Services	208
Food	50
Domestic and Household Services	250
Total	14,830

Drawn from table 13 of *The Size of the Underground Economy in Canada, 1992*

And from the corresponding summation of all the underground transactions that are missing from the expenditure based GDP:

Table 22: Upper Limit on Transactions that are Potentially Missing from the GDP, 1992
 Statistics Canada's Upper Limit on Transactions that are Potentially Missing from the
 GDP, 1992

Category	Amount (millions of dollars)	Percent of Published Estimates
Personal Expenditure on Goods and Services	14,830	3.5
Government Expenditure on Goods and Services	0	0
Government Investment	0	0
Business Investment in fixed capital	3,578	3.2
Business Investment in Inventories	15	0.6
Exports	1,100	0.5
Imports	1,003	0.5
GDP at Market Prices	18,490	2.7
Drawn from Table 14 of <i>The Size of the Underground Economy in Canada, 1992</i>		

The Statistics Canada estimates are on the low side of the estimates for the underground economy. Their sector approach identifies and distinguishes between transactions that are unrecorded from those that are unmeasured. They argue that much of what is unrecorded is in fact measured by their overlapping reconciliation methods. By focusing on the impact that the underground economy has on their estimates of GDP, the low estimate (of their upper bound on the amount of the GDP missed) is consistent with the relatively narrow focus. Illegal activity is not supposed to be a part of the GDP. Resale of “old” goods is only peripherally counted in the GDP. Household production is not in the GDP. Barter is not generally in the GDP.²² Although measured in terrific detail, there is no reason to believe that including some of these other categories would not increase the size of the underground economy.

4.5 E. A. Giles, Lindsay M. Tedds and Gugsä Werkneh

“The Canadian underground and measured economies: Granger causality results”
 manuscript, June 1999.

The basic data for the size of the underground economy has been taken from the MIMIC model (Giles and Tedd, 2000) The focus in this paper is to identify whether the underground economy is systematically related to the measured economy. This is accomplished by looking at “causality” tests between the two. Loosely, series A causes

²² As been discussed above, some of the activity in each of these categories is in fact picked-up in the current estimates.

series B if the use of past values of both series A and B can significantly reduce the error in forecasting series B. That is, it can reduce the error in forecasting series B using past values of series B alone.

These tests answer the questions: Can past values of the GDP explain output in the underground economy? And/or is it the case that past values of the underground economy can explain the behaviour of the measured economy?

The results suggest that the measured economy has more of an impact on the unmeasured economy, and there is little by way of causation from the underground economy to the measured economy in Canada. Further the impact of fiscal policy is to expand the measured economy and the unmeasured economy. There is little evidence that monetary policy will have a similar effect. Because the two series are not trending together (cointegrated in the language of econometrics), this means that if there is a shock to the behaviour of producers in the measured economy, it will not produce a systematically predictable result in the unmeasured economy.

Giles et al. use values of the underground economy of 3.5% of GDP in 1976 and 16% in 1995, and they have data for each year.

The paper stresses that normally it is important to ensure that the two series being tested for a causal relationship must be of the same “order”. That is, if one series has no trend and the other series has a trend, then even if a relationship is discovered, it is statistically meaningless because the series is not “cointegrated”. Both tested series must have comparable trends (or absence of trends.) These can be identified, and should be identified, before the estimation takes place so that the “order” of the series is comparable. However, using new technology that permits inference in the presence of non-cointegrated relationships, Giles et al. find that they can identify casual behaviour.

4.6 A Summary of Recent Estimates for Canada

Table 23 Underground Economy Estimates for **Canada**

Canada					
Average over	1970-75	1976-80	1981-85	1986-90	1990-95
Household Surveys			1.3	1.4	
Tax Audit			2.9		
National Accounts Discrepancy Between Income and Expenditure			3.25*		2.7*
Physical input Co-variation				11.2	
Currency Demand	5.1	6.3	8.8	12	
Cash to deposit Ratio	13.8	15.9	11.2	18.4	
Transactions		26.5	15.4	21.2	
MIMIC		8.7			

5.0 Part V: Reflections

There have been many estimates of the size of the underground economy in the past few sections. This section recapitulates certain themes developed in earlier sections and highlights two issues not directly dealt with in the national estimates.

5.1 Economic Transactions are not the same thing as GDP

The amount of economic activity is not precisely the same thing as GDP or GDP per capita although frequently it is used this way as shorthand. This is useful to remember because many transactions take place that are not part of the GDP and yet may generate activity which is part of the underground economy. GDP refers to *final* transactions, not all transactions.

For example, sales of previously sold goods are not counted in the calculation of the GDP. Recall that the GDP measures the final value of goods and services *produced in the current year*. *Only the mark-up that measures the value of the activity of selling the good, not the value of the good appears in the GDP*. This is the only current productive activity embodied in the transaction. Consequently sales of used cars, previously sold houses, previously sold painting and the like do not appear in the measure of GDP. If the sale is private, there is little likelihood of any facet of the sale being found in the GDP.

Similarly, the GDP measures the *market* value of good and services produced. Many activities do not have a market value even though all agree that they are valuable and important. Volunteer work and household work are not estimated or accounted for in the GDP. Although some imputations are made for activities that are easily compared to market transactions – the value of owner-occupied housing being the most important – no such imputation is provided for a wide range of other difficult to measure services.

From the point of view of law enforcement, the missing data from the national income accounts is an interesting exercise. It is not, however, all that relevant to the size of the law enforcement problem. The primary purpose of Statistics Canada's exercise is to calculate how much should be added to the national accounts due to the underground economy. The national income accounts measure the value of final transactions in the production of current goods and services in the Canadian economy during a year. Illegal transactions may be "intermediate" in nature. They may occur at many stages of the production process. They may also occur in the transactions of assets or goods that were produced in previous years.

For example, if the resale of most old goods is unreported, since there is a minimum of new economic activity taking place through the mark-ups that would be counted in the GDP, there can be as much extortion, theft, bribery and the like associated with these

goods without many national income accounting issues being triggered. Yet we may still wish to calculate the cost of the transactions associated with the used goods. Similarly, the illegal transfers of income – theft -- are very important to law enforcement, yet transfers regardless of size involve no new production and are excluded from the GDP.

If a victim is hit on the head and \$100 stolen, this is a transfer and does not enter into the national income accounts directly. The *indirect* way in which crime enters into the accounts is through the current expenditures we make on the police, courts, new security systems, and current medical expenses.

The question that the Statistics Canada document *The Size of the Underground Economy in Canada* examines is something like: Were all final transactions appropriately recorded, what would be the size of the GDP and its constituent parts? These are important and useful questions, but they do not answer the question: How much illegal activity is there in Canada? Although the Statistics Canada measure provides an upper bound to the underground economy in terms of its impact on the current national income accounts, it actually serves as a crude kind of *lower bound* on all illegal activity. That is, it does not record transactions that do not affect the GDP.

5.2 Organized Crime

This review does not touch on the issue of organized crime. Although organized crime may be a significant contributor to the underground economy, there are other conceptual issues that make it a topic unto itself. Two are particularly pressing. First, how does one count the activities that are perfectly legal but controlled by criminals? Refuse collection, laundries and the like are legal and counted in the GDP, but the proceeds are returned to both the legitimate employee and, in some cases, the criminal owner. Are they part of the “underground” economy? Some aspect of their enterprise may be, but it is not an activity *per se* of the underground economy. Second, how do we wish to deal with the enterprises that manipulate the wealth of crime? We do not mean simply the laundering of funds, as that is, in principle, a part of the underground economy as it provides a current service, but what count is there of the accumulated proceeds of past criminal activities? Is there an “empire” of illegal funds, and how should it be treated vis-à-vis the wealth and resources of the rest of society? Clearly there is much to be said about this topic, but it is not reviewed in our analysis.

5.3 Capital Flows

The hope that some check can be made on the flow of funds from criminal elements by using the national accounts measure of capital flows is impractical at present. Capital flows are huge. Even the most pessimistically (large) estimate of the underground economy and the size of organized crime is unlikely to provide a measurable impact on capital flows that is somehow distinct from other transactions. There is little professional literature on this topic. Law enforcement may have insights into practical manipulation of funds across borders, but the literature does not indicate a consensus that statistical

techniques that can tease out the relationships between the underground economy and capital flows at the national level.

Two efforts to do so, however, are provided by the International Monetary Fund's Working Paper series. Tanzi (1996) argues that money laundering (from production in the underground economy and from transfers such as extortion and theft) may be as much as \$300-\$500 billion per year. The funds tend to flow to jurisdictions that have the least effective regulation. Tanzi argues that this "dirty" money causes policy makers to observe economic signals – exchange rate pressure, interest rates and asset prices -- that are contaminated by these flows. Quirk (1996) develops a framework of macroeconomic analysis that identifies a shift from currency to non-currency money laundering in the 1990s. He suggests that money laundering is a significant determinant in affecting national monetary policy. He also finds evidence that economic growth is hindered by crime among a cross section of countries.

This evidence is interesting but not compelling. Although it deserves more attention than it has received in the literature thus far, there are two "facts" that need to be explained to put the arguments in context. First, although \$300-\$500 billion is a lot of money, in 1995 there was \$1,200 billion *per day* changing hands in nine (major) money markets of the world (Caves, Frankel and Jones, 1999).²³ Consequently, injections of \$500 billion *per year* into the volume of world international transactions constitute approximately *one-tenth of one percent of all transactions*: 0.001 of all transactions. To be fair, the money turns over more than once, but the task of distinguishing money flowing from the underground economy from the 99.9% of the rest of the cataract is a daunting task. It is particularly true if we are interested in developed economies such as Canada where the proportion of transactions is high relative to financially less developed economies. Although in its infancy, this is a literature that deserves to be developed as we better understand the volume of money emitted and processed by the underground economy.

5.4 Summing Up

The estimates of the underground economy are varied along three important dimensions: technique, location and date. We have not made much of the dates at which time the estimates have been made because the focus in this report is on the kinds of techniques and their ramifications for the size of the "for profit" underground economy. In other words, we have not addressed the substantive question as to the growth and size of the underground economy. We have reported estimates to understand the implications of the techniques for assessing the relative size of what it is that is being estimated as "underground".

The table in the Appendix gives the final overview. It is a stark reminder that the number of estimates is growing. Whether there is consensus or chaos is a reasonable question. What is clear, however, is that there will be more estimates. The topic is too important to be ignored. How we learn to discriminate the better estimates from the poorer estimates

²³ These include New York, London, Tokyo, Zurich, Frankfurt, Paris, Singapore, Hong Kong, and Australia (Caves, Frankel and Jones, 414-415.)

will have to be the next frontier for analysis. At the present time there is no litmus test for precision. Some estimate “testing” is desperately needed.

Appendix

Table A1: The Size of the Underground Economy: A Summary of Methods for Five Countries

The Size of the Underground Economy: A Summary of Methods for Five Countries										
	Average over	Household Surveys	Tax Audit	National Accounts Discrepancy Between Income and Expenditure	Difference Between Official and Actual Employment	Physical input Co-variation	Currency Demand	Cash to deposit Ratio	Trans-actions	MIMIC
Canada	1970-75						5.1	13.8		
	1976-80						6.3	15.9	26.5	8.7
	1981-85	1.3	2.9	3.25*			8.8	11.2	15.4	
	1986-90	1.4				11.2	12	18.4	21.2	
	1990-95			2.7*						
Germany	1960-69			16.7						
	1970-75	3.6		11	23		4.5		17.2	5.8
	1976-80			10.2	38.5		7.8		22.3	6.1
	1981-85			13.4	34		9.2		29.3	8.2
	1986-90					14.5	11.3		31.4	
	1991-97						14.7			
Great Britain	1970-75	1.5		2.5			4.3	14	17.2	
	1976-80	2.7		3.6			7.9	7.2	12.6	8
	1981-85			4.2			8.5	6.2	15.9	
	1986-90					13.2	9.7			
Italy	1970-75		3	3.2			11.3	23.4	19.5	
	1976-80		3.9	4.3	18.4		13.2	27.2	26.4	10.5
	1981-85						17.5	29.3	34.3	
	1986-90		10	9.3		19.3	21.3			
	1991-97						27.3			
United States	1970-75	3.7	4.9	3.2			3.5	8.8	17.3	
	1976-80	4.5	6.3	4.9			4.6	11.2	24.9	8.2
	1981-85	5.6	8.2	6.1		7.8	5.3	14.6	21.2	
	1986-92	8.1	10	10.2		9.9	6.2		19.4	
Sweden	1965-69	1.0								
	1970-75			5.3						
	1976-80		3.4	5.3			7.5	10		
	1981-85									
	1986-97						19.8			

Source: Table 8 in Schneider (1999), and author's tabulations
 * More extensive estimation process than other comparisons.

Table A2: Physical Input Method

Physical Input Method, 1989-1990 (as a % of GDP)			
OECD		Former Soviet Union	
Australia	15.3	Azerbaijan	21.9
Austria	15.5	Belarus	15.4
Belgium	19.8	Estonia	19.7
Canada	11.7	Georgia	24.9
Denmark	16.9	Kazakhstan	15
Finland	13.3	Kyrgyzstan	13.9
France	12.3	Latvia	15.6
Germany	14.6	Lithuania	15.2
Greece	13.1	Moldavia	18.1
Ireland	21.8	Russia	14.7
Italy	20.6	Ukraine	16.3
Japan	19.6	Uzbekistan	12.7
Netherlands	13.2		
New Zealand	13.4	South America	
Portugal	9.3	Brazil	29
Spain	16.8	Chile	37
Sweden	22.9	Colombia	25
Switzerland	11	CostaRica	34
United Kingdom	10.2	Guatemala	61
United States	10.5	Mexico	49
		Panama	40
Asia		Paraguay	27
Cyprus	21	Peru	44
Hong Kong	13	Uruguay	35.2
Israel	29	Venezuela	30
Malaysia	39		
Philippines	50	Eastern Europe	
Singapore	13	Bulgaria	25.1
South Korea	38	Croatia	22.8
Sri Lanka	40	Czech Republic	14.7
Thailand	71	Hungary	26.3
		Poland	22.5
Africa		Romania	19.5

Botswana	27	Slovakia	15
Egypt	68	Slovenia	26.8
Mauritius	20		
Morocco	39		
Nigeria	76		
Tunisia	45		

Sources: Schneider (1999)

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