

What Produces a Hidden Economy? An International Cross Section Analysis.*

BRUNO S. FREY

HANNELORE WECK

*University of Zurich
Zurich, Switzerland*

I. Introduction

Recently, the hidden or underground economy has received rapidly increasing attention by economists. The phenomenon has been discussed for a long time by politicians and the public in mediterranean countries such as Italy (where it is known as "lavoro nero"), and in developing countries. It is, however, quite new for it to be seriously studied by professional economists. Gutmann's estimate [14] that the hidden economy currently comprises at least 10% of officially measured GNP in the United States has received wide attention in the press and in Congressional committees. Feige [8] comes up with a corresponding figure of 33% (!) of GNP for 1978 and has more recently lowered it to 27% of official GNP for the same year [9]. These two authors, as well as many others, point to the "revolutionary consequences" [15; 16] of the existence of a hidden economy of such size. In particular, the official statistics provide mistaken signals to the public decision-makers: they are led to think that there is wide-spread unemployment because of the official unemployment statistics, while in fact a considerable amount of those "unemployed" do indeed work. Similarly, there may be an underestimate of the rate of growth in income, and an overestimate of the rate of inflation. The importance of the untaxed hidden economy for public revenues is obvious. The official measures leaving out (or considering only in part) the hidden economy, may also lead to systematically biased estimates of econometric models at the micro and macro level.

The present study pursues three purposes. The *first* is to identify *problem areas* of future economic policy both with respect to the *causes* producing, and the *countries* being affected by, a hidden economy. It turns out that in several countries the problems created by a rising hidden economy are expected to be so significant that policy makers are well advised to direct their attention to the subject.

The *second* purpose of this study is to provide a background with which the results

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obtained by using—quite different—methodologies may be compared. According to the present study, the alarming figures for the size, and increase, of the underground economy provided by authors such as Gutmann and Feige for the United States do not seem to be convincing. Feige's measured huge increase of 91% between 1976-78 [8,10] is from that point of view less acceptable than e.g. Tanzi's estimate [31] of an increase of 3.4—5.1 percentage points of GNP between 1929 and 1976.

The *third* purpose of this study is to guide future research into relevant directions. Those determinants identified to be important according to our methodology can serve as candidates for inclusion into the analysis undertaken by other methodologies. This opens the way to a measurement better based in theory, taking account of broader aspects.

II. Existing Research and Approach Used

Economic research has concentrated on measuring the *size* of the hidden economy. Various direct and indirect methods have been used to locate the traces of a sector which at first sight seems to be "unmeasurable." The estimates provided are of unequal quality and differ widely. The wide range is the result of using different methodologies, which focus on different aspects and parts of the hidden economy.¹

Compared to the mere estimation of the size of the hidden economy, little emphasis is placed on analysing the *causes* leading to the existence and growth of an underground sector. Most authors simply state that the main reason for its existence is the burden of taxation, and some also mention the burden imposed by government restrictions. Some of the most advanced studies [9; 20; 25; 31] seek to estimate econometrically the impact of changes in the tax rate on the traces the hidden economy leaves in the monetary sphere, in particular on the use of currency. It turns out that the tax burden is unlikely to be the *single*, decisive cause inducing people to become active in the hidden economy.²

Analyzing intensively the *causes* leading to a hidden economy is required on two major grounds: (a) The behavioral aspect or incentives of why and how individuals are induced to take up irregular activities must be the core element of any measurement based on (economic) *theory*; (b) For policy purposes, it is not sufficient to know the hidden economy's size, but in order to *influence* its future development, one must know what factors determine it.

This paper develops an alternative approach to the existing ones, concentrating on the factors which may be expected to have caused, and will in the future cause, an *increase* in the hidden economy. For this purpose, the likely determinants in the 17 OECD countries over the period 1960 - 78 are subjected to a sensitivity analysis. This allows identification of the determinants likely to be crucial, and to rank the countries according to the amount of *pressure* for an increase of the hidden economy policy-makers have to

1. The hidden economy is defined differently by the various authors but there is a growing consensus [18; 23; 31] that it is part of the economy which "escapes the purview of our current societal measurement apparatus" [9,3], and that its activity should be measured in terms of GNP (as compared to turnover). For a survey and critique of the studies currently available see O'Higgins [26] and Frey and Pommerehne [10].

2. Klovland [20], for example estimates for Norway and the period 1910-78, that an increase in the tax rate does not (as theoretically expected) increase the currency-demand deposit ratio—which, according to Cagan [3] and later Gutmann [14], is taken to be positively related to the size of the hidden economy—in a positive, but rather in a statistically significant negative direction. Feige [9] finds that his yearly estimate of the hidden economy's size is negatively related to the tax rate and that there must be additional factors relevant.

expect. It turns out that in Sweden, Norway and the Netherlands there are (compared to the other countries) strong forces pushing for an increase in underground activities, while these pressures are only weak in the case of the United States, Canada, France and Italy.

Part III of this paper theoretically identifies eight likely determinants of the hidden economy. In parts IV and V the effect of the different rankings of the countries relative to each determinant and the weighting of the determinants is discussed. In part VI the expected pressures the various countries will be subjected to are derived, and part VII offers concluding remarks.

III. Determinants of the Hidden Economy.

The decision of individuals whether, and to what extent, to work in the hidden sector, may be analyzed by the economic model of behavior, differentiating between preferences and constraints, or the effect of the relative prices (costs). The *preference* of working in the regular, rather than irregular, sector is given by "tax morality" which captures all those factors relating to the basic allegiance to the community an individual lives in. Three sets of changes in *relative costs* and *benefits* may be distinguished:

- (a) The increasing cost of working in the official sector, composed of the rising burden of taxation (both direct and indirect³), of social security contributions and of government imposed restrictions (as to who is allowed to work and how the work may be performed).
- (b) The falling costs of working in the hidden economy due to increasing disposable time. A decreasing participation rate and lower official working hours, and a higher rate of unemployment provide additional opportunities to become active in the hidden economy.
- (c) The increasing costs of hidden sector activity due to the expected punishment imposed by government.

The size of the hidden economy does not only depend on the demand for, but also the supply of, jobs in that sector, i.e., one must consider a market for hidden economy labor. Firms will have an incentive to switch jobs to the underground economy if their activity in the official sector is increasingly taxed (including social security contributions), and—possibly even more—if they are increasingly restricted by government regulations concerning jobs. Another determinant of underground job offers is the punishment the firms (or private households) have to expect if they are caught. In many countries, this punishment is higher for the firms offering employment, than the people working in the underground. Thus, the same determinants are active on the demand and supply sides of the hidden labor market.

As our approach endeavors to isolate the factors tending to *increase* the pressure for the formation and growth of the hidden economy, it is necessary to know empirically the *changes* in the determinants mentioned over time, in our case for 17 OECD-countries from 1960 to 1978. While there are some roughly comparable figures of relative tax

3. It is important to note that the incentive of tax evasion may not only depend on the size of marginal income taxes, but also on the taxes on goods and services. In the latter case, the suppliers and demanders have a joint and simultaneous incentive of evading taxes by transacting business in the hidden economy.

morality between countries at a point in time⁴, and for selected countries over time⁵, the comparative development of tax morality between countries over time is not known. The same is true for expected punishment of working illegally. This leaves five determinants for which reasonably comparable data over countries and time are available.

The burden of taxation is measured as the share of direct and indirect taxes and social security contributions to GDP. The increase in tax burden refers to the increase in percentage points over the period 1960 to 1978. As an approximation to the burden of regulation we use—as no direct measurement is available—the rate and the unemployment rate are relative to the population and the total labor force, respectively. We use a ten-year average of the unemployment rate in order to eliminate short-term fluctuations. Weekly hours of work in manufacturing industries are taken as measure of working time. The data used and their sources are given in the Appendix.

The approach used proceeds in the “opposite” direction from that used in multiple regression analysis. There, the parameters α_i are estimated by regressing the determinants ΔX_i on the dependent variable ΔY

$$\Delta Y = \sum_{i=1}^n \alpha_i \cdot \Delta X_i + \epsilon_i. \quad (1)$$

In the case of the problem here treated, the variable ΔY — the increase in the size of the hidden economy—is unknown, and therefore assumptions about the weights α_i must be made based on outside observations. This procedure may seem to be rather unsophisticated. However, as has been shown in experiments undertaken by psychologists, using a linear model gives clearly superior forecasts compared to the “clinical” method in which people—including experts—make a prediction on the basis of the knowledge gained without an explicit model. This result holds irrespective of whether the weights used in the linear model are chosen on the basis of intuitive judgement, equally (“unit weighting”) or randomly.⁶ Applied to the situation here considered this means that choosing the weights of the linear model (1) after identifying the likely determinants of the hidden economy is a better predictor of the hidden economy’s size than an “estimate” based on pure specula-

4. See Schmoelders [28], Struempel [30] and Tretter [32] for some European countries.

5. The empirical studies of tax morality existing—e.g., Vogel [33] for Sweden, Lewis [21] for the United Kingdom and Herschel [16] for developing countries—relate to one, or at best, two points in time. Indirect evidence of changes of individuals’ relationship to government may be deduced from regular Gallup polls inquiring about the reaction to statements such as “government wastes a lot of money” or “I trust government always or most the time” [4, 114-18].

6. A typical situation experimented with is the choice of applicants to graduate school. A forecast based on a personal interview by the members of the application committee is consistently worse than a forecast on the basis of a linear model composed of the determinants of success in graduate school, irrespective of whether these determinants are weighted by intuition, equally or randomly; see Dawes and Corrigan [6], Einhorn and Hogarth [7], and Wainer [34]. These authors show that in certain circumstances unit regression weights have greater accuracy than least squares weights.

tion⁷, on guesstimates or on dubious relationships without any fully spelled out and definite connection with the hidden economy⁸. The procedure suggested to evaluate the (relative) increase in size of the unobserved sector, while simple, thus need not be worse than a more sophisticated method which necessarily has to be based on an indirect approach, i.e., has to estimate the *traces* left elsewhere by the hidden economy. So far, none of the current approaches mentioned above has been able, nor seriously attempted, to produce a tight theoretical argument of how exactly the size of the traces is connected with the size of the hidden economy.

Nevertheless, we are faced with a problem every single-equation model (including multiple regression) is subject to. The variables ΔX_i put on the right-hand side of equation (1) must be determinants, i.e., must *cause* the variable to be explained, ΔY . It is, however, well possible that the increase of the shadow economy ΔY influences in return some or all of the variables ΔX_i . The tax rate, for example, may be increased by public decision-makers in response to an increase in the hidden economy, because taxable income in the official economy has decreased due to this switch of economic activity. In order to take into account this "reverse causation" and to evaluate its likely importance, a full-scale model of the interaction of the official economy, the public sector (government), and the hidden economy would be required. Such a model does not yet exist. Our study, in company with all the other approaches, thus assumes that the variables identified as determinants do indeed have a causal effect on the size of the hidden economy, and that the reverse effects are small and may be disregarded.

The countries' relative rankings of the expected increase in the size of the hidden economy (ΔY) thus depend on two independent influences:

- (i) the differences in the countries' ranking with respect to the various determinants ΔX_i (see section IV);
- (ii) the weights α_i assumed (see section V).

IV. Identifying the Crucial Rankings

If the countries' rankings with respect to two determinants are the same, the second ranking does not contain any additional information with respect to the hidden economy's size. On the other hand, a determinant's ranking which differs much from the other determinant's rankings has *ceteris paribus* a large influence on the countries' ranking with respect to the hidden sector's increase in size (ΔY). In order to test this influence, the (rank) correlation between each determinant ΔX_i and a benchmark ranking is chosen. For

7. As e.g., de Grazia reporting German's hidden economy to be 2% of GNP [13], or Intersocial that it is 1% of GNP in Japan [17].

8. E.g., the "large dominations approach" which tries to estimate the size of the hidden economy by looking at the use of large banknotes—see Ross [27] for the U.S.—or, at least to some extent, the other approaches which measure developments in the monetary sphere without showing explicitly the causal connection between the use of money (or currency) and the hidden economy, nor defining (even approximately) *what* is being measured (e.g., turnover or GNP created).

this purpose, each determinant is normalized⁹ and weighted equally¹⁰. The smallest (rank) correlation with this benchmark ranking is with respect to the changes in the (official) rate of unemployment ($r = 0.09$), followed by the changes in the (official) rate of participation ($r = 0.21$). *Ceteris paribus*, i.e., with equal weights, these two determinants have the strongest impact on the countries' ranking with respect to the hidden sector's increase in size. Faced with incomplete information, policy makers should devote strongest attention to these two factors when they intend to influence the pressure towards an increasing underground economy. On the other hand, the countries' ranking with respect to changes in the (official) working hours ($r = 0.81$), the changes in the tax burden ($r = 0.73$), and the changes in the burden of regulation ($r = 0.72$), have *ceteris paribus* little influence on the ranking with respect to the hidden economy's expected increase. They should not be the policy makers' central—or only—consideration when they want to affect the underground economy's development.

V. Weighting the Determinants

In the absence of any direct information on how strongly the five determinants distinguished contribute to the pressure for an increasing underground economy, the weights are assumed on the basis of acknowledged procedures in the presence of uncertainty and of what has been informally conveyed by the literature. This corresponds to the procedure used in "soft modelling" [19]. Eight sets of weights are employed (see table I) which allow to analyse the *sensitivity* of the countries' rankings with respect to the expected increase in the hidden economy.

The first two weighting schemes assume that nothing is known and that therefore the determinants can be weighted equally. Weights (a) attribute 20% to each of the five determinants, while weights (b) split the determinants in two parts: 50% is attributed to the increasing burden of working in the official economy, the increase in the tax share and in regulations receiving a weight of 25% each. The other 50% of the weights are equally divided between the opportunities provided by the labor market, the changes in the official participation rate, unemployment and working hours receiving a weight of $16\frac{2}{3}$ % each. The other six weighting schemes stress those factors considered important by the various authors. Weight (c) emphasizes the two factors most often mentioned in the literature, the increasing burden of taxation¹¹ and the decrease in labor force participation¹² (to 30% and 25%, respectively). In the case (d) the major stress is put on the increase in taxation. Weights (e) through (h) attribute each a weight of 35% to the determinants not relating to taxation¹³, in each case leaving a high combined weight of the burdens of taxation and regulation (45-55%) because these determinants are considered to be of particular importance by virtually all of the authors dealing with the subject.

9. ΔX_i is normalized to $\Delta z_i = (\Delta X_i - \Delta \bar{X}_i) / \sigma_i$, where \bar{X}_i is the mean and σ_i the standard deviation of determinant i .

10. Following La Place's rule of "insufficient reason", see Luce and Raiffa [22].

11. Following authors such as Feige [8; 9], Gutmann [15], Klovland [20], Martino [24], Tanzi [31].

12. Following authors such as Alessandrini [1], Contini [5], de Grazia [13], Fuà [12], Frey [11], Isachsen, Klovland and Strøm [18].

13. See e.g., Bulletin de la Banque de Paris et des Pays-Bas [2], Intersocial [17], Schmoelders [29].

Table I. Weighting Schemes of the Determinants (in percent)

	Determinants				
	Increase in burden imposed		Increase in labor market opportunities		
	Δ tax share	Δ regu- lation	Δ participa- tion rate	Δ unem- ployment	Δ working hours
Equal weighting					
a. of each determinant	20	20	20	20	20
b. between increase in burden and increase in labor market opportunities	25	25	$16\frac{2}{3}$	$16\frac{2}{3}$	$16\frac{2}{3}$
Stressing particular determinants					
c. Δ taxation Δ participation	30	15	25	15	15
d. Δ taxation	50	15	15	10	10
e. Δ regulation	20	35	25	10	10
f. Δ participation	30	15	35	10	10
g. Δ unemployment	30	15	10	35	10
h. Δ working hours	30	15	10	10	35

VI. Identifying the Relative Pressures for an Increasing Hidden Economy

Table II shows the mean and median rank, as well as the average absolute deviation in rank, of each of the 17 OECD countries (1960-78) as the result of weighting the normalized determinants (based on the data given in the appendix) with the set of weights (a) to (h) discussed in the last section.

The Scandinavian countries (including Denmark) are on top of the mean and median ranking suggesting that the various determinants exert a *strong pressure* for an increase in the hidden economy. In each of these countries, the main push comes from the large increase in taxation and regulations and the drop in official working hours. The BENELUX countries also rank high, especially the Netherlands, in both cases again due to large tax increases and falling official working hours, but contrary to the Scandinavian countries, the increase in regulation does not exert any strong pressure. The analysis also suggests that a strongly increasing hidden economy is to be expected in Austria and Ireland indicated by a strongly falling official participation rate, and in the case of Austria, decreasing official working hours.

According to Table II, a comparatively *weak pressure* on increasing the hidden

Table II. Mean and Median Ranking and Deviation of Countries Relative to the Pressure for an Increase in the Hidden Economy. 17 OECD Countries, 1960-78.

Country	Ranking		Mean absolute deviation in rank
	Mean	Median	
Sweden	17.0	17	0.00
Norway	15.1	16	1.33
Netherlands } Denmark }	13.8	14	0.85
Finland } Austria }		14	1.50
	12.6	12.5	1.63
		13	1.68
Ireland	11.4	11.5	1.38
Belgium	9.9	9.5	1.38
U.K.	9.5	9	1.23
Spain	9.3	8	1.33
F.R.G. } Switzerland }	5.6	6	1.33
		5	1.03
Italy	4.9	5	1.16
Japan	4.8	3.5	1.45
France	3.3	3	0.58
Canada	2.4	2	0.98
U.S.A.	1.5	1	0.63

economy's size is expected in the United States and Canada which rank low with respect to all determinants except the increase in the unemployment rate. Rather surprisingly, in Italy and France no strong upward push on the underground economy is expected; these countries rank low with all determinants but some pressure is likely to arise due to the falling participation rate and increasing regulation (in Italy only).

An *intermediate* position with respect to the pressure for a larger hidden economy is found for the United Kingdom, Spain, Switzerland and Germany.

The categorization according to expected upward push is, however, only part of the picture. A country may be associated with one or another group only if its relative position is not very sensitive to small variations in weights. The average absolute deviation from the mean rank shows how strongly a country's relative position is affected by the varying weight structure (a) to (h). Using as cut-off point a deviation not exceeding 1.33 ranks, the position of the Scandinavian countries Sweden and Norway, of the Mediterranean countries Spain, Italy and France, of the central European countries Netherlands, Switzerland and Germany (F.R.), and of the Anglo-Saxon countries United States, Canada and United Kingdom is *stable*. On the other hand, the ranking of Austria, Finland and Denmark depends strongly on the particular weighting used (mean deviation larger than 1.50). For these countries, it is not advisable to attach too much importance to the "mean" upward push identified because it may well be that in a particular country one of the determinants inducing a strong upward pressure is of great importance. For Austria, e.g., one would have to expect a strong increase in the hidden economy provided the falling participation

rate and official work hours are particularly important, while one would have to expect a low increase, if the fall in unemployment is a crucial determinant.

VII. Concluding Remarks

This paper has endeavoured to identify those factors which are expected to increase the size of the hidden economy, to analyze which of the determinants are likely to be most important (sensitivity analysis), and to rank the countries relative to each other with respect to the extent of pressure which is likely to arise for an increase in the hidden economy. The analysis suggests that Sweden, Norway and the Netherlands have in the present, and will have in the future, considerable problems to face due to an increasing size of the underground economy. In the United Kingdom, Spain, Switzerland and Germany the problems created by a rising hidden economy are expected to be significant, while in the United States, Canada, France and Italy the problems created by the underground economy will in comparison not be of much more importance than in the past. Two determinants of the size of the hidden economy have to be left out of account because no data are available: it is an important topic for future research to collect the missing data on changes in tax morality and on the extent of controls of the underground economy imposed by the public authorities.

Appendix. Determinants of the Level and the Increase in Size of the Hidden Economy. 17 OECD Countries, 1960, 1970 and 1978.

Country	Burden of taxation		Burden of regulation		Participation rate		Unemployment rate		Working hours		Tax immorality
	Direct and indirect taxes and social security contributions as % of GDP		Employment in public sector (excl. public enterprises) as % of total labor force		Total labor force as % of total population		Unemployed persons as % of the total labor force (ten-year average)		Weekly hours of work in manufacturing industries		Index
	%	%	%	%	%	%	%	%	hours	hours	Index
	1960	1978	1960	1978	1960	1978	1960	1978	1960	1978	
A	30.3	36.6	10.5	17.9	51	41	3.2 ^g	1.5	43.1 ^l	33.4	9.0
B	26.3	42.6	11.8	15.8	39	41	3.9	3.7	41.4 ^b	35.2	11.6
CA	24.0	30.2	15.9 ^b	18.3	36	47	4.5	6.3	40.4 ^l	38.8 ^l	6.3
DK	25.3	42.0	9.9	22.8 ^a	48 ^e	51	4.0 ^h	2.8	40.2 ^c	33.0	3.6
SF	27.8	36.3	7.9	16.9	49	48	1.2	3.3	44.4	38.5	3.6
F	33.4	38.4	12.1	13.6	42	42	3.8 ⁱ	3.4	45.5	41.0	14.3
FRG	33.2	39.8	7.9	13.9	48	44	5.7 ^g	3.1	45.6 ^l	41.6	9.0
IRL	22.2	35.7 ^a	9.1 ^b	15.3 ^a	41 ^f	35	7.4 ^g	7.0	45.4	42.4	6.3
I	27.1	32.9	7.8	13.2	42	39	7.0 ⁱ	6.1	43.7 ^m	41.5 ^m	17.0
JAP	18.7	22.6	6.7	6.3	49 ^f	48	1.5 ^j	1.8	47.8	40.6	6.3
NL	30.2	47.0	11.6	13.9	38	36	1.9	3.0	48.8	41.1	9.0
N	32.1	48.9	12.5 ^c	20.1	42	46	1.0	1.5	41.7 ⁿ	30.1 ⁿ	3.6
SP	16.5	22.6 ^a	6.9 ^d	11.3	41	36	0.9 ^h	3.7	43.5	41.6 ^p	11.6
S	28.6	53.0	12.6	28.2	49	51	1.8 ^k	2.0	37.9 ^{l,o}	30.0 ^{a,o}	3.6
CH	20.5	31.0	6.3	10.1	43	45 ^a	0.2 ^k	0.2	46.1	44.4 ^l	1.0
UK	27.6	34.7	14.7	20.1	48	47	1.2	3.4	47.4	41.9 ⁿ	3.6
USA	27.5	31.1	14.9	15.7	40	47	4.4	5.8	39.7 ^l	40.4 ^l	6.3

a. 1977 b. 1961 c. 1962 d. 1964 e. 1955 f. 1959 g. \bar{O} (1951,1956-60) h. \bar{O} (1956-60)

i. \bar{O} (1965-60) j. \bar{O} (1953-60) k. 1960 l. Hours paid for m. Calculated from hours per day

n. Calculated from hours for men and women o. 1976

Sources: Burden of taxation : OECD, *National Accounts Statistics*, Paris, various years.

Burden of Regulation : Martin, John P. "Public Sector Employment Trends in Western Industrialized Economies." in *Public Finance and Public Employment*, edited by Robert H. Haveman, Detroit: Wayne State University Press, 1982, 29-46; and OECD, *Labor Force Statistics*, Paris, various years.

Participation rate : OECD, *Labor Force Statistics*, Paris, various years and OECD, *Manpower Statistics*, Paris, various years.

Unemployment rate : OECD, *Labor Force Statistics*, Paris, various years and OECD, *Manpower statistics*, Paris, various years.

Working hours : ILO, *Yearbook of Labor Statistics*, Geneva, various years.

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