T he Importance of the Underground Economy in Greece

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I. Introduction

The growing interest on underground economy in capitalist economies goes hand in hand with the recent enrichment of the literature concerning it. Despite the fact that different studies have given it different definitions,[1] identified different causes[2] and used different estimation methods,[3] a few conclusion can be derived regarding this form of economic activity.

- The underground economy is the economic activity whose result is not included in national income[4]
- in spite of the large number and diversity of the causes leading to the existence of the underground economy or encouraging it, the main factors are, most probably, heavy taxation, on one hand[5] and government intervention in the economy on the other[6]
- to identify the factors encouraging underground economic activity,[7] the structure and characteristics of each economy have to be taken into account. Despite the fact that, generally, attitudes towards the underground economy are negative[8] there seems to be a slight shift in the literature in question[9]. This changing attitude towards the underground economy stems from the development of the prevailing theoretical views. This rising importance of supply economics and all that goes with it, stresses the importance of efficiency and competitiveness on the international level rather than the problems of tax evasion which are related to the underground economy.[10]

The aim of this article is to highlight the characteristics of the underground economy in Greece and to specify a model taking these characteristics into account.[11] The study also briefly discusses the positive and negative aspects of underground economic activity, considering the actual possibilities and weaknesses of the Greek economy.

II. The Model

The obvious difficulty in specifying a model relating to the underground economy is primarily associated with the definition of the dependent variable which should, naturally, represent it. All previous models[12] are based on the attempt to estimate, directly or indirectly, the difference between the officially declared GDP and the real GDP, the latter being greater than the former. The methods chosen by various researchers in order to measure the underground economy, are more or less dependent on the characteristics of each economy; this may also be the reason why the application of these methods to different economies is rarely successful.[13].

The choice of the dependent variable in the following model was made with reference to the Greek economy. It consists of the difference between the official value of α in the Cobb-Douglas function and that which would have ensured internationally acceptable standards (i.e. α=0.75 approximately). We call this variable UEA (Underground Economic Activity).

The dependent variable UEA represents a difference between the officially declared revenue and the real revenue. It does not resemble the measures of underground economic activity used in other studies,[14] but it nevertheless is within the same school of thought.[15]

The Size of the Underground Economy

Using UEA, computed as described above, we can make tentative estimates of underground economic activity in Greece. It is shown in Table 1, that UEA constituted 4.5% of the civilian GDP in 1970 and 25% in 1985.

It, therefore, represents a value of little importance up to 1976 which, however, rises steeply since. On the basis of the data and calculations included in Table I, the civilian GDP of the Greek economy was 11% greater than the one officially declared on average during the period in question, by 15% greater on average during the period 1977-85 and by 22% greater on average during the last four years. If underground activity is included, productivity per person employed would be about 14% greater on average during the period 1970-85, than the official one.

Disposable income represented on average 84% of the official GDP during the period 1970-85. The average propensity to consume, on the other hand, is equal to 67% of the official GDP during the period in question. If we, now, attempt to re-estimate the average propensity to consume in the civilian GDP including the underground economy, this would be 28% higher than the official average propensity to consume, over the whole period.[16]

Table 1. The Underground economy as % in the civilian GDP

	(1) GDP Current Prices (million drchs)	(2) Agricultural GDP	(3) (1) - (2)	(4) UEA	(5) (4)/(3)
1970	258000	47058	210942	9498	4.50
1971	287422	52334	235088	5386	2.29
1972	329977	61467	268510	7477	2.78
1973	428216	87311	340905	0	0
1974	507328	100365	406963	11007	2.70
1975	593181	110971	482210	0	0
1976	728735	136204	599253	15166	2.55
1977	844628	141543	703085	88329	12.56
1978	1016709	177074	839635	168596	20.07
1979	1245187	198166	1047021	129157	12.33
1980	1523724	270058	1253666	137295	10.95
1981	1856745	329285	1527460	191009	12.50
1982	2288314	424415	1863899	363284	19.49
1983	2706100	462769	2243331	468783	20.89
1984	3317770	593421	2724349	627980	23.05
1985	4025537	700237	3325300	829819	24.95

Sources: (1) The Greek Economy in Figures; (2) OECD, Economic Surveys, Greece; (3) EUROSTAT; (4) Physical persons' declarations for taxation purposes.

Specification of the Model

The model which covers the period 1968-85 has the following form:

$$UEA_t = a_1 + a_2 EMPS_t + a_3 CNSG_t + a_4 MIMP_t + a_5 I NVM_{t-2} + a_6 CBF\alpha_t + U_t$$

where:

UEA = the underground economy in period t measured as the amount which should be added each year to the officially declared revenues of the independent workers in order that the value of α in the Cobb-Douglas function be equal to 0.75; this represents the dependent variable of the model;

EMPS = employment in the service sector in period t;

CNSG = public sector spending for consumption purposes in period t;

MIMP = imports of consumer's manufactured products in period t;

INVM = investment in the manufacturing sector (with a two year lag).

CBFα = the official value of α in the Cobb-Douglas function in period t^{17}

U = Error term

III. The Variables of the Model

The adoption of UEA as the dependent variable of the model requires suitable independent variables to satisfy plausible theoretical causes and effects. The variables to be included in the model are related to governmental intervention and taxation, employment in the various economic sectors of the efficiency of economic activity and the dependence of the Greek economy on imports.

Table II shows the data for the dependent and independent variables of the model. In choosing the variables we sought to satisfy two conditions namely (a) that they are theoretically plausible explanatory variables and (b) that they are consistent with economic reality in Greece.

The dependent variable UEA, which, as stated earlier is taken to represent underground economic activity, has increased by 87 times during the period considered. The very high rates after 1981 may be explained in terms of a number of factors pertaining to the Greek Economy.

Table 2. The Data

	(1) UEA	(2) EMPS	(3) CNSG	(4) MIMP	(5) INVM	(6) CBFα
1970	9498.00	1072.00	37742.0	200.700	10044.0	.795000
1971	5386.00	1103.80	39607.0	230.200	11198.0	.776000
1972	7477.00	1124.60	41851.0	271.000	13238.0	.789000
1973	0.00000	1334.60	44698.0	397.300	14457.0	.768000
1974	11007.0	1156.50	50096.0	400.300	14914.0	.780000
1975	0.00000	1178.00	56075.0	497.000	13132.0	.753000
1976	15166.0	1200.00	58953.0	569.000	13288.0	.838000
1977	88329.0	1224.00	62800.0	688.000	12599.0	.862000
1978	168596.	1253.00	65000.0	799.000	12244.0	.899000
1979	129157.	1297.00	68800.0	1016.70	13824.0	.820000
1980	137295.	1325.00	68940.0	875.000	14899.0	.821000
1981	191009.	1424.00	73640.0	883.000	13973.0	.855000
1982	363284.	1463.00	75330.0	954.000	13120.0	.906000
1983	468783.	1453.00	77400.0	883.000	12208.0	.924000
1984	627980.	1496.00	79760.0	834.000	12101.0	.958000
1985	829819.	1571.50	82000.0	954.000	11052.0	.973000

Sources: (1) OECD, Economic Surveys, Greece, EUROSTAT and physical persons' declarations for taxation purposes; (2) OECD, Economic Surveys, Greece, EUROSTAT ; (3) The Greek Economy in Figures (current prices); (4) The Greek Economy in Figures (indices); (5) The Greek Economy in Figures (constant prices); (6) Same as 1 .

The prevailing fiscal system in Greece was highly unsatisfactory. In fact, the 60% of public spending are financed from the taxes paid by the wage earner.[18] The average tax burden of the wage earners rose from 8.7% in 1973 to 11.9% in 1981 and to 15.2% in 1985. On the other hand, the contribution of merchants and entrepreneurs dropped from 41.4% in 1973 to 17% in 1985 and, finally, the contribution of liberal professions dropped from 13.2% in 1973 to 8.8% in 1985.[19] These developments which are not related to the changing relative size of wage earners to total employment, are mainly due to the governmental policy, which attempted to encourage investment without paying adequate attention to its effect on tax-evasion[20] and to undesirable distribution of income.[21]

The austerity policy followed during the last few years in Greece managed to freeze real wages although it did not succeed to control the revenues of the self employed. This may be the reason why this policy was not able to bring about a drop in the economy's propensity to consume and imports of manufactured goods.

The independent variable EMPS indicates a significant rise in employment in the services sector, not accompanied by a corresponding rise in the whole of the economy or the secondary sector. It may be hypothesised that increases in independent employment in the tertiary sector unrelated to that of the secondary sector is a factor associated with underground economy[22] and its growth[23].

Table II shows a spectacular growth of public sector spending (CNSG). This variable may be taken as an indicator of tendencies associated with underground economic activity, including taxation[24], government intervention[25], a low degree of fiscal morality[26], a high propensity towards tax evasion[27], and a high rate of inflation.[28] Furthermore, this independent variable measures and includes certain complementary relationships, such as the relative importance of the private sector vis-a-vis the public one and its growth, the contribution of public spending to growth, the number of public workers, and the consequences of the application of an unsatisfactory fiscal policy.

The independent variable MIMP, namely imports of consumer goods has been included mainly to test the hypothesis that underground economic activity is a substitute to imported consumer goods. It might be possible that the underground economy can satisfy certain requirements which compete with imports - in other words, a decrease in underground economic activity can result in an increase in imports and vice-versa. In this case, a negative relationship between UEA and MIMP should be expected. We are interested in this hypothesis because the policy implications related to the Greek underground economy would be extremely important, given that the external balance deficit represents a constraint to the rapid growth of the Greek economy.

The independent variable INVM represents investment realised in the manufacturing sector and is measured with a lag of two years. We expect a negative sign on the coefficient of $INVM_{t-2}$. It is hypothesised that with the growth of underground economic tertiary activities compete for funds with the manufacturing sector. This is in keeping with the characteristics of the Greek economy, namely a low propensity to invest in the manufacturing sector, and an inability of this sector to create new employment opportunities. For this reason, when $INVM_{t-2}$ drops, UAE is expected to increase.

The variable CBFα is the calculated value of α in the Cobb-Douglas function of the Greek economy, estimated for the period 1970-85 as described earlier. It is based on official data (i.e. it excludes underground economic activity). The coefficient on this variable is expected to have a positive sign, indicating that changes in underground economic activity are related to changes in the income of self employed persons - or to be more precise from those earning non-wage revenue.

Before proceeding to estimate the model, it should be noted that despite the possibility that the Greek underground economy is one of the highest in Europe, it has not, as yet, been adequately econometrically analysed.[29]

The following section gives the estimates of the model presented above and discusses some properties of the model.

IV. The Estimates of the Model

The estimated coefficients of the model are the following:
$$UEA = constant + 645.682\ EMPS_t + 17.853\ CNSG_t + 0.126E + 07\ CBF\alpha_t$$
$$(-4.4636) \quad (2.375) \qquad\qquad (2.354) \qquad\qquad (2.011\ )$$
$$- 35.7742\ INVM_{t-2} - 629.347\ MIMP_t + U_t$$
$$(-2.6159) \qquad\qquad (-2.578)$$

No.of Observations = 16 R^2 (adj) = .923   D.W. = 1.761   F = 36.967

The following remarks can be made on the results:
a. The general fit of the model is quite satisfactory. This is indicated in the first place, by the high value of the coefficient of determination R^2(adj)=0.923.
b. All the independent variables included in the model are significant at the 95% significance level.
c. The value of the F distribution is equal to 36.9666 while its critical value in our case is equal to 4.74.
d. The signs of the independent variables can all be justified theoretically.
e. The estimated model presents no first order autocorrelation as indicated by the

value of the D.W. coefficient which is equal to 1.76089.

f. Tests for the normal distribution and for homoskedasticity of the residuals do not indicate that we should reject the hypotheses that the residuals follow approximatley the normal distribution and that the residuals are homoskedastic.

g. Finally, in the following table we may see the elasticities of each independent variable in relation to the dependent variable, as well as each one's explanatory power in the model.

Variable	Coefficient	Beta Coef.	Elasticity	Partial R
MIMP	-629.347	-0.707288	-2.15477	-.632
CNSG	17.853	1.05366	5.74825	.597
CBFα	.126E+07	0.346787	5.58324	.537
INVM$_{t-2}$	-35.7742	-0.312429	-2.32975	-.637
EMPS	645.682	0.391365	4.37309	.601

The elasticity of CNSG which shows a high degree of statistical significance in the model, indicates that a one percent increase in this variable brings about a rise of 5.74 percent in the underground economy. Its positive sign is in accordance with the theoretical view that attributes the existence of the underground economy, in the first place, to heavy taxation and extensive government intervention.

According to our estimates, a one percent increase in CBFα results in a 5.58 percent increase in UEA. This high elasticity naturally, stresses the relationship between self employment income and the underground economy. This need not negate however the possibility that a number of workers earn non wage income (apart from wages). It is a pity that the available statistical data in Greece do not allow such a distinction.

The elasticity of UAE with respect to EMPS is 4.37. The positive sign of EMPS as well as its elasticity in relation to UEA are to be expected since the growth of the tertiary sector feeds the underground economy.

The negative elasticities with respect to the the independent variables INVM$_{t-2}$ and MIMP are also plausible for reasons discussed earlier.

As regards the negative relation between UAE and MIMP, it is, not possible, at this stage of the research to confirm that the imported goods and those provided by the underground economy are on the same indifference curve. They would be if they could be considered as substitutes. But are they? If the answer is found to be positive, the implications concerning the Greek balance of payments would be extremely important.

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V. Some Comments

According to the method used in this study, the underground activity accounts for approximately 25% of the officially declared civil sector GDP in 1985. Supressing underground economic activity may therefore mean a large loss of income and employment.

Under these conditions, a policy aiming to fight against underground economic activity should solve, in the first place, the problem of its replacement. Apart from the fact that the actual economic structures do not seem to offer many alternatives, the elimination of 25% (and more) of the real civil sector GDP may usher in the danger of sharply increasing imports if, in fact, MIMP and UEA are substitutes.

Discussions on underground economic activity generally focus on the disadvantages of such activity. One disadvantage is that tax evasion gives rise to an unbalanced tax-burden on the wage earners, and in Greece this is giving rise to a highly uneven income distribution. However, eliminating underground economic activity without taking steps to replace would constitute a decline in the real (as distinguished from the official) GDP.

In some instance, the curtailment of underground economic activity may even mean a loss of relatively efficient production. In Greece, for example, Tourism, a major industry sector in this country[30], has probably become more efficient and competitive, because of its numerous underground elements.

It can also be argued that a high ratio of underground to official activity has implications relating to the natural environment, since it may signify a higher percentage of small firms using little capital[31] in comparison to other countries with a lower ratio. In other words, underground economic activity may possibly give rise to a relatively lower degree of pollution.

VI. Conclusion

Every economy has its own characteristics, and a model of the underground economy of a particular country should take into account the specific structures and stage of development of the country. The present study has sought to present a model for the underground economy, with special reference to the Greek economic reality.

It was argued that underground economic activity in Greece is the combined result of insufficient scope for industrialization and of excessive government intervention.

It is important to stress that one should distinguish between the undesirable consequences of the underground economy on income distribution the rate important role of such activity on the growth of real GDP. It is, therefore, vital to consider the phenomenon of the underground economy with no prejudices.

If the underground economy is, in fact, recognised as on balance undesirable, and a policy for its curtailment is adopted, the numerous structural particularities of the economy in question should be taken into account.

NOTES AND REFERENCES

1. See, among others, . E.L. Feige, "How big is the Irregular Economy?", *Challenge*, Nov/Dec. 1979 pp. 5-13; V. Tanzi, The Underground Economy in the Unites States: Estimates and Implications", *Banca Nazionale del Lavoro*, *Quarterly Review*, 33, 1980, pp. 427-53; K. Macafee, "A Glimpse of the Hidden Economy-A Survey", *The Economic Record*, Sept. 1984, pp. 209-21.

2. See Murray L. Weidenbaum, "The High Cost of Government Regulation", *Challenge*, Nov/Dec. 1979, pp. 32-39; A. Dilnot and C.N. Morris, "What do we know about the Black Economy in the United Kingdom?", *Fiscal Studies*,. 2, March 1981, pp. 163-79; O.E.C.D., *Employment Outlook*, Sept. 1986, Ch. II.

3. The methods attempting to estimate the underground economy are numerous. These include S. Burns *The Household Economy*, Beacon Press, Boston 1977; P.M. Gutmann, "The Subterranean Economy", *Financial Analysis Journal*, 34; M. Carter, "Issues in the Hidden Economy-A Survey", *The Economic Record*, Sept. 1984; V. Tanzi, *op. cit.* 1980, pp. 427-53; Richard D. Porter and Amanda S. Bayer, "A Monetary Perspective on Underground Activity", *Federal Reserve Bulletin*, March 1984 pp. 177-190; M.O. Higgins, "The Relationship between the Formal and the Hidden Economies" in W. Gaertner and A. Wedig (eds), 1985; S. Smith, *Britain's Shadow Economy*, Oxford University Press, 1986.

4. See E.L. Feige, *op. cit.*

5. See V. Tanzi, *op.cit.* p. 428; Bruno Frey, Hannelore Weck and Werner W. Pommerehne, "Has the Shadow Economy grown in Germany? An Exploratory Study", *Welwirtschafliches Archiv*, 1982, p. 500; E.L. Feige, *op.cit.*, p.5; Jan T. Klouland, "In Search of the Hidden Economy: Tax Evasion and the Demand for Currency in Norway and Sweden", *Norwegian School of Economics and Business Administration*, Bergen, Dec. 1980

6. See M. Carter, *op.cit.* p. 211 and Murray L. Weidenbaum *op. cit.* pp. 32-39.

7. See O.E.C.D. *op.cit.* p. 62.

8. See N.R. Norman, "The Economics of Tax Evasion", paper presented at the 11th Conference of Economists, Adelaide 1982, p. 23; J. Smith, "Market Motives in the Informal Economy", in W. Gaertner and A. Wenig (eds); "The Economies of the Shadow Economy", *Berlin and Heidelberg*, *Spinger-Verlag*, 1985; E.L. Feige, "The U.K. Unobserved Economy: A Preliminary Assessment", *Journal of Economic Affairs*, 1981, pp. 205-12.

9. See S.M. Miller, "The Pursuit of Informal Economies", *Economic Impact*, 1988/2, p. 23; Gabriele Gaetani d'Aragona, "The Hidden Economy: Concealed Labour Markets in Italy", *Rivista Internazionale di Science Economiche et Commerciali,* 1981, p.p 282; M. Roy, "Le Travail Noir", *Le Point*, 12.11.79, pp. 77 ; L. Gazzo, "Travail Noir: Les Chomeurs voient Rouge", *Vision* (Paris), Apr. 1977, p. 36; O.E.C.D. *op.cit.* p. 69.

10. See Maria Negreponti-Delivanis, "The economy of the Underground Economy in Greece", being prepared for publication by Papazisis (in Greek).

11. The underground economy in Greece has not up till now been adequately modelled. See the interesting study by P. Pavlopulos, "The Underground Economy in Greece", IOBE No. 17, 1987, where the author reaches approximately the same percentage as in the present study far as the economic activity within the GDP is concerned, although he does so using a microeconomic method.

12. There are references to some in note 3 above.

13. In the case of Greece, any attempt to apply previous models in order to estimate the importance of its underground activity, has failed. Cf. P. Pavlopoulos *op.cit.* 1987, p. 161 and Maria Negreponti-Delivanis, *op.cit.* Part I, Ch. I.

14. See E.L. Feige, *op.cit.* 1979, V. Tanzi, *op.cit.* 1980, K. Macaffee *op.cit.* 1980, Michael Carter, *op.cit.* 1984.

15. See Burns, *op.cit.* 1977, P.M. Gutmann, *op.cit.* 1977, V. Tanzi, *op.cit.* 1980, Richard D. Porter and Amanda S. Bayer *op.cit.* 1984, M.O. Higgins, *op.cit.* 1985, M. Negreponti-Delivanis (and collaborators), *The problematic Greek Industry*, 2nd edition, Thessaloniki 1986b, P. Pavlopoulos *op.cit.*, 1987 and others.

16. See M. Negreponti-Delivanis (in collaboration with V. Portaritou-Kresteniti) *What is the possible efficiency of the austerity policy applied in Greece*, Oikonomikos Tachidromos, 1986, (in Greek), where it is argued, among other things, that the average declared revenue on the part of all households represents 72.2% of their total annual purchases; (in other words, their spending for consumption is by 28% higher than their officially declared revenue). More precisely, it represents 70.0% in the case of households where the head is a wage earner, 63.2% for households where the head is boss and 59.6% in the case of households where the head is self employed.

17. α is calculated as follows:
    (Salaries/Civil sector revenue)/ (Wage earners/(Civil sector employment).

18. These represent only 46% of total employment.

19. See A. Agapitos *Wage earners bear the tax burden*, Oikonomikos Tachidromos, 1986 (in Greek).

20. M. Negreponti-Delivanis (and collaborators), op.cit. 1986. p. 101

21. *Ibid,* p. 102 *et seq.*

22. See E.L. Feige, *op.cit.* 1979, p. 7, A. Dilnot et C.N. Morris *op.cit.*, 1981, pp. 163-179, J. Skolka, *op.cit.* 1985, p. 65.

23. See M. Negreponti-Delivanis, *Analysis of the Greek Economy*, 2nd edition, Athens 1985, p. 246.

24. See V. Tanzi, *op.cit.* 1980, Bruno S. Frey, Hannelore Weck, *op.cit.* 1983, pp. 822-832.

25. See Raffaele de Grazia, *Clandestine Employment: A Problem of our Times* , ILO, Vol. 119, No 5, Sept.-Oct. 1980, p. 555, D. Mirone, "Profili e dinamica del mercato speciale e atipico del lavoro", *Rivista di Politica Economica*, Rome, Aug-Sept. 1978, pp. 1141-2.

26. See Bruno S. Frey and Hannelore Weck-Hanneman, *op.cit.* 1984 p. 37.

27. See M. Negreponti-Delivanis, *op.cit.*, 1986b, p. 85 *et seq.*

28. See Raffaele de Frazia, *op.cit.* 1980, p. 555.

29. See M. Negreponti-Delivanis (and collaborators), "Measures for the encouragement of industrial investment", *KEPE* No. 16 1986, M. Negreponti-Delivanis (with the collaboration of V. Portaritou-Kresteniti), *op.cit.* 1986b.

30. Argued by Eleni D. Delivanis in her D.Phil Thesis in progress at the University of York (U.K.).

31. An Interview With Robert E Litan, "The Need for Policy Reforms", *Economic Impact*, 1988/2, pp. 32-36.