

## The Determinants of the Shadow Economy: The Case of Greece

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### Abstract

This paper aims at assessing the relative importance of various factors as key determinants of the size of the shadow economy in a sample of OECD countries. Using panel data for a group of 19 countries for the 2003 – 2008 period, we find that the quality of governance, the regulatory framework in the product, labor and credit markets and the tax burden both in the sense of the direct cost on entrepreneurial activity and the cost of compliance to the tax administration framework, are the most important factors affecting the part of the economic activity that takes place outside the official sector, that is the shadow or underground economy. These results are used to evaluate the potential gains Greece could obtain, in the case it could converge to the best practice or even to the average levels of the determining factors of the rest of the OECD countries.

### 1. Introduction

The shadow or hidden or underground economy has become a subject of considerable academic interest only since the beginning of the 1970s. However, the literature on the measurement of the phenomenon (for example, Blades [3], Frey and Pommerehne [10], [11], Giles [13], Thomas [31], Schneider [23] and Schneider, Buehn and Montenegro [28]) as well as on its determinants (for instance De Soto [7], Dreher and Schneider [9] and Singh, Jain-Chandra and Mohommad [29]) is already very extensive. Although the Greek authorities started to grasp the problem of the existence of a large shadow economy in Greece after 1992, when the need of fiscal consolidation started to be imperative (Vavouras and Karavitis [33]), this issue returned in the epicenter of the academic and political interest during the current

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debt crisis period, when the quest for higher fiscal revenues made the need for combating the existing large shadow economy and the associated tax evasion imperative.

The relative empirical research focusing on the Greek shadow economy, especially on the measurement of the phenomenon is also extensive. Indicatively, we could refer to the works of Pavlopoulos [21], Negreponi-Delivani [20], Vavouras, Karavitis and Tsouchlou [34], Kanelopoulos, Koussoulakos and Rapanos [17], Agapitos and Mavraganis [1], Schneider and Enste [26], Manolas and Vavouras [19], Tatsos et. al. [30] and Schneider [25].

The shadow economy comprises all output that goes unreported and therefore is “hidden” from income tax. A part of it pertains to legal activities, such as transactions between firms and retailers that are paid “off the counter”, an agreement that enables both parties to avoid paying taxes. The rest is the product of illegal activities, such as prostitution, drug trafficking and so on. According to Schneider, Buehn, and Montenegro [28], the “underground economy includes all market-based legal production of goods and service that are deliberately concealed from public authorities to avoid the payment of income, value added or other taxes, to avoid payment of social security contributions, having to meet certain legal labor market standards, such as minimum wages, maximum working hours, and safety standards, and complying with certain administrative procedures”.

The present paper aims at analyzing empirically the determinants of the underground economy using panel data for 19 OECD countries for the 2003-2008 period. The empirical results are used for the estimation of the potential reduction of the size of the Greek shadow economy resulting from an improvement of its determining factors. The structure of the paper is as follows: in section 2 data for the size of the underground economy in Greece are presented, while in section 3 the factors that theoretically determine the size of the underground economy are analyzed. In section 4 empirical estimates of the relationship between the hidden economy and its determinants are presented, using panel data techniques, whereas section 5 sums up the results of the study and concludes.

## **2. The Size of the Shadow Economy in Greece**

The size of the shadow economy is large in many countries all over the world. In Table 1 estimates for the size of the shadow economy in selected OECD countries are presented. This Table is based on estimates of Schneider [24]. In the area of OECD, the southern countries (Greece, Italy, Spain and Portugal), plus Belgium are estimated to have the highest rate of “hidden” economic activities, ranging between the 24-30% of their recorded or official GDP. The group of countries characterized by a small size of shadow economy includes countries with a relatively small public sector (Japan, USA and Switzerland) and countries with high tax “morality” (USA and Switzerland).

**Table 1. The size of the underground economy in selected OECD countries (% of GDP)**

Country	1989-90	1999-2000	2010
Austria	6.9	9.8	8.7
Belgium	19.3	22.2	17.9
Denmark	10.8	18.0	14.4
France	9.0	15.2	11.7
Germany	11.8	16.0	14.7
Greece	22.6	28.7	25.2
Ireland	11.0	15.9	13.2
Italy	22.8	27.1	22.2
Netherlands	11.9	13.1	10.3
Portugal	15.9	22.7	19.7
Spain	16.1	22.7	19.8
Sweden	15.8	19.2	15.6
U.K.	9.6	12.7	11.1
Switzerland	6.7	8.6	8.3
Canada	12.8	16.0	12.7
Japan	8.8	11.2	9.7
USA	6.7	8.7	7.8

Source: Schneider [24].

As far as Greece is concerned, all the existing estimates for the size of its hidden economy, independently of the method of estimation and the period of reference, show that the unrecorded economic activities constitute a high percentage of the official GDP. This percentage, due to the current economic crisis, increased initially (up from 24.3% of the recorded GDP in 2008 to 25.2% in 2010), and then it is estimated to be decreasing (down to 24.3% in 2011 and 24% in 2012), based on Schneider [25].

### 3. The Determinants of the Shadow Economy

The factors that theoretically influence the size of the shadow economy in a given country are numerous. They could be distinguished to two basic categories: purely economic factors, and other factors, such as social, psychological, administrative, and so on. The relative importance of each factor is different at the level of each individual country. In the rest of this chapter, the most important determinants of the shadow economy are analyzed:<sup>1</sup>

*i. The tax burden.* It is related to the burden caused by the imposition of taxes and social security contributions. It is generally accepted that the increase of taxes and social security contributions is one of the main factors, and perhaps the most important one affecting the rise of the shadow economy (for example, Schneider and Enste [27]). It is straightforward

<sup>1</sup> See also Vavouras and Manolas [35], ch. 10.

that high direct and indirect taxes in the official economy are directly related to the enlargement of the shadow economy. A large part of tax evasion pertains to “hiding” income earned from a second employment, or from self-employment, or an agreement between the two respective parts to avoid the payment of VAT, transfer taxes, etc. At the same time, a significant part of social security contributions evasion stems from the declaration of lower wages and thus the payment of lower contributions for the social security, both from the part of employees and employers.

In the neo-classical models, the marginal tax rate is considered as the basic factor for the increase of the shadow economy. The higher the marginal tax rate, the stronger the effect “of substitution between labor and leisure” and the larger the distortion in the decision of a person to distribute time between labor and leisure. If a person could get an income from the hidden economy, then the substitution effect would be higher than the income effect and, thus, the individual will work less in the official economy (Schneider [22]). Empirical studies on various European countries confirm the important effects of the tax burden on the size of the shadow economy. Cebula [4] estimated that an increase of the marginal tax rate of the personal income tax rate in USA by 1 percentage point, results, *ceteris paribus*, to an increase of the hidden economy by 1.4 percentage points. Similarly, Chianini, Marzano and Schneider [5], using data for the Italian economy, found that an increase by 1 percentage point of tax evasion increases the tax rate by 0.3%, while the reverse increases the tax evasion in the long-run by 0.48 percentage points.

*ii. The existence of a large number of regulations in the economy:* Regulations target at the control of markets by imposing rules and restrictions. They take the form of laws or other regulations and they mainly pertain to the labor market, the employment of foreigners, restrictions on free trade, etc. As a result, they limit the choices of individuals in the framework of the official economy (Schneider and Enste [26]). These regulations lead to an increase in the cost of labor in the official economy, providing incentives for employment in the shadow economy rather than in the official economy.

Johnson, Kaufmann and Shleifer [14], as well as Johnson, Kaufmann and Zoido-Lobaton [15] found that an increase by one unit of the indicator of regulation (which takes values from 1 to 5, with 5 to show that a country has stringent regulations), *ceteris paribus*, results to an increase of the hidden economy by 8.1 percentage points. Similarly, estimates of Friedman, Johnson, Kaufmann and Zoido-Lobaton [12], using data from 76 developed and developing countries, show that an increase of the indicator of regulations by one unit, results to an increase of the shadow economy by 10 percentage points.

More specifically, institutional restrictions in the labor market usually increase the cost of labor, thus increasing the incentive of enterprises to absorb workers from the secondary or parallel labor market (illegal economic immigrants, individuals who receive unemployment benefits etc) rather than from the legal labor market. For example, the reduction of hours worked in France and Germany, increased the available time for leisure and could lead to an increase of employment in the shadow economy (Hunt [16]). Similarly, part-time employment and early retirement could have similar results (De Gijssel [6]). The more general conclusion from this category of empirical studies is that the increase of the number or the intensity of regulations in an economy (and not the improvement of their effectiveness) increases rather than decreases the activity in the underground economy.

*iii. The role of the State:* The State influences the size of the shadow economy mainly via its ability of deterring and repressing tax evasion and from the degree of acceptance of its power. More specifically, the ability of a State to reduce the tendency for tax evasion depends on the organizational effectiveness of tax services, the structure of the existing tax system and the degree of accounting organization of enterprises. The risk of being caught and punished is one of the main deterring factors for tax evaders. At the same time, the tax morality of individuals is connected not only to the existing level of social development but also to the

perception they have for the State, although the two factors are not unrelated. If they believe that the State is an ineffective organization that does not aim at promoting prosperity, they could more easily turn to the hidden economy. On the other hand, countries with high corruption, especially in the public sector, also tend to have an extensive hidden economy, since public sector corruption increases the opportunities provided to turn to the shadow economy. Finally, sometimes, the State, for various reasons, relaxes the controls, thus strengthening the activity in the shadow economy. For example, in Greece, the underground economy is not irrelevant to electoral or political cycles (Vavouras and Manolas [35]).

Except for Andvig et. al. [2] and Dreher and Schneider [8], who have shown that a relationship exists between corruption and the hidden economy, the role of governance in relation to the underground economy is also examined mainly in the studies of Torger and Schneider [32] and Singh, Jain-Chandra and Mohomammad [29]. In the first study, the authors alternatively used more than 25 variables which are related to the governance and the quality of institutions and found the existence of its strong correlation with the hidden economy while, in addition, the increase in tax morality decreases the size of the underground economy. The empirical analysis of Singh, Jain-Chandra and Mohomammad [29] suggests that institutions are a more important determinant of the size of the shadow economy compared to tax rates.

## **4. Empirical Analysis**

### ***4.1. Independent variables***

In this section we proceed to estimate the determinants of the shadow economy: using the estimates of Schneider [24] for the size of the shadow economy in 21 OECD countries, we evaluate the relevant importance of various factors referred to in the literature. More specifically, we model the size of the shadow economy as a function of:

- a) The various aspects of governance in a country, including the control of corruption and the degree of government effectiveness. We would expect that countries characterized by better governance would be more efficient in leaving less leeway / enforcing sanctions for activities in the informal sector.
- b) The regulatory framework in the product, labor and credit markets. *Ceteris paribus*, more rigid / inflexible regulation would tend to provide incentives to break the rules. This, however, is not necessarily the case for the credit market.
- c) Tax burden, both in the sense of the direct cost on entrepreneurial activity and the cost of compliance to the tax administration framework. We expect that the higher the tax burden is the more it provides incentives to switch to the shadow economy.

### ***4.2. Data and sources***

Our sample includes 14 out of 15 of the “old” EU Member States (excluding Luxembourg) and selected members of the OECD, namely the U.S., Japan, Australia, Canada, Norway, Switzerland and New Zealand. As mentioned above, the data for the dependent variable (the size of the shadow economy) were taken from Schneider [24], while for independent variables sources include:

- a) The OECD database for the tax burden (which includes social security contributions), along with Employment Protection Legislation and Product Market Regulation variables.

- b) The annual report *Economic Freedom of the World* of the Fraser Institute for the credit market regulation variable and alternative indices for the regulatory framework in the product and labour markets. This report also provides an overall index of regulation in the economy.
- c) The World Bank (Kaufmann, Kraay and Mastruzzi [18] providing data for the six governance indicators which are widely used for international comparisons, namely: voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law and control of corruption.

### 4.3. Empirical analysis

In this section we present our empirical estimates for the determinants of the shadow economy in the selected group of countries. The model specifications eventually chosen with the appropriate statistical / econometric criteria are presented in Tables 2 and 3. We should note however that, before concluding, various alternatives were tried, as per: (i) the combination of variables, (ii) data sources, (iii) econometric methods.

Regarding the latter, eventually the equation was estimated using Panel EGLS, with country weights and diagonal correction of standard errors for heteroscedasticity and autocorrelation (using the methodology of White). Specifications with both fixed and random effects were tried, but their performance was relatively inferior based on the usual statistical / econometric criteria. Also, apart from allowing for a different residual variance for each cross section (captured by the country weights), there is no indication that the data structure is characterized by period specific heteroskedasticity, contemporaneous covariances, and between-period covariances (given, in any case, the relatively small time dimension).

In Table 2 estimates for the determinants of the shadow economy are presented, with independent variables including product market regulation (source: OECD), labor and capital market regulation (source: Fraser Institute), the tax burden and the two that we consider as the most important (taking also into account the relevant theoretical and empirical research) governance indicators (namely, control of corruption and government effectiveness). The overall fitness of the model is very good, with independent variables explaining a significant part of the variance of the dependent variable (as shown by the corrected  $R^2$  and the test on its statistical significance using the F-statistic). All estimators are statistically significant at the 1% statistical significance level, with the exception of the credit market deregulation variable which is significant at the 10% statistical significance level.

Also, all estimators have the expected sign: for example, increasing the control of corruption and government effectiveness would tend to have an adverse effect on the size of the shadow economy, and the same holds for the deregulation of both the labor and product markets. On the other hand, increasing the tax burden would tend to stimulate the shadow economy. Regarding the deregulation of the credit market, an additional note is in order: contrary to the effect of deregulation of the other markets, increased regulation of this market seems to be condoning to the downsizing of the shadow economy. This is not, however, a counterintuitive result, if we take into account that financing the activities of the shadow economy becomes more difficult when regulation and supervision are tighter<sup>2</sup>. The same holds for the ability to use in the formal sector income earned through informal sector activities (for example, it is difficult to proceed with depositing large amounts which could be considered as “money laundering”).

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<sup>2</sup> An example in this respect would be loans to self-employed professionals, if banks are obliged by the regulator to take into account only declared income. The same would apply to mortgages, if cross-checked against the declared / objective values of real estate used for contracts (which is, in fact, the taxable income of the constructor – seller and is systematically lower than actual market values).

In Table 3 we use the same specification but, in order to capture the effect of governance, we use an average of the six World Bank governance indicators mentioned above. Again, the equation was estimated using Panel EGLS, with country weights and White correction for standard errors. The overall fitness of the model is very good, with all estimators having the expected signs and being statistically significant at the 1% statistical significance level.

**Table 2. Determinants of the size of the shadow economy with individual governance indicators**

Dependent variable: Shadow economy (% of GDP)				
Method: Panel EGLS (Cross-section weights)				
Sample: 2003 2008				
Cross-section units: 19				
Total number of observations: 114				
Variable	Coefficient	Standard error	t-statistic	P-value
Constant	14.082	3.459	4.071	0.00
Control of corruption	-0.900	0.293	-3.078	0.00
Government effectiveness	-4.074	0.574	-7.105	0.00
Deregulation of the labour market	-1.409	0.173	-8.161	0.00
Deregulation of the credit market	0.470	0.290	1.622	0.10
Product market regulation	3.502	0.717	4.886	0.00
Tax burden	0.2361	0.041	5.743	0.00
Weighted statistics				
R-squared	0.83	Mean dependent var.	19.60	
Adjusted R-squared	0.82	S.D. dependent var.	8.54	
S.E. of regression	2.84	Sum squared resid.	865.34	
F-statistic	86.08			
Prob(F-statistic)	0.00			

**Table 3. Determinants of the size of the shadow economy using an average of governance indicators**

Dependent variable: Shadow economy (% of GDP)				
Method: Panel EGLS (Cross-section weights)				
Sample: 2003 2008				
Cross-section units: 19				
Total number of observations: 114				
Variable	Coefficient	Standard error	t-statistic	P-value
Constant	14.066	2.527	5.566	0.00
Average of governance indicators	-7.569	0.688	-10.995	0.00
Deregulation of the labour market	-1.464	0.146	-10.046	0.00
Deregulation of the credit market	0.942	0.285	3.303	0.00
Product market regulation	3.542	0.494	7.170	0.00
Tax burden	0.208	0.034	6.091	0.00
Weighted statistics				
R-squared	0.85	Mean dependent var.		22.63
Adjusted R-squared	0.84	S.D. dependent var.		13.76
S.E. of regression	2.93	Sum squared resid.		926.99
F-statistic	119.26			
Prob(F-statistic)	0.00			



#### 4.4. Estimates of the relevant impact of individual factors on the potential reduction of the shadow economy in Greece

Based on our results on the determining factors of the shadow economy, we can proceed to estimate the potential impact of each one of them in trying to reduce the latter's size. More specifically, we have elaborated two scenarios: a) each one of the determining factors for Greece takes the value of the average of the rest of the countries, and b) the same variables take the values of the best performing country. The results are presented in Table 4.

Two basic conclusions are in order: 1) Greece would benefit more by trying to reach the average of the other countries with respect to regulation of the product market, the labor market and government efficiency. 2) Greece has a lot of ground to cover in trying to converge to this average, insofar as the control of corruption, improving government effectiveness and the deregulation of the labor market are concerned. Most notably, the performance of Greece is impressively low regarding the control of corruption, as the rest of countries are performing (on average) almost 14 times better than Greece.

**Table 4. Estimates of the relevant impact of individual factors on the reduction of the shadow economy in Greece**

<i>Variable</i>	<i>Impact on the shadow economy – sample average</i>	<i>Impact on the shadow economy – best performing country</i>	<i>Average / performance of Greece</i>	<i>Best performing country / Performance of Greece</i>
<b>Control of corruption</b>	-1.37	-2.07	13.86	20.42
<b>Government efficiency</b>	-3.89	-6.45	2.56	3.60
<b>Deregulation of the labor market</b>	-3.48	-6.48	1.55	2.02
<b>Deregulation of the credit market</b>	-1.20	-1.78	1.43	1.63
<b>Product market regulation</b>	-4.07	-5.28	0.49	0.34
<b>Tax burden</b>	1.28*	-0.85	1.16	0.89
<b>Total benefit</b>	<b>-12.71</b>	<b>-22.92</b>		

\* In 2009, before the implementation of the MoU, Greece had a lower tax burden compared to the sample average.

## 5. Concluding Remarks and Policy Recommendations

The shadow economy has many political, social and economic implications. The existence of a significant hidden component to total actual economic activity not only affects the reliability of the official data and the various socioeconomic indicators based on these data, but also affects almost all the main objectives of economic policy. As far as the fiscal policy is concerned, the large shadow economy reduces dramatically public revenues (mainly direct and indirect taxes) and increases public expenditures (mainly social transfers<sup>3</sup> and interest payments) increasing as a result the public deficit and debt. In a country like Greece that is facing debt sustainability problems and where fiscal adjustment is generally recognized as its primary objective, the above issue makes the need to adopt policy measures towards reducing the off-market activities in the economy imperative.

Improving the effectiveness of the tax system is an important factor contributing to the restriction of the shadow economy in a country. The repression, but even more importantly the prevention of tax offences, is the basic factor in the effort to reduce the size of the hidden economy. Regarding prevention, this could be pursued through policies such as the rationalization of the tax burden, so that a “horizontal” and “vertical” tax justice exists and the tax burden corresponds to the real situation in the economy. Other relevant policies include the improvement of the transparency of the tax system and the systematic control and cross-checking of data provided by tax-payers. As far as the repression is concerned, it is very important that penalties are imposed in an effective way that makes them reliable and applicable, promoting the concept of tax justice. Through these policies, tax morality will also improve, thus contributing to the restriction of the hidden economy in the long-run.

In the field of prevention, as well as in the field of repression of the shadow economy, the role of ITCs is very important. It is a fact the effectiveness of the state’s controlling mechanism does not solely depend only on new technologies, but also on the organization of the services in charge, as well as on the existence of a qualified and productive staff. The increase of productivity of the entire public sector is necessary, by improving the methods of organization and administration, combined with the improvement of the quality of use of the existing resources. This will result to containing public expenditure, which in turn will reduce the tax burden and will boost the development of the official private sector, thus restricting the size of the shadow economy.

Finally, due to the close relationship between corruption and the hidden economy, the effective restriction of public sector corruption in Greece is expected to have a significant impact on the reduction of the shadow economy. Thus, policies aiming at the reduction of the shadow economy in Greece should primarily focus on the fight against corruption and on the improvement of the quality of governance, mainly by reducing the unnecessary state interventions, by abolishing the clientelistic relations of politicians with the electorate and by combating the persistent institutional weaknesses that provide fertile ground for rent seeking behavior on behalf of politicians and public employees. In this context, the Greek debt crisis could be regarded as a “chance” for an historic transformation of the economy that however requires the transformation of the Greek society as well, since the effective reduction of the shadow economy in the long-run is mainly a social issue, namely an issue of social development.

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<sup>3</sup> Moreover, social transfers are misallocated as a result of hidden income by many of the beneficiaries.

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