

Capital Subsidies, Taxation and Underground Activities

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Extended Abstract

The main aim of this paper is to verify whether the allowance of incentives to capital affects the firm's choice to produce in the underground sector.

In table 1 we report the size of the underground economy estimated for OECD countries with an indirect method (cash approach by Schneider); it is clear that underground economy plays an important role in all developed countries, even though with different intensities.

Table 1: The size of the shadow economy in some OECD countries

OECD Countries	Average 1994-95	Average 1996-97
Greece	29.6	-
Italy	26.0	27.2
Spain	22.4	23.0
Portugal	22.1	-
Belgium	21.5	22.2
Denmark	17.8	18.2
France	14.5	14.8
Netherlands	13.7	13.8
Germany	13.5	14.75
Great Britain	12.5	13.0
Japan	10.6	-
USA	9.2	8.8
Austria	7.0	8.6

Sources: Schneider and Enste (2002). Numbers in the columns represent the share of the shadow economy as % of the GNP.

It is also evident that Italy has a large shadow economy, substantially higher than other OECD countries; moreover, as we will show, it is particularly relevant in southern regions, which are interested by a structural development gap.

Incentives to investments have a long tradition in Italy, especially toward less developed areas, which can be traced back to 50's. After a difficult phase

of reorganization of the public finance, a new normative structure for aids to development in southern regions was completed in 1996. Figures available for recent years on the intensity of incentives suggest that they are still an important industrial policy instrument, whose weight on GDP amount to 0.44% for Italy and rises to 0.95% for its southern regions, as shown in table 2.

Table2: The territorial distribution of incentives to capital

Average 1998-2001	Center-North	South	Italy
incentives requested	32%	68%	66500 (mln of euros)
i. allowed/i.requested	56.7%	40.3	30700 (mln of euros)
incentives to small firms	22%	51%	38%
incentives/GDP	0.21%	0.95%	0.44%

Sources: Istituto per la Promozione Industriale (IPI)

The Institute for the Industrial Promotion (IPI) estimates that during the period 1998-2001 there are 95 different kind of possible channels to obtain public incentives for firms operating in the non agricultural sector; the most of them give a direct or indirect contribution to capital accumulation, while only a residual part gives a contribution to operating costs (3 of the existing 95 incentives laws).

If we consider official data available, at regional level, for the size of the underground economy, proxied by the size of the irregular workers, during the same period, we see that there is a substantial stability, and in general the phenomenon is much more strong in southern regions.

Table 3: The territorial size of the underground economy

% irregular labor	1995	1996	1997	1998	1999
Whole Industry					
Italy	8.3	7.8	7.9	8.0	8.0
North-West	4.8	4.5	4.2	4.4	4.5
North-East	3.7	3.2	3.2	3.5	3.2
Center	8.8	8.2	8.3	8.4	9.1
South	19.7	19.3	20.0	19.6	19.3
Services					
Italy	15.9	16.3	16.6	16.9	16.9
North-West	14.9	15.0	14.9	14.8	14.4
North-East	14.2	14.5	14.3	14.3	14.1
Center	15.7	16.0	16.7	17.0	17.0
South	18.2	18.9	19.7	20.7	21.2

Sources: ISTAT. Numbers in columns represent the share of irregular workers as % of total workers

Data available confirm the usefulness of the investigation of the relationship between capital allowances and the size of the underground economy, as they seem to suggest the failure of a causal of relation.

Preliminarily to the theoretical analysis on the effects of the incentives to investments on the allocation of capital between the two sectors it is necessary to specify what kind of underground production we want to consider. Actually, while it is straightforward to understand what we mean by regular¹ production - output is produced using the market technology e.g. regular inputs, and regularly declared- the definition of the irregular production is less immediate, and may need some specifications. First of all, irregular production can be ruled either by a completely irregular firm (hereinafter defined as *underground firm*), or by a firm which acts only partially in the underground sector (hereinafter defined as *hybrid firm*).

Capital allocating decision is, of course, different in the two cases: the share of capital invested in the irregular sectors is 1 for the *underground firm*, while it is less than unity for the *hybrid firm*.

Empirical investigation suggests that *underground firms* usually operate in sectors labor intensive, in particular in the service field, or in the industrial field which are more traditional and less capital intensive, such as constructions.

In this paper we will focus exclusively on *hybrid firms*. If we define the taxation rate as τ and the surcharge to be paid if discovered cheating the government as s , then, for any firm, the underground sector generates two states of world about the underground revenues:

- discovered and fined, $(1 - \tau s)y^u$
- and getting-away-with-it, y^u

As the firm produces an homogeneous good in the two sectors, the regular and the irregular sector, then output is given by:

$$y = (1 - \tau)y^m + y^u \quad \text{when } \rho = 0 \quad (1)$$

$$y = (1 - \tau)y^m + (1 - \tau s)y^u \quad \text{when } \rho = 1 \quad (2)$$

Accordingly, if the firm perceives the probabilities ρ and $(1 - \rho)$ attached to the two states, the ex ante expected output can be written as follows:

$$E(y) = (1 - \tau)y^m + \rho(1 - \tau s)y^u + (1 - \rho)y^u \quad (3)$$

At time zero the firm is endowed with a certain amount of capital, and with an intertemporally fixed flow of a non-capital resource (labour). Each instant

¹In the proceeding of the paper we will use the terms irregular (regular) and underground (market) production as synonymous.

it decides how much resources to devote to the regular production, and it also decides, maximising the intertemporal utility function, how much of the revenue to invest. Investments in the regular technology are encouraged by government, which allows investors to subtract a share α of net investment from taxable revenue.

We consider the relationship between the subsidy policy that provides a transfer to the firm and the underground activity with the following different production frameworks:

1) **Moonlighting model 1** A firm has to choose how to allocate investments in a context characterized by two identical technologies, characterized by constant return of scale:

$$\begin{aligned} y^m &= f(K^m); \\ y^u &= f(K^u); \\ f' &> 0, f'' < 0 \end{aligned} \tag{4}$$

This condition is, of course, somewhat simple and peculiar, and it represents our starting framework. The choice is determined by the evasion models parameters (ρ, τ, s, α) . The model provides an optimal allocation of the capital stock between the two sectors.

2) **Dualistic firm** A firm faces two different technologies taking into account the evasion model's parameters (ρ, τ, s, α) :

$$\begin{aligned} y^m &= f^m(K^m); \\ y^u &= f^u(K^u); \\ f' &> 0, f'' < 0 \end{aligned} \tag{5}$$

This model is not straightforward as the previous one, but in all likelihood it captures a large component of the real phenomenon. Also this model yields an allocation which is optimal for the firm.

3) **Moonlighting model 2** This should be interpreted as a unique technology, as in case 1, which is used in official (reported) time and in black (un-reported) time:

$$\begin{aligned} y &= f(K) = y^m + y^u \\ f' &> 0, f'' > 0 \end{aligned} \tag{6}$$

The difference with model 1 is the presence of increasing returns of scale, which allow the firm to use the same stock of capital in two different production, evading taxation.

As we will show later, the implications of the model are quite different depending on the type of hybrid firm considered.

The last version of the paper provides a solution for the relationship between taxation, capital subsidies to the firms and underground activities for each of the three situations described above. The paper carries out a comparative analysis and draws some interesting policy implications.