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The tax evasion social multiplier: Evidence from Italy

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ABSTRACT

We estimate social externalities of tax evasion in a model where congestion of the auditing resources of local tax authorities generates a social multiplier. Identification is based on a contrast of the variance of tax evasion at different levels of aggregation. We use a unique data set that contains audits of about 80,000 small businesses and professionals in Italy and also provides an exact measure of reference groups in our model. We find a social multiplier of about 3, which means that the equilibrium response to a shock that induces an exogenous variation in mean concealed income is about 3 times the initial average response. This is a short-run effect that persists to the extent that auditing resources are not adjusted to internalize the congestion externality.

> Theft—whether from the state, from a fellow citizen or from a looted Jewish store—was so widespread that in the eyes of many people it ceased to be a crime.
>
> —Tony Judt, Postwar.[1]

1. Introduction

In this paper, we investigate the social determinants of tax compliance and tax evasion. Like most other kinds of illegal behavior, tax evasion exhibits large variance across geographic units with relatively similar fundamentals, such as similar countries or areas within a country.[2] In the benchmark model of Allingham and Sandmo (1972) such fundamentals are the parameters characterizing preferences (degree of risk aversion), the tax system (tax rates) and the enforcement system (probability of detection and sanctions).[3] In this paper we use detailed audit data from Italy to show that the observed large variance of tax evasion in spite of similar fundamentals reflects, to some extent, social externalities in underreporting income. We emphasize a particular source of such externalities: tax enforcement congestion.

Generally speaking, although large residual variance in illegal behavior—and many other types of socioeconomic phenomena—may be due to mere unobserved heterogeneity, social scientists view such variance increasingly as a telltale sign of interdependencies between individual decision makers. Glaeser et al. (1996) pioneered this approach by showing formally how positive covariance between individual decisions to engage in crime generates a multiplier effect that amplifies—both in time and across space—relatively small differences in fundamentals. The reason is that, in the presence of positive

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[1] Judt (2005), 37.

[2] In Italy, for instance, the picture varies greatly from region to region and also across provinces within regions, even though Italian regions are quite homogeneous units. Pisani and Polito (2006) estimate that between 1998 and 2002 the ratio of concealed to reported income from productive activities across Italian regions ranged from 13% in Lombardy and 22% in Emilia Romagna and Veneto to 66% in Sicily and 94% in Calabria. The variance across provinces within regions is noticeable. Two extreme examples are Lombardy, where the ratio ranges from 5% in the province of Milan to 34% in the neighboring province of Lodi, and Calabria, where it ranges from 53% in the province of Reggio Calabria to 184% in the province of Vibo Valentia.

[3] An extension of this model allows for "tax morale", an intrinsic motivation inducing people to abide by their tax obligations—i.e., an additional preference parameter. See, for example, the theoretical analysis of Gordon (1989) and the empirical study by Frey and Feld (2002). Andreoni et al. (1998) and Slemrod (2007) offer excellent surveys of theory and evidence on tax compliance and tax evasion. Sandmo (2005) offers a retrospective discussion of the shortcomings and of the unexploited potential of the Allingham-Sandmo model.

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complementarities between individual choices, any shock affects individual behavior directly via private incentives and indirectly via the behavior of other individuals. The ratio between the equilibrium aggregate response to the shock and the sum of the direct, initial individual responses is the *social multiplier*.[4] For the most, the literature interprets these externalities as having been generated by sociological forces embedded in individual preferences—what Manski (2000) classifies as "preference" interactions. For example, the seminal paper of Allingham and Sandmo (1972) includes an extended version of the basic model that features a social stigma effect; Gordon (1989) introduces the idea of tax morale sustained by peer pressure in a model of tax evasion; Cowell (1990, chapter 6) analyzes equilibrium tax evasion when preferences depend on the average evasion of other taxpayers; and Myles and Naylor (1996) analyze an optimal audit policy for an independent revenue service when there is a social custom that rewards honest taxpaying. In this paper we emphasize a potentially important source of social complementarity that is more technological in nature and thus more amenable to policy: enforcement congestion. The idea is that the probability of apprehension and punishment decreases if more people behave illegally while the enforcer's available resources are fixed. Manski (2000) classifies these as "constraint" interactions. The importance of constraint interactions for illegal behavior is discussed by Ehrlich (1973), Sah (1991), and, more recently, Ferrer (2010). In the context of tax evasion, this externality is implicit in models where taxpayers and the tax authority interact strategically and the latter is subject to a budget constraint in its auditing activity (Sanchez and Sobel, 1993; Bassetto and Phelan, 2008).

We allow for tax enforcement congestion in a simple model where taxpayers belong to local tax jurisdictions and decide how much to report to a local tax authority, which performs audits subject to a budget constraint. If the individual probability of an audit is decreasing in individual reported income and the local budget constraint cannot be relaxed promptly, then a social effect arises: when some taxpayers report less income, the probability of other taxpayers in that jurisdiction being audited decreases. Hence these other taxpayers will also report less income. In the social interactions literature, the group that influences the behavior of an individual is called that individual's *reference group*. Therefore, local tax jurisdictions are natural reference groups in the tax evasion model we describe here. The equilibrium maps into the popular linear-in-means model frequently employed in empirical analyses of social interactions (Manski, 1993). Thus our estimates admit a structural interpretation.

Identification exploits the "variance contrasts" method developed by Graham (2008), who extends the framework of Glaeser et al. (1996). The key idea is that the social multiplier can be identified by comparing the within-group and between-group variance of individual behavior (i.e., the same variance at different levels of aggregation) provided at least one group-level exogenous characteristic affects the within-group variance but does not directly affect the between-group variance. As in Graham (2008), the typically larger dispersion of individual heterogeneity (and so of tax evasion) in small reference groups provides such an identifying restriction. We show that the social multiplier can be identified in this way while retaining a structural interpretation in terms of only endogenous social effects.

Our empirical analysis employs a unique, cross-sectional data set of tax audits of self-employed workers in Italy (i.e., of small businesses and professionals). The audits we observe were performed by local branches of the national fiscal authority. These branches are responsible for tax enforcement within local tax jurisdictions. We thus observe the exact measure of reference groups in our model—a unique feature among nonexperimental studies of social interactions. We find a social multiplier of about 3, which means that the equilibrium aggregate response to a shock that affects concealed income is about 3 times the initial average response. This result has noteworthy policy implications. We mention two of them here, postponing a thorough discussion until the end of the paper. First, reducing tax evasion may be easier than generally supposed, because the social multiplier amplifies the impact of stricter enforcement. In other words, governments can reduce tax evasion at a fraction of the cost needed to directly induce each taxpayer to report more honestly. Conversely, looser enforcement reduces tax revenues more than when multiplier effects are absent. Second, if individual incentives change in favor of underreporting then the government should promptly adjust its auditing resources in order to internalize the congestion externality and prevent an outbreak of tax evasion.

The paper is organized as follows. Section 2 presents the model, and Section 3 describes the data set and its institutional background. The formal econometric framework is presented in Section 4 along with the identification strategy. Results are reported in Section 5, and Section 6 concludes. A Supplemental web appendix (Galbiati and Zanella, 2012) contains all derivations, some extensions, and additional material.

2. Model

2.1. Setup and equilibrium

Our empirical analysis will exploit data on income reports by self-employed workers. Because the personal income of these workers is not subject to third-party report, the Allingham–Sandmo model is particularly apt for interpreting these data. Consider a population of N taxpayers, indexed by $i=1, \ldots, N$, distributed across G tax jurisdictions, indexed by $g=1, \ldots, G$ and of size n_g. Local tax authorities are in charge of tax enforcement in each group g, and they receive from the central government $a_g \leq n_g$ tokens that can be used to audit taxpayers. The cost of an audit is one token. The taxable income of taxpayer i is private information and is denoted y_i. The taxpayer reports an amount y_i^R, which is public information, to the local tax authority and pays a tax at an exogenous, individual-specific flat rate t_i on this amount. Taxpayer i in jurisdiction g is audited with probability p_{ig}. We assume that an audit enables the tax authority to observe true taxable income. If $y_i^R = y_i$ then nothing happens, but if $y_i^R < y_i$ then the taxpayer must pay the full tax bill as well as a proportional fine at rate f on the evaded tax.[5] We assume that there are no rebates when a taxpayer over reports income (i.e., when $y_i^R > y_i$). Hence the taxpayer will never over report and so we can ignore that case in what follows.

We assume that the taxpayer is risk neutral.[6] Therefore, we follow Scotchmer (1987) in assuming that the goal of the taxpayer is to minimize the expected tax bill:

$$\min_{y_i^R} \left(1-p_{ig}\right) t_i y_i^R + p_{ig} t_i \left(y_i + f\left(y_i - y_i^R\right)\right). \tag{1}$$

We do not model explicitly the determination of audit probabilities. Rather, we posit a linear specification that captures in a simple way the externality arising from the tax authority budget constraint when auditing resources are given:

$$p_{ig} = \frac{a_g}{n_g} + \alpha_0 Pr\left(y_i^R < y_i | \mathbf{x}_i\right) - \frac{\alpha_1}{n_g - 1} \sum_{j=1, j\neq i}^{n_g} Pr\left(y_j^R < y_j | \mathbf{x}_j\right). \tag{2}$$

[4] We believe the term *social multiplier* was first used in the sense in which it is now commonly used in the social interactions literature by Schlicht (1981).

[5] In assuming that the fine is proportional to the evaded tax (and not to undeclared income) we adopt the Yitzhaki (1974) variant of the Allingham-Sandmo model, although which version is adopted is not important for our purposes. The Yitzhaki variant simplifies the model because it rules out the substitution effect when the tax rate changes.

[6] This assumption is appealing in the context of this paper because our data set consists of a sample of entrepreneurs.