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## Measuring Tax Burdens in the Presence of Non Observed Incomes

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### *Abstract*

The Tax-to-GDP ratio is an important tool for both economists and policymakers. Despite its pivotal role, this indicator is measured and analyzed without due attention to the potential biases stemming from the so called non-observed economy. This note aims at filling this gap, pointing out the effects of untaxed and undeclared incomes on both sides of the Tax-to-GDP ratio.

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## 1. Introduction

From both national and international perspectives, to understand tax reforms or to evaluate tax policies it is necessary to go beyond statutory rates. In fact, due to the complexity of tax credits, exemptions, deductions, etc., statutory rates bear little relation to rates actually paid. This is why tax ratios derived using aggregate data have attracted increased attention from policymakers and analysts as a possible approach to proxy tax burdens. The literature estimating this kind of implicit tax rates (Mendoza *et al.*, 1994; OECD, 2000; de Haan *et al.*, 2001; Carey and Rabesona, 2002), focuses on relating actual tax payments to the “corresponding” national account tax base. It usually deals with implicit tax rates on capital, labor, etc, emphasizing several *caveats* (“all current measures reviewed have at least some important shortcomings.” OECD, 2000, p. 3). De Haan *et al.* (2001) have redone the empirical analyses of studies in which average effective tax rates (AETR) have been used. They show that a more refined approach to national account aggregates leads to different AETR and to opposite findings. In contrast, when addressing the overall Tax-to-GDP ratio the literature underrates measurement issues. Surprisingly, no work sufficiently recognizes that even so highly aggregate figures may be seriously flawed.

Against this backdrop, we argue that the interpretation of overall AETR may suffer from severe drawbacks when there is a significant share of non observed economy (NOE) – that is illegal, informal and underground activities<sup>1</sup>. The reason why even the proxy of the overall tax burden may be misleading is twofold. First, a significant share of NOE is a fact of life all over the world (Schneider and Enste, 2000). Second, NOE incomes affect both side of the ratio because they shrink government revenues and hamper the reliability of GDP estimates<sup>2</sup>. Previewing one of the proposed considerations, everybody should agree that only honest taxpayers pay taxes. Accordingly, the Tax-to-GDP ratio should be computed making use of declared incomes only.

From the practical point of view, obviously, the main problem when addressing “NOE-correct” AETR is to gather reliable estimates of the non observed incomes. In this note we take advantage of the peculiar Italian situation, which is a good case-study because of i) its non trivial share of tax evasion and ii) the availability of official (they are released by the Italian National Institute for Statistics, Istat) estimates of the hidden incomes.

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<sup>1</sup> According to SNA93 (U.N. et al., 1993), illegal activities are productive activities i) forbidden by law or ii) which are usually legal but carried out by unauthorized producers. The informal sector is broadly characterized as consisting of production units with the primary objective of generating employment and incomes to the persons concerned and, as such, forms a part of household unincorporated enterprises. The underground sector represents the area of legal production activities that are not directly observed due to reasons of an economic and/or statistical nature. The former are the activities carried out with the deliberate desire to avoid taxes, social contributions, etc. The latter are all those production activities that are not registered due to statistical issues (*e.g.*, the failure to fill out the administrative forms). Throughout this paper I will refer to underground economic activities as hidden, irregular, undeclared, etc. (but, obviously, illegal or informal).

<sup>2</sup> Due to the inclusion of the NOE production, at the end of 2006 Greece revised its GDP upward by 25%. Accordingly, all fiscal ratios involving the new GDP estimates show significant “improvements”. This is not the first case (*e.g.*, Italy in 1987) and, possibly, it will not be the last one (*e.g.*, Eastern European countries).

## 2. The Relationships Between Tax-to-GDP ratios and Underground Incomes.

The availability of estimates of regular and irregular GDP allows computing two policy relevant versions of the overall backward-looking tax burden. We will call them USUAL and MAX. The former is the conventional Tax-to-GDP ratio based on the overall (regular plus shadow) GDP. The latter makes use of the declared income. While quantifications are not strictly necessary to the present aim, national accounts consistent data help commenting conceptual issues. Table I collects the results of dividing total government revenues by the two<sup>3</sup> available GDPs.

**Tab. I. Tax-to-GDP ratios and Hidden Incomes (%)**

Years	MAX	USUAL	EVASION
1992	48.03	40.59	15.80
1993	50.52	42.25	16.80
1994	48.34	40.24	16.50
1995	48.93	40.12	17.10
1996	50.69	41.83	17.00
1997	52.56	43.21	17.70
1998	50.58	41.75	16.80
1999	51.04	42.54	17.00
2000	51.00	42.29	16.90
2001	50.12	41.93	17.50
2002	50.08	41.41	16.20
2003	50.59	41.97	16.70

Source: author's elaboration on Istat (GDP) and OECD (Tax) data. MAX=Tax/regular GDP; USUAL=Tax/overall GDP; EVASION=hidden income as % of overall GDP; Tax=total tax revenues.

Before examining the figures, the logic of this letter suggests to understand what really they can tell us. Given the two diverse estimates, a first question naturally arises – which is the most reliable indicator? On that it must be recalled that, at least for OECD countries, official estimates of GDP are worked out according to the SNA93 framework (U.N. *et al.*, 1993). Thus, the overall GDP is likely to be exhaustive, that is NOE incomes inclusive. As the presence of a non trivial amount of tax evasion is a fact of life all over the world, it means that USUAL is less reliable<sup>4</sup> than MAX. Modifications in tax evasion levels affect differently

<sup>3</sup> Istat releases two point estimates of hidden GDP (Baldassarini and Pascarella, 2003). The “minimum hypothesis”, which is surely economic underground and the “maximum hypothesis”, which amounts to the former plus a part that is an inextricable mixture of statistical and economic underground. In table 1 we use the former, more conservative, estimate.

<sup>4</sup> Although our approach is eminently macroeconomic, one may argue that an opposite conclusion is obtained if each agent hides the same share of income.

the two ratios. To the extent the overall GDP is really all-inclusive, a reduced tax evasion surely increases USUAL because it enlarges fiscal receipts without affecting the overall GDP (there is only an offsetting switch between regular and irregular incomes). Under the hypothesis of a proportional rise in revenues and regular GDP, instead, the tax evasion cutback does not impinge on MAX. Different causes behind the tax evasion decline impact differently on the reliability of the two proxies. If, *ceteris paribus*, there is less tax evasion due to an increase in the expected penalty and/or in the tax morale, then the positive variation recorded by USUAL is correct. Instead, wrongly, MAX remains constant. If, *ceteris paribus*, the new situation stems from reduced statutory tax rates<sup>5</sup>, MAX is biased but USUAL is even more fallacious. Opposite results are generated by a tax evasion worsening. What about informal incomes? To the extent informal production is untaxed and included in the regular GDP, a greater share of informal activities implies a reduction in both the proposed tax ratios. While it is correct, it must be kept in mind that a part of GDP, which is legally excluded from the tax base, it is included in the proxy of the true tax burden.

The analysis of the fiscal side of AETR adds further insights. Given that it is harder to hide consumption than income, indirect taxes are paid even by (income) tax dodgers<sup>6</sup>. To the extent it is true the USUAL ratio, taking into account even hidden incomes, turns out to be less biased than MAX (which over-estimates the AETR on law-abiding citizens). Likewise, illegal incomes are (at least partly) spent in the legal sector. Thus, like irregular earnings, even them pay indirect<sup>7</sup> taxes. According to the SNA93, illegal activities should be included in GDP. Unlike other countries (*e.g.*, the UK), however, in Italy they are not added (yet) to the overall GDP. All that implies that both versions of the Italian AETR are over-estimated – the denominator being unaffected, some government receipts are paid neither by regular nor by irregular incomes.

All that considered, we are tempted to say that the true overall fiscal pressure could lie somewhere between the two extreme ratios reported in table I. This latter show that the “NOE correction” is constantly as high as 20%, calling for a careful approach to common-wisdom figures. Their full-sample correlation is high, 95%, but decreasing (85% in the period 1998-03). Clearly, the magnitude of these statistics depends on the volatility of NOE incomes which, therefore, should be taken into account.

### 3. Concluding Remarks.

This note is motivated by two considerations. First, the availability of reliable and comparable estimates of tax burdens is fundamental in both political and economic circles. Second, the underground economy is immanent in economic systems. According to a recent

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<sup>5</sup> The hypothesis is that lower statutory tax rates imply greater revenues due to the more than proportional response in the declared tax base. Otherwise stated, the hypothesis is that we are in the decreasing part of the Laffer curve.

<sup>6</sup> To the extent it is easier to tax consumption than incomes, a clear normative message emerges for revenue-maximizing governments – in the presence of a significant share of NOE, it is better to resort to indirect than to direct taxes.

<sup>7</sup> In fact, one should virtually take into account the fact that GDP estimates include only illegal activities with mutual agreement between the parties (*e.g.* sale of drugs is included, extortion is not. See SNA93). *Vice versa*, all illegal incomes spent “regularly” pay indirect taxes. Therefore, even a switch between illegal activities may affect the Tax-to-GDP ratio.

survey (Schneider and Enste, 2000), even OECD countries are operating with a significant and long-lasting share of hidden GDP (15% in the last decades). Complementing the existing literature, I have focused on the main conceptual and practical difficulties encountered in the measurement of ex post overall tax rates in the presence of undeclared incomes. Although I dealt only with system-wide items, it should be noted that the proposed reflections may shed some light even on labor/consumption tax rates.

Needless to say, gathering reliable estimates of NOE incomes is a very complex task. Nevertheless, difficulties should not lead to minimize the effects of undeclared activities on pivotal indicators such as AETR. Data for Italy suggest that acritically referring to the conventional measure of the Tax-to-GDP ratio could be significantly misleading.

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