Materiali di discussione

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The distributive impact of
tax evasion in Italy

By

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1 . *Introduction and main conclusions*

According to recent international estimates, Italy, together with Greece, has the largest hidden economy among western countries. Schneider F.(2002) estimates that in 2001/2002, Italy's shadow economy represented 27% of the nation's GDP. ISTAT (2006) figures for the same period, on the other hand, revealed that Italy's underground economy accounted for between 16.8% and 17.3% of GDP.   The significant difference between these two figures highlights the difficulty of measuring the entity of the shadow economy, and the uncertainty of such estimates.

A first issue concerns the definition of the "shadow economy". Broadly speaking, the shadow economy is defined as the total market production of goods and services that is not directly observable (measurable). There has yet to be any agreement on a more detailed and practical description , although the OECD handbook [OECD (2002)], a manual adopted for national accounting systems, describes the four main components of the shadow economy as being:

1) the illegal economy: criminal activities and regulated legal activities carried out by unauthorised persons (for example, medical assistance offered by persons without the necessary qualifications to do so)

2) the underground economy: legal activities hidden in order to evade taxes and social security contributions (such as irregular employment)

3) the informal sector: unregistered activities, very small-scale business.

4) the statistical underground economy: basically, activities that go unobserved because of certain flaws in the statistical system.

In principle, all four components should be included in GDP estimates; however, in practice, governments' Central Statistics Institutes are recommended to take account only of those elements that can be measured in a reasonable manner, namely the underground economy. The difference between the ISTAT and Schneider estimates may be partly due to the fact that ISTAT's figures include the underground economy only, whereas the Schneider estimates refer to the whole shadow economy.

Measurement methods are commonly divided into two categories: indirect and direct approaches. Indirect methods are based on the comparison of aggregate (macro) indicators (such as the difference between income and expenditure figures), or the dynamics of macro indicators (a decrease in the official participation rate is interpreted as an increase in irregular employment), or other macro indicators (such as the demand for currency or for electricity). Direct methods use micro data, such as income surveys or tax audit files, to measure the degree of compliance with the law. An important difference between the two methods is that some direct methods allow for the direct observation of hidden income by income level, thus making it possible not only to measure the total amount of hidden income, but also to assess its distribution by income level. This is the reason why direct methods have been used to estimate tax evasion, and the redistributive effects of tax evasion, in Italy (see M. Bordignon & A. Zanardi (1997), A. Marenzi.*(1996),* M. Bernasconi & A. Marenzi (1997), C. Fiorio & FD'Amuri (2005)).

Bordignon & Zanardi (1997) used micro data from tax return auditing, regarding taxable income and taxes paid in 1987 and 1989, conducted by the Italian tax authorities up

until December 1995. They found that among the self-employed, 84.3% declared less income than was audited later on, and that on average reported income only amounted to 55.3% of audited income. Nevertheless, such remarkable findings can not be safely considered as providing a reliable picture of tax evasion in Italy. Certain biases are to be expected, given that the underlying sample of audited taxpayers is not a random one, but a selection of tax forms chosen to be checked. Unfortunately, the tax authorities failed to make public the criteria they used in their selection of taxpayers for auditing purposes.

The approach adopted by A. Marenzi.*(1996),* M. Bernasconi & A. Marenzi (1997), C. Fiorio & F. D'Amuri (2005) provides a more representative picture of the distribution of taxable incomes. These scholars compared the incomes surveyed by the Bank of Italy (in its Survey of Household Income and Wealth - SHIW) with a random sample of tax forms. The underlying rationale for this was that the incentive to conceal income during anonymous interviews was much lower than in interviews with the tax authorities, and therefore individuals were more truthful when interviewed by the Bank of Italy. This led us, in turn, to examine the difference between the two sources of figures for income hidden in order to evade taxes. They found that income declared in the SHIW was, on average, higher than the equivalent figures on the tax authority's files. The percentage of income concealed from the tax authorities decreased with income; consequently, if tax had not been evaded, disposable income would have been distributed in a slightly less equal manner.

Their results are based on the essential assumption that the observed correlation between the rate of underreporting to the tax authorities, and the level of income, is not produced by tax evasion itself. In other words, they have assumed that tax payers do not move from one percentile to another (re-ranking) as a result of tax evasion. Such studies have therefore not resolved the question of whether, and to what extent, the estimations they make are affected by the presumed absence of any re-ranking effects of tax evasion.

The present study is going to adopt their same approach, albeit with an explicit examination and discussion of the question of whether the observed redistributive effects of tax compliance is a result of re-ranking produced by tax evasion. In fact, the available data do not allow for any reasonable estimate of the said re-ranking effect, and so we are going to examine and compare two extreme scenarios: one scenario will be constructed under the assumption that the re-ranking effect is irrelevant, while the other will be built assuming that the observed negative correlation between income level and the rate of underreporting is entirely due to re-ranking. Our results suggest that the assumptions made regarding re-ranking effects are bound to play a major role in redistributive effects estimations. The 'irrelevant re-ranking effect' scenario will show that tax evasion has virtually no effect on equivalized household income distribution, while the 're-ranking effect scenario' will produce a significantly less equal distribution of equivalized household income due to tax evasion.

The rest of the paper is organised as follows:

Section 2 describes the data we used, and the process of reconciling the variables that are variously defined in diverse sources. We shall also attempt to assess the role played by error measurement.

We shall refer to *income underreporting* as the difference between the incomes given in survey data (SHIW) and the incomes shown by the tax authorities' figures. Section 3 shall describe the phenomenon of income underreporting in Italy.

Income underreporting is clearly not the same thing as *tax evasion*. To compute tax evasion, taxes paid (in the case of income underreporting) have to be compared with those taxes that would have been paid if income had not been underreported. Underreporting estimates will be used to compute the amount of taxes evaded, by running a number of simulations of EUROMOD built under different hypotheses underlying tax evaders' behaviour. Section 4 describes the EUROMOD model and the Italian tax benefit system.

Unlike previous studies, the use of a comprehensive tax benefit model such as EUROMOD, enables to take into account not only the effects of income tax evasion, but also the effects of the reduction in social security contributions and of welfare benefit fraud[1]. Section 5 describes different simulated scenarios and the redistributive effects of tax evasion.

2. Data and data adjustment

We have followed the approach adopted by several previous studies, and inferred tax payers' behaviour by comparing those incomes revealed by the Bank of Italy's income budget survey (SHIW), and those incomes declared to the tax authorities.

SHIW. The Bank of Italy's SHIW is a survey of disposable household income and wealth which has been conducted since 1965 - on an annual basis between 1965 and 1987, and every two years since then. The present study has utilised the 2002 survey, in which 8011 households (21141 individuals) were interviewed between February and September 2003, with regard to their income for the year 2002. Around 65% of these interviews were conducted using the CAPI method, and the participation rate was 34.3%. For a more detailed description of the SHIW, see A. Brandolini (1999), and for the 2002 survey see Banca D'Italia (2004).

Fiscal Data. The Italian Ministry of Finance releases statistics on taxable incomes, income tax and the number of taxpayers, based on information gathered from annual tax returns (*Ministero dell'economia e delle finanze, dipartimento per le politiche fiscali* [2005]). These statistics include tables summarising income sources, allowances, tax credits and tax due, classified according to diverse categories of total taxable income before deductions (*reddito complessivo*). Separate tables cover employees and pensioners, each ordered into diverse classes of total taxable income once again.

Thus any comparisons between the SHIW and the Tax authorities' figures are limited by the nature of the fiscal data we have access to. For example, it was only possible to compare data organized according to more than one characteristic in very few cases (when such cross tabulation was present in the original tax data); furthermore, we had to adopt the Ministry of Finance's classification system, and then adapt the SHIW figures to this system. A number of adjustments were necessary in order to bring the SHIW variables in line with the Ministry of Finance definitions.

The most important such adjustments included:

o   The complex calculation of gross incomes so as to adapt SHIW data to fiscal data. We could not use disposable income as an ordering variable, since tax figures only report items of taxable income ordered by class of total taxable income. Therefore, we had

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[1] C. Fiorio & F.. D'Amuri. (2005), for example, used a micro-simulation model that only simulates personal income tax.

to apply a gross-to-net procedure to SHIW data in order to compute taxable incomes and the components thereof from the Bank of Italy's figures, which are reported after taxation and benefits.

o   Tax figures do not provide any information about self employment as such. Self-employed persons' items of income are reported as separate items: that is, in addition to income from self employment itself, such income also includes fees, other forms of self-employed income, and business income. All these types of income are included in one single SHIW variable. In order to reconcile the definitions, we had to compute the number of self-employed tax payers shown by the tax authorities' figures as the sum of those people receiving each single type of income from self employment . As a consequence, the number of self employed was overestimated, and consequently the average income from self employment was underestimated, in that the same taxpayer often received more than one such form of income.

Before calculating the entity of underreporting, we carried out some checks on data reliability, and investigated whether it was necessary and possible to make any further adjustments to data. Table 1 compares incomes and the number of taxpayers receiving each type of income, tax relief or paying tax. In the case of total taxable income ("*reddito complessivo*"), the SHIW survey seems to significantly underestimates the actual number of taxpayers, the difference being more than 5 million (slightly more than 34 million taxpayers according to the SHIW survey, against more than 39 million according to the tax authorities' figures). This divergence can only be partly explained by differences in the definitions adopted by the two sources. While we could identify taxpayers as being those people with a positive taxable income, the tax authorities' definition includes everyone who submitted a tax return, including those people with a zero or negative tax base. However, according once again to the tax authorities, the number of negative and zero incomes declared in 2002 amounted to only 345,910, which is too few to account for the aforesaid difference.

Table 1: tax related variables				
	SHIW		Ministry of Finance	
Summary figures	**(1) Number**	**(2) mean(*)**	**(4) Number**	**(5) mean(*)**
Taxable income ("reddito complessivo")	34399977	19503	39789740	15670
Tax allowances (deductible from taxable income)				
- Deductible expenses, social security contributions	5078790	5173	10925975	1340
- Cadastral income from main residence	15739224	3971	15413156	460
Tax credits (tax reductions)	28428864	721	37632373	919
tax payable	32709868	3971	31097664	3740

(*) Monetary non-equivalized personal income (€/year – 2002)

The limited information on deductible expenses in the Bank of Italy's SHIW resulted in significant differences in the number and entity of tax allowances (deductions from the tax base) other than the cadastral rent from a taxpayer's main residence. It is

likely that tax credits are underestimated for the same reason, albeit to a less extent than allowances are.

Despite the differences in taxable income, allowances and tax credits, the figures for those with tax to pay appear relatively similar both in terms of the number of taxpayers, and the average amount due: According to our calculations based on the SHIW figures, 32,709,868 taxpayers SHIWhad tax to pay, compared with 31,097,664 when calculated on the basis of the Ministry of Finance's data. This may indicate that the main differences concern very low incomes, the majority of which are not subjected to taxation. Indeed, almost 2.5 million taxpayers with a positive income declared an annual taxable income of less than 1,000 Euros, while almost 4 million declared incomes of less than 2,000 Euros[2].

Although this comparison of summarised figures would seem to suggest that the two data sources are reasonably consistent with one another, a closer examination of the individual sources of income shows that we cannot rule out data inconsistency. This problem has already been raised and extensively examined in C. Fiorio & F. D'Amuri (2005).

Table 2 shows the number of taxpayers per income source. The number of recipients for each income source is consistently lower in the SHIW figures compared than it is in the tax authorities' figures. The SHIW figures reveal 1,600,000 fewer employees (almost 10%), 2,200,000 fewer pensioners (18%), 1,150,000 fewer self-employed (more than 24%), and 1,112,000 fewer persons earning revenue from property (6%). Given that only certain incomes are not reported in the SHIW, in the cases of those taxpayers who receive income from more than one source, the difference in the number of recipients of total taxable income (from any source), between the SHIW and Ministry of Finance figures, is much smaller than the sum of all such differences (see Table 2). The immediate conclusion is that there are two different problems inherent in the quality of the SHIW data. The fact that the total number of taxpayers is smaller in the SHIW shows that it has completely missed certain recipients of income; while the fact that the sum of the individual income source differences is much greater than the total difference, shows that the SHIW only reports certain sources of income for those recipients with more than one such income source.

Table 2 – Number of taxpayers by income source (2002)			
Income source	**SHIW (1)**	**Ministry of finance (2)**	**[(1)-(2)] /(1)**
wages and salaries	16816091	18455925	-0.10
pensions	12666647	14961019	-0.18
self-employment	4839109	5985342	-0.24
Property	17661539	18773928	-0.06
Total ("*reddito complessivo*")	34399977	39789740	-0.16

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[2] Ministero dell'economia e delle finanze, dipartimento per le politiche fiscali (2005).

Every source of income poses a number of different questions. First of all, we can rule out the voluntary underreporting and tax evasion of pension incomes. Thus the significant differences in the total number of pensioners and average pension, depending on the data source, highlights the importance of measurement error in our analysis. In fact, a previous analysis of measurement errors in the SHIW [C. Biancotti (2004)] classified pension income figures as being among the more reliable. Moreover, the number of pensioners compared to other figures, such as those for the total labour force, is overestimated (Brandolini 1999) as a result of differences in the accepted definitions. The significant underestimation of the number of pensioners here is probably due to the difficulties pensioners have in correctly identifying the type of pension they receive. In particular, they tend to confuse certain very low minimum contributory pensions (taxable) with social assistance pensions, which although very low as well, are not in fact taxable. The figures provided by the tax authorities obviously only include taxable income, and therefore we only chose taxable pensions (among those reported in the SHIW) in order to reconcile the diverse definitions of pensions adopted by the two sources of data; however, in doing so we were probably misled by the poor judgment of those interviewed, that is, we classified many of the smaller taxable pensions as exempted from taxation, which in turn resulted in fewer taxpaying pensioners and larger average (taxable) pensions.

Previous studies on data reliability property (C. Biancotti [2004]) classified also information on income property among the more reliable, but only household-level incomes were taken into consideration when conducting quality checks. Property income is a component of taxable income, and income tax in Italy is assessed individually. This is why we had to use individual property incomes. In the SHIW questionnaire, home ownership is first assessed at the household level (questions are designed to assess the value of property and the share thereof owned by the household); then a second set of questions aim to establish who are the actual owners of the home from among those individuals in the household. Basically, the personal ID of the owners is asked for, with a maximum of four owners for each property unit. No analysis of such data at the individual level has yet been carried out.

Tax authority figures provide further information on the composition of employees' taxable income. Table 3 below shows the number of employees (defined as those tax payers receiving employment income) receiving only employment income, and those receiving both employment income and some other form of income. The SHIW and tax authorities' data reveal a very similar number of employees whose only source of income is their employment, whereas there is a rather significant difference between the two sources with regard to the figures for the number of employees with income from property; however, the largest difference concerns the number of employees with other forms of income. In the SHIW, the number of employees with other forms of income – in addition to, or other than income from property- represents only 10% of the actual number furnished by the Ministry of Finance.

This would seem to confirm the findings of previous studies showing that secondary jobs are not accurately represented in the SHIW (A. Brandolini[1999]). If this is so, we should also expect a corresponding underestimation of the number of self- employed, since many of the self-employed earning money from secondary jobs are missing from the figures. Unfortunately, we cannot get this sort of information from the tax authorities' figures, although the comparison with national accounts would seem to lend some support to this hypothesis.

Table 3 - Number of workers by composition of taxable income (2002)	Ministry of Finance (a)	SHIW (b)	(b)-(a)
Employment income only	9056363	9344077	287714
Employment income and property income	4626073	6971767	2345694
Employed income and other forms of income	4773489	500247	-4273242
Total	18455925	16816091	-1639834

Table 4 shows tax authorities' data and SHIW data by occupation, compared with national accounts figures, with the latter broken down into regular and irregular work. The figures do not coincide completely, as the national accounts define employment status according to a person's main occupation, while our computations based on the SHIW and tax data perceive employment status as corresponding to income source, so that taxpayers with more than one source of income appear more than once in such calculations. We would thus expect a larger number of taxpayers in the SHIW figures than in the national accounts. What we in fact found, however, was that the numbers of both employees and the self-employed were higher in the national accounts. The underestimation of the number of self- employed in the SHIW is confirmed by comparing the said number with that of regular workers.

Our preliminary analysis of the available data clearly shows that there are two main problems inherent in the SHIW figures: (i) the absence of a number of secondary jobs; and (ii) the underestimation of the number of workers, due to non-response bias[3]. Two possible solutions to this quandary may be to impute incomes from secondary jobs, and to re-weight the SHIW by post-stratification, although neither of the two was actually feasible.

Tab 4 - Number of workers by employment status (thousands - 2002)		
Type of income	employment income	self –employment income
Tax authorities' figures (income source)	18455	5985
SHIW (income source)	16816	4839
National accounts (regular work)	*15278*	*5500*
National accounts (irregular work)	*2676*	*555*
National accounts total	17954	6055

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[3] The response rate in the SHIW is significantly lower than 50%

Imputing secondary jobs proved impossible, since the number of observations featuring secondary jobs in the SHIW was too low to permit any reliable estimates of the amounts to be imputed[4]. Moreover, this approach would work correctly if the missing secondary jobs were similar to the ones reported to the SHIW, which does not appear to be the case here given that lower incomes seem more underrepresented in the SHIW .

Post stratification procedures, on the other hand, require reliable external sources in order to compute totals. As has already been mentioned, national account figures are not suitable for such procedures due to the differences in definitions[5].Furthermore, the specific issue of which figure is to be adopted (total workers or regular workers), could end up reducing the number of workers. This is why, in order to find totals for re-weighting procedures, Fiorio & D'Amuri (2005) had to use the same data used to make the comparisons, that is, the tax authorities' figures.

3. Underreporting: results

We refer to *income underreporting* as the difference between those average incomes shown in survey data (SHIW), and those incomes reported in the tax authorities' figures. An analysis of the phenomenon of underreporting constitutes the starting point for our estimation of the percentage of income that is concealed from fiscal authorities, and as such will be used as an input when simulating the effect of tax evasion using EUROMOD.

An initial overview of underreporting is provided by table 5, which shows SHIW incomes and those incomes declared to the tax authorities (by income source). The table reveals that mean income is larger in the SHIW, for all income sources except wages. Underreporting appears relatively more important in the case of property income, but in absolute terms it is more significant in the case of self employment income.

The largest difference between the two data sources emerges in relation to income from property: SHIW property income is 70% larger than the same income as reported to the tax authorities. Despite the doubts raised above concerning the quality of SHIW data, the main reason for this vast difference is commonly thought to be the different definitions of the variables concerned. According to the Italian tax system, when dwellings are not actually rented (as in the case of home owners actually living in their homes), an imputed income is calculated on the basis of a series of conventional indicators (the said income being termed the 'cadastral rent'). The SHIW, on the other hand, reports the subjective estimate of market rent made by home owners[6]. As we mention in appendix, however, income from a taxpayer's main residence is not taxable; therefore, regardless of the magnitude, this discrepancy has little effect on taxable income and, in turn, on tax evasion estimates, since the bulk o income from property consists in imputed income from main residence

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[4] The idea was to compute the average secondary income by using the corresponding average income reported in the SHIW. When we computed the average employment income (from secondary jobs) of workers whose main source of income was their self-employed profession, we ended up with only two non-weighted observations.
[5] National accounts define employment status as a person's status at a particular moment during the year, while for the tax authorities, workers are defined according to income received during the course of the year, and therefore we would expect the number of workers defined in this latter manner to be systematically greater than the number defined using the former criterion.
[6] The question is: if the dwelling were rented, how much rent would be charged?

Table 5 - Dimension of income under-reporting by income source
(mean income by income source €/year 2002)

income source	SHIW (1)	Ministry of Finance (2)	[(1)-(2)]/(1)
wages and salaries	16772	17420	-0,04
pensions	12933	11280	0,13
self-employment	30327	14910	0,51
Property	5002	1500	0,70
Total ("reddito complessivo")	19503	15670	0,20

The second biggest difference in relative terms concerns income from self employment: surveyed income is more than twice the income declared to the tax authorities. In absolute terms, this represents the biggest difference of all, amounting to more than 15,000 Euros per year. Unlike property income, however, in this case there are no obvious reasons for assuming that there is any significant difference in the way income is defined, which could help explain such a large degree of underreporting.

Despite the noticeable underreporting of pension incomes, we decided to rule out the possibility of any real tax evasion with regard to pensions. There are strong arguments in favour of this decision: firstly, the Italian pension system is almost entirely public, and income tax on pensions is paid at source, so that it is very unlikely that any such tax is evaded; secondly, as we mentioned in the previous section, measurement error affects SHIW pension incomes to a degree that explains the observed underreporting.

Aggregate summarised statistics provided by the Ministry of Finance do not allow for any detailed analysis. The only disaggregated information available is that concerning geographical areas and total taxable income classes. Underreporting by area and income source is shown in Table 6, while underreporting by taxable income quintile is shown in Table 7. Both tables show underreporting as a percentage of SHIW income.

Table 6 - Income under-reporting by area and by income source

	employment income	self employment income	taxable income
North West Italy	0.5	48.8	20.3
North East Italy	-8.1	52.8	21.2
Central Italy	-5.6	59.5	18.5
Southern Mainland Italy, Sicily & Sardinia	-5.1	53.4	17.7
ITALY	-3.8	50.8	19.6

Table 7 - Income under-reporting by taxable income quintile

quintile	SHIW income	reported income(*)	(a) – (b)
Employment Income	**(a) (€/year)**	**(b) (€/year)**	**%**
1 (bottom)	4.85	3.65	24.69
2	10.48	10.89	-3.9
3	14.43	15.8	-9.49
4	18.71	19.83	-5.99
5 (top)	32.76	36.95	-12.8
Total	16.77	17.4	-3.74
Self-employed income	**(a) (€/year)**	**(b) (€/year)**	**%**
1 (bottom)	5.15	1.44	71.97
2	8.94	5.9	33.95
3	12.5	10.36	17.14
4	18.24	15.12	17.12
5 (top)	47.14	41.71	11.51
Total	30.33	14.91	50.84

(*) computed assuming equidistribition whitin income classes

The breakdown of under-reporting by geographical area (Table 6) does not reveal any significant differences between the different areas of Italy provided we look at total taxable income. Interestingly, it varies slightly more if we disaggregate income into individual income sources. For example, employment income is over-reported in all areas except for the North-West. Although the underreporting of selfemployed income is significant everywhere, it tends to be greater in central Italy, and slightly less significant in the North-West.

Figures for the under-reporting, by quintiles, of taxable income (table 7) confirm the findings of previous studies of tax evasion in Italy: under-reporting is more significant among lower-income earners. In the case of employees, underreporting is only present in the poorest quintile, while the average income declared to the tax authorities is larger than the surveyed average for the remaining 80% of employees[7]. Self-employed income is significantly underreported in all quintiles, albeit to an increasingly lesser degree as income increases.

Previous studies [(Bernasconi & Marenzi (1997). and Fiorio& D'Amuri (2005)] have used similar figures to model the manner in which taxpayers conceal income from the tax authorities. Taxpayers in the same income bracket have been assumed to conceal the same proportion of income from the tax authorities. Obviously, this would only be true if tax evasion itself did not result in a change in income ordering. If relatively wealthy people slide down into the poorer quintiles for the simple reason that they conceal

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[7] Response rate in SHIW decreases with income, hence the upper tile of income distribution is underepresented .

substantial income from the tax authorities, then the observed levels of underreporting by quintiles may reflect the re-ranking effect instead of any genuine degree of tax evasion. In fact, observed underreporting by income level may be explained using various different hypotheses about tax evasion behaviour.

In principle, this matter can only be resolved after appropriate tests have been conducted. Unfortunately, neither we nor the authors of previous studies are in a position to access the right kind of data required to test the re-ranking effects hypothesis[8]. Given such data limits, we decided to tackle the problem in a different way: we chose to run a sort of robustness exercise as a possible alternative to a statistical test. Both rival hypotheses – the presence/absence of the re-ranking effect- were simulated using EUROMOD, in order to assess the distributive effects of tax evasion. By comparing the results of such simulations, we can establish whether the assumption of the absence of any re-ranking effects plays a major role in suggesting the equalizing effects of tax evasion.

4. EUROMOD: the model and the Italian tax benefit system

Studying the distribution of underreporting among income classes is not the same as analysing the distributive effects of tax evasion. The latter may differ considerably from underreporting behaviour. Firstly, tax benefit systems are progressive, and thus even if underreporting is much greater in the case of the poorer taxpayers, the entity of tax evasion may be flatter or even greater among the rich. Moreover, poorer and wealthier individuals may co-exist within the same household, and a family's total income may include incomes from various different sources. Finally, equivalent income may differ significantly from monetary income, due to the presence of a different number of dependent within the family.

A multi-country tax benefit model, EUROMOD, has been used to compute the distributive effect of tax evasion. EUROMOD is a tax-benefit microsimulation model covering all 15 pre-May 2004 Member States of the European Union (EU-15), and it is currently being adapted to incorporate some of the new member states[9]. The original model was built between 1998 and 2000, and since than it has been continuously updated and improved. At the moment, work on the model involves a team of researchers from all 15 (pre 2004) member states of the European Union, as well as from 4 of the new member states. The EUROMOD consortium is co-ordinated by the Microsimulation Unit at Essex University (http://www.iser.essex.ac.uk/msu/emod/index.php).

At present, EUROMOD makes it possible to simulate the 1998 and 2001 tax benefit systems of all EU-15 countries, the 2003 system for some of them, and the 2005 system for four of the new member states. Three different EUROMOD simulations of the most recent Italian tax benefit system (2001) will be compared in order to analyse the distributive effects of tax evasion in Italy. A baseline, which has been constructed under the assumption of no tax evasion, together with two alternative scenarios, both of which envisage the presence of tax evasion.

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[8] The presence of re-ranking effects may only be tested by comparing the same taxpayers, classified according to SHIW incomes and their taxable incomes as declared to the tax authorities. This would require the precise merging of survey data and administrative data: for an example of this method, see Jäntti (2004).
[9] For a description of EUROMOD: Sutherland H.(2007) and Lietz C., Mantovani D. (2006)

In order to provide suitable input for these different scenarios, we computed *underreporting* of income, that is, the difference between the income surveyed by the Bank of Italy, and the income resulting from tax returns to tax authorities. The Bank of Italy survey (SHIW), which is carried out every two years, was performed in 2001, based on income earned in the year 2000, and in 2003, based on income for the year 2002. It was therefore impossible to use the same year as that of the tax benefit system simulated by Euromod. Given that the SHIW figures for 2001 are not available, we have assumed that underreporting behaviour remained unvaried between the two years in question. When absolute amounts were used, we adjusted them by the inflation rate[10].

A second important adjustment needed to be made to the SHIW figures. This survey only reports incomes after taxes and benefits; and so in order to compare them with the tax authorities' figures[11], income before taxation and benefits had to be imputed. The absence of the 2002 system in EUROMOD meant that this model could not be used for such purposes, and so we had to implement a new net-to-gross procedure based on the 2002 Italian tax benefit system.

The structure of the tax benefit system remained largely unaltered between 2001 and 2002, with just certain monetary values being updated. A full description of the 2001 system, and of the manner in which it is implemented in EUROMOD, can be found in the EUROMOD Italian Country Report[12]. For our purposes, only certain tax benefit instruments are of any importance, namely: social security contribution, income taxes, and family benefits (*assegno al nucleo familiare*). There is a brief description of these instruments, used in the nettogross procedure, in the appendix.

5. *The redistributive effects of tax evasion*

Two different scenarios have been implemented. Together with the more traditional model (in which the share of income a subject conceals depends on that subject's income level), there is also the scenario in which only geographical area and income source affect a tax evader's behaviour. Underreporting, computed according to the two different models, has been used to calculate the entity of evaded taxes (tax evasion). The effects of tax evasion have been assessed by comparing the EUROMOD baseline scenario with the two alternative simulations obtained under the following hypotheses:

A basic scenario, based on the hypothesis of zero underreporting, will be compared with two alternative scenarios based on different estimates of underreporting. Scenario 1 will be based on the hypothesis that underreporting depends exclusively on income source and geographical area, thus assuming that any correlation between income level and the underreporting rate observed ex-post is entirely due to the re-ranking effect of underreporting. Scenario 2, on the other hand, will be based on the assumption that underreporting depends on income source and income level, which implies the assumption that the observed correlation between income level and underreporting rate is not at all due to the said re-ranking effect.

In these two alternative scenarios, we have ruled out the possibility of voluntary tax evasion on pension income, so that any corrections for underreporting have been made

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[10] For example when limits of income classes were used.
[11] Aggregate statistics from Ministry of Finance are ordered only by taxtable income taxes.
[12] See: http://www.iser.essex.ac.uk/msu/emod/documentation/countries/italy/index.php.

exclusively for employment income and self- employed income. In the event of observed over-reporting (groups or categories that appear to declare a larger income to the tax authorities than to the SHIW interviewers), no corrections were made to the baseline[13].

Corrections for underreporting consisted in multiplying incomes by appropriate coefficients. Subsequently, a new EUROMOD simulation was run using the thus obtained "corrected incomes", and finally non-reported income was added back to disposable income. The correction coefficients we employed are shown in Table 8.

Table 8 - Correction of Euromod incomes: coefficients		
Scenario 1: correction for income source and geographical area		
Area	employment income	Self-employed income
North West Italy	0.98	0.51
North East Italy	1	0.47
Central Italy	1	0.40
Southern Mainland Italy, Sicily & Sardinia	1	0.47
Scenario 2: correction for income source and income quintiles		
quintile	employment income	Self-employed income
1	0.7531	0.28
2	1	0.66
3	1	0.83
4	1	0.83
5	1	0.88

Table 9 shows the results of both scenarios, firstly (a) in terms of certain summary indicators of inequality (Gini index) and of poverty (head count ratio), and then (b) in terms of monetary gains and losses by deciles of the household's equivalized disposable income. The distributive effects of tax evasion on household disposable income clearly differs substantially from underreporting. There are three major reasons for this:

1- The progressivity of tax benefit systems. Poorer people face lower marginal tax rates, and thus the same absolute (or even larger) amount of income concealed from the tax authorities by the poor, will result in them evading a smaller quantity of taxes than do the rich.

2- Generally speaking, the various members of a family do not enjoy the same personal income. As a rule, women and the younger members of a family receive a lower income than the adult men with whom they live. In other words, the same household may be composed by poorer and richer family members, whereas they are assumed to enjoy the same level of household income.

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[13] The reason for not making any corrections is that we assumed over-reporting to be due to measurement errors rather than tax evasion.

3-   Finally, in order to compute the effect of tax evasion on household welfare, we use the OECD modified equivalence scale[14]. Equivalent income may significantly differ from monetary income, due to the presence of differing numbers of dependent members in households with a similar level of monetary income.

Tab. 9 - Effects of tax evasion on income distribution

a) Summary indicators: inequality and poverty

	base	scenario 1	scenario 2
Gini - disposable income(1)	0.34	0.36	0.34
poverty rate (2)	20.2%	21.0%	20.3%

b) effect on household disposable income(3)

decile (4)	(€/year- 2001)			difference (%)	
	Base	Scenario 1	Scenario 2	Scenario 1	Scenario 2
	(a)	(b)	(c)	(b-a)/a	(c-a)/a
1(bottom)	6931	7027	7066	1.38%	1.95%
2	11104	11087	11126	-0.15%	0.19%
3	14441	14822	14780	2.64%	2.35%
4	17026	17190	17210	0.96%	1.08%
5	19862	20451	20435	2.97%	2.89%
6	23260	24323	23609	4.57%	1.50%
7	27413	28812	28264	5.10%	3.11%
8	31567	32677	32173	3.52%	1.92%
9	38553	40614	39179	5.35%	1.62%
10(top)	66079	76999	68260	16.52%	3.30%
all	*26079*	*27665*	*26628*	*6.08%*	*2.11%*

(1) equivalized disposable income - equivalence scale: OECD modified
(2) the poverty line is 60% of the scenario's median income.
(3) mean monetary disposable household income - ordering: individual equivalized disposable income
(4) Observations are ordered by equivalent household disposable income. The ordering variable varies for each scenario: each scenario is ordered by its own simulated disposable household income.

Scenario 2 was constructed under the same assumptions made by previous Italian studies, namely: the absence of any re-ranking effects of tax evasion, that is, all taxpayers with the same source of income and in the same income class, are characterised by the same underreporting rate. Therefore is not surprising that the redistributive effects of this scenario are rather similar to those of previous findings: Fiorio & D'Amuri (2005) reported a very slightly more egalitarian distribution in the scenario with evasion than in the baseline case (the Gini index was, respectively, 34.6% and 34.8%, in 2002), whereas we found no variation in the Gini index, which remained at the baseline value of 34%. The

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[14] Modified OECD scale consists in coefficients equal 1 for the first adult, 0.5 for any other adults in household and 0.3 for children. A child is a person aged 13 or less.

poverty rate remained almost the same as well (20.3% against 20.2% in the baseline case). Household disposable income did change as a result of tax evasion (+2.11% on average), although there was no clear pattern across the various deciles.

Scenario 1, on the other hand, was constructed under the hypothesis that all taxpayers with the same source of income and residing in the same area, are characterised by the same underreporting rate, regardless of their income level. Unlike scenario 2, scenario 1 has significant distributive effects. The Gini index increases to 36 % and the poverty rate goes up to 21%. Household income is affected to a greater extent than in scenario 2. Household income increases by an average of 6.08%, clearly in proportion to income, although the relationship between the two is an irregular one.

The comparison between the two scenarios enables us to make a rough assessment of the role played by the assumption of the absence of re-ranking. According to our computations, under this assumption tax evasion has no regressive effect on household incomes, whereas a strong regressive impact emerges once the said assumption is relaxed. None of the previous studies examined the role played by re-ranking; however, in the light of our findings, it would seem plausible that re-ranking could have had an essential part to play in their results as well. It this seems clear that a closer examination ought to be made of the re-ranking effect.

References

Banca D'Italia (2004) *Italian Household Budgets in 2002,* Supplements to the Statistical Bulletin Methodological notes and statistical information, Year XIV- Number 12 – March 2004

Biancotti C., D'Alessio G., Neri A. (2004) *Errori di misura nell'indagine sui bilanci delle famiglie italiane*, temi di discussione n. 520, Bank of Italy 2004

Bernasconi, M. Marenzi, A. (1997). *Gli effetti distributivi dell'evasione fiscale in Italia. Ricerche quantitative per la politica economica,* CIDE-SADIBA, Banca d'Italia

Bordignon,M. Zanardi, A (1997). *Tax evasion in Italy. Giornale degli Economisti, 56*

Brandolini, A.(1999) *"The Distribution of Personal Income in Post-War Italy: Source Description, Data Quality, and the Time Pattern of Income Inequality"* , Temi di discussione n. 350, Bank of Italy, 1999

Fiorio,C. D'Amuri, F. (2005) *Workers' tax evasion in Italy*, Working paper n. 104 Econpubblica, Università Luigi Bocconi

ISTAT (2006) *La misura dell'economia sommersa secondo le statistiche ufficiali Anni 2000-2004,* contabilità nazionale - statistiche in breve, 14 Dicembre 2006

Jäntti M. (2004), *The effect of measurement errors, non-response and attrition on income inequality, poverty and mobility.* In Manfred Ehling and Ulrich Rendtel (ed.), Harmonisation of panel surveys and data quality. Statistisches Bundesamt,Wiesbaden, December 2004.

Lietz C., Mantovani D.(2006) *A short Introduction to Euromod: An Integrated European Tax-benefit Model* in Microsimulation in action: Policy Analysis in Europe using Euromod, Bargain O. (editor) Research in Labor Economics, 25, Elsevier Ltd. 2006

Marenzi, *A.(1996) prime analisi sulla distribuzione dell'evasione dell'IRPEF per categorie di contribuenti e per livelli di reddito.* Rapporto CNEL, il Mulino.

Ministero dell'economia e delle finanze, dipartimento per le politiche fiscali(2005), *Le persone fisiche- anno d'imposta 2002*, Roma 2005

OECD (2002) Measuring the Non-Observed Economy : A Handbook

Schneider F. (2002) *The Size and Development of the Shadow Economies of 22 Transition and 21 OECD Countries*, IZA Discussion Paper No. 514, June 2002

Sutherland H. (2007) *EUROMOD: the tax-benefit microsimulation model for the European Union* in A. Gupta and A. Harding (eds.) Modelling Our Future: population ageing, health and aged care International Symposia in Economic Theory and Econometrics Vol. 16, Elsevier (2007)

APPENDIX – a short description of the Italian tax benefit system

a) *Social security contributions*

Social security contribution rates vary from one sector to another, and according to firm size, especially in the case of employers' social security contributions; the rates applied to employees tend to be rather similar - between 9% and 10% - with a few exceptions such as those workers employed in domestic services and agriculture. The self-employed and shopkeepers only pay for old-age, invalidity and survivors' pensions. Social security contribution rates (around 16.5%) increase slightly as income rises, up to a maximum ceiling.

Social security contribution rate: the manufacturing sector, firms with more than 50 employees (2002)		
	Blue-collar	**White-collar**
Employer	**33.08**	**30.86**
Old Age, Invalidity and survivor pension contributions	23.81	23.81
Unemployment benefits	1.91	1.91
CIG (*cassa integrazione guadagni*)	2.8	2.8
Sickness and maternity benefits	2.68	0.46
Others	1.88	1.88
Employee	**9.19**	**9.19**
Old Age, Invalidity and survivor pensions	8.89	8.89
CIG (*cassa integrazione guadagni*)	0.3	0.3

b) *Personal income tax*

Personal income tax (IRPEF*, Imposta sul Reddito delle Persone Fisiche*) in Italy is assessed at the individual level on the basis of annual income received (from January to December each year). IRPEF is graduated, with five progressively higher marginal tax rates applied to higher income brackets. Most income tax on earnings is withheld at the source. While tax on employment income is entirely withheld at the source, a withholding tax at the lowest rate is applied to self-employed incomes when such incomes are paid by a firm.

IREPF- Income brackets and rates.		
Brackets (€ / year)		rates
Bottom	Top	
0	10329.14	18%
10329.14	15493.71	24%
15493.71	30987.41	32%
30987.41	69721.68	39%
69721.68	∞	45%

Taxable income (reddito complessivo). The following incomes are subject to Personal Income Tax:

- Employment Income
- Self-employed Income Farmers' Income
- Most pensions
- Income from land and property

- dividends
- Certain other forms of income (e.g. alimony, some minor benefits …).

Dwellings are taxed on the base of their cadastral rent, if an actual rent is not received on them. Farmers' land and income are taxed on the base of imputed incomes as well. The most important benefits, namely social pensions and family benefits (*assegno al nucleo familiare*), together with school grants, are exempted.

Financial interest is not included in IRPEF tax base, but is subject to a separate flat rate tax. Tax on interest (*imposta sostitutiva*) is collected at source. Different rates are applied to interest from different kinds of investment.

Tax allowances (deductions from the tax base). Certain expenses (oneri deducibili) are deductible from the tax base, such as: cadastral rent on a person's main residence, the medical costs of disabled people, maintenance paid to a separated spouse, and certain other selected forms of expenditure (such as charitable gifts and payments to the church). All compulsory social security contributions are non-taxable, although employees and the self-employed are treated in different ways. Contributions payable on self-employed income have to be included in tax returns (this means that they are part of the "reddito complessivo"), and they are therefore treated as a deduction from taxable income. Employees' social security contributions are not included in incomes subject to personal income tax (that is, they are not included in the "reddito complessivo"), and thus they are not classified as deductions.

Income brackets and rates are applied to the tax base ("reddito imponibile"), which is defined as those incomes subject to tax ("reddito complessivo") less all tax allowances.

Tax credits (deductions from tax). Italy's tax system in 2002 contained no general allowances, but rather a series of different tax credits applied to different sorts of income (employment income, pensions, self-employed income, income from temporary jobs). The entity of tax credits differs, and all of them decrease as income rises, albeit at a different rate. Entitlement is proportionate to the number of months worked during the course of the year; however, there are additions for those workers who did not work all year. There are also additions for pension incomes received by pensioners of over 75 years of age.

Employment Income tax credit (*)		
lower limit (€/year)	upper limit (€/year)	Tax credit (€/year)
0	6197	1146.53
6197	6352	1084.56
6352	6507	1032.91
6507	7747	981.27
7747	7902	903.8
7902	8057	826.33
8057	8212	748.86
8212	8263	686.89
8263	8780	650.74
8780	9296	614.58
9296	9813	578.43
9813	15494	542.28
15494	20658	490.63
20658	25823	438.99
25823	30987	387.34
30987	31142	335.70
31142	36152	284.05
36152	41317	232.41
41317	46481	180.76
46481	46688	129.11
46688	51646	77.47
51646	∞	51.65

(*)This tax credit also applies to pensions

Employment Income tax credit		
additional amounts for those employed for fewer than 12 months over the course of the previous year permanent jobs		
lower limit (€/year)	upper limit (€/year)	Tax credit (€/year)
0	4700	155
4700	4803	103
4803	4958	52

Employment Income tax credit		
additional amounts for those employed for fewer than 12 months over the course of the previous year temporary jobs		
lower limit (€/year)	upper limit (€/year)	Tax credit (€/year)
	4700	207
4700	5165	155
5165	5681	103
5681	6197	52

Pensioners additional tax credit		
additional amounts for pensioners below the age of 75		
lower limit (€/year)	upper limit (€/year)	Tax credit (€/year)
	4855	98.13
4855	9296	61.97

Pensioners additional tax credit		
additional amounts for pensioners above the age of 74		
lower limit (€/year)	upper limit (€/year)	Tax credit (€/year)
	4855	222.08
4855	9296	185.92
9296	9554	92.96
9554	9813	46.48

Self-employed Income tax credit		
lower limit (€/year)	upper limit (€/year)	Tax credit (€/year)
	4700	573.27
4700	4803	516.46
4803	4958	464.81
4958	5113	413.17
5113	7747	361.52
7747	7902	309.87
7902	8263	247.9
8263	8780	211.75
8780	9296	175.6
9296	9813	139.44
9813	15494	103.29
15494	30987	51.65

Family tax credits. The income threshold for being considered a dependent was 2840.5 €/year in 2002. Tax credit for dependent spouses ranged from 546.18 € for those taxpayers earning less than 15494 €/year, to 422.23 € for those taxpayers earning more than 51646 €/year.

Tax credits for each dependent child depended on personal monetary income and on the number of children, and ranged from 516.46 € to 285.06 €. There was no age limit for dependent children, although taxpayers were entitle to an additional sum of 123.95 € for each child below the age of 3. For tax purposes, dependent children could either be assigned to one parent or be shared between the two parents. In the case of orphans, the tax credit for the first child was increased to the level of the tax credit for a dependent spouse. Finally, there was a smaller deduction for other dependent family members, such as dependent parents and disabled siblings.

Deduction for dependent spouse		
Taxable income ("reddito complessivo")		
lower limit (€/year)	upper limit (€/year)	Tax credit (€/year)
	15494	546.18
15494	30987	496.6
30987	51646	459.42
51646	∞	422.23

Deduction for dependent children (amounts €/year)									
1 child		2 children		3 children		4 and more children		first child	Any other child
Lower limit	Upper limit	Lower limit	Upper limit	Lower limit	Upper limit	Lower limit	Upper limit	Amount per child	
0	36152	0	41317	0	46481	-	-	516.46	516.46
36152	51.646	41317	51646	46481	51646			303.68	336.73
51646	∞	51646	∞	51646	∞			285.08	285.06

additions: 774.69 € for disabled children
123.95 € for children aged less than 3

Deductions for other dependents		
Taxable income ("reddito complessivo")		
lower limit (€/year)	upper limit (€/year)	Tax credit (€/year)
	51848	303.68
51848	∞	285.08

Tax credits for selected expenditure. 19% of certain costs (mainly medicines and healthcare) could be deducted from tax. Moreover, 36% of the cost of home renovation could be deducted over the course of ten years.

c) *Family benefit ("assegno per il nucleo familiare")*

Family benefit (Assegno al nucleo familiare) is a means-tested benefit for those families where employment income or employment pensions constitute the main source of income. Many types of family with two or more family members are eligible for family benefit: married couples, with or without children or with disabled grown children; single parents; orphaned adults with dependent siblings below the age of 18; adults with dependent orphaned grandchildren below the age of 18. Single people are only eligible if they are disabled. The entity of, and the income limits on, family benefit vary according to type of family, number of

members, and the presence or otherwise of disabled persons within the family. In fact, there are more than 10 tables giving income limit and the amounts payable for almost 15 types of family, defined in terms of a vast range of possible combinations of characteristics (married couples without children and without disabled family members, couples with children but without/with disabled within the family , single parents without /with disabled children …). Two tables, shown below, concern the two largest groups of beneficiaries: married couples with children and without disabled members, and single parents without disabled family members.

A married couple with at least one child aged less than 19, without disabled family members								
Income limits (€/year)		*benefit amount (montly)*						
		number of family members						
lower	*upper*	*1*	*2*	*3*	*4*	*5*	*6*	*7 +*
0	11,422.98	-	-	130.66	250.48	358.94	492.18	619.75
11422.99	14134.92	-	-	114.65	220.53	339.83	481.34	600.64
14134.93	16846.33	-	-	92.45	190.57	312.97	473.07	584.11
16846.34	19556.69	-	-	65.59	158.04	283.02	453.97	565.00
19556.70	22269.16	-	-	43.90	111.55	241.70	407.48	507.68
22269.17	24980.56	-	-	25.82	81.60	217.43	390.96	488.57
24980.57	27693.03	-	-	15.49	57.33	176.63	364.10	466.88
27693.04	30403.39	-	-	15.49	38.73	135.83	339.31	439.50
30403.40	33114.80	-	-	12.91	25.82	102.77	317.62	426.08
33114.81	35825.68	-	-	12.91	25.82	91.93	225.18	398.70
35825.69	38538.69	-	-	12.91	23.24	91.93	154.42	292.83
38538.70	41250.09	-	-	-	23.24	78.50	154.42	218.98
41250.10	43962.04	-	-	-	23.24	78.50	132.21	218.98
43962.05	46673.44	-	-	-	-	78.50	132.21	189.02
46673.45	49385.92	-	-	-	-	-	132.21	189.02
49385.93	52098.40	-	-	-	-	-	-	189.02

Single parents, without disabled family members								
Income limits (€/year)		*benefit amount (montly)*						
		number of family members						
lower	*upper*	*1*	*2*	*3*	*4*	*5*	*6*	*7 e più*
	13,230.58	-	99.68	184.89	412.13	554.16	724.59	891.92
13,230.59	15,942.53	-	79.53	164.75	372.37	531.43	715.81	869.20
15,942.54	18,652.88	-	54.23	136.34	332.60	491.67	701.86	843.89
18,652.83	21,364.82	-	23.24	102.26	289.73	454.48	676.04	821.17
21,364.83	24,077.30	-	20.66	73.85	230.34	403.35	616.65	744.21
24,077.31	26,788.71	-	20.66	48.55	190.57	369.27	593.93	721.49
26,788.72	29,500.11	-	-	34.09	159.07	315.56	559.84	693.09
29,500.12	32,211.53	-	-	34.09	136.34	261.33	528.34	659.00
32,211.54	34,922.41	-	-	28.41	119.30	221.56	499.93	639.37
34,922.42	37,635.41	-	-	28.41	119.30	204.52	378.05	605.29
37,635.42	40,347.35	-	-	28.41	102.26	204.52	284.05	465.84
40,347.36	43,057.70	-	-	-	102.26	176.11	284.05	369.27
43,057.71	45,770.18	-	-	-	102.26	176.11	244.28	369.27
45,770.19	48,482.11	-	-	-	-	176.11	244.28	318.14
48,482.11	51,194.58	-	-	-	-	-	244.28	318.14
51,194.59	53,906.00	-	-	-	-	-	-	318.14