The Crisis and Tax Evasion in Greece: What Are the Distributional Implications?

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Introduction

As every European who occasionally switches on her TV set must be aware, Greece is in the throes of a dramatic crisis. This started off in 2009 as a fiscal crisis, soon turned into a sovereign debt crisis, and finally mutated into a full-blown recession, unprecedented in depth and duration. At the time of writing (May 2012), the Greek economy had already been in recession for four consecutive years, and showed few signs of recovery. The latest official figures (Bank of Greece 2012) estimated the size of (negative) growth in 2011 at – 6.9 percent, and bleakly forecast a further – 5.5 percent in 2012. Overall, GDP looks set to contract by as much as 17.4 percent in real terms in 2012 versus 2008. So deep and drawn out a recession had simply no precedence in the country's economic history at peacetime.

In May 2010, at the height of the debt crisis, the Greek government negotiated a 110 billion euro loan with the European Union, the European Central Bank and the International Monetary Fund. As a condition for the loan, the government signed up to a three-year Memorandum of Economic and Financial Policies, committing Greece to sweeping spending cuts, steep tax increases, and an ambitious programme of structural reforms (IMF 2010; EC 2010). The Greek programme was updated in July 2011, when the euro area summit conceded lower interest rates and a longer repayment period (CEU 2011a), and again in October 2011, when the European summit opened the way to a new loan and a negotiated reduction in the nominal value of Greek government bonds, colloquially known as a 'haircut' (CEU 2011b).

Fiscal consolidation, a crucial part of the programme, proved moderately successful: revenues rose from 38.0 percent of GDP in 2009 to 41.0 percent in 2011, while expenditure fell from 53.8 percent of GDP in 2009 to 50.3 percent in 2011 (IMF 2012, 9). Most of the deficit reduction (about 5 percent of GDP) was actually achieved in 2010, moving the OECD to observe that "no other OECD country has achieved such a fiscal improvement in a single year over the past three decades" (OECD 2011, 12).

As recognised from the outset, the fight against tax evasion was to play a crucial role. Firstly, by virtue of its sheer size: at an estimated 27.5 percent of GDP in the period 1999–2007, the informal economy in Greece was larger than any other EU country (Schneider 2012); the VAT tax gap in 2006 was 30 percent, compared to an EU average of 12 percent; while the tax debt as a share of annual net tax revenue in Greece was 72.2 percent in 2011, compared to an OECD average of 12.3 percent (IMF 2012, 9). In this context, the scope of improvement was great: the OECD reckoned that "if Greece collected its VAT, social security contributions and corporate income tax with the average efficiency of OECD countries, tax revenues could rise by nearly 5 percent of GDP" (OECD 2011, 15).

Equally obvious is the social and political importance of progress in the fight against tax evasion. In the words of the OECD: "a decisive reduction in tax eva-

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sion is indispensable for fairness and [the] acceptance of the broader fiscal consolidation effort. [...] Reduction in tax evasion has become a major yardstick in measuring the success of the adjustment programme for many observers" (OECD 2011, 15).

Progress on that front to date has been at best limited. For example, the latest review of the economic adjustment programme for Greece by the European Commission concluded that "fiscal consolidation was held back by a less than successful fight against tax evasion" (EC 2011, 17). Even more significantly, this also seems to be the perception of most observers at home and abroad. Evidence for the latter includes a recent interview given by Christine Lagarde, Managing Director of the International Monetary Fund, to the British daily *The Guardian* (25 May 2012).[1]

Our paper focuses on one aspect of tax evasion in Greece, namely its distributional implications. It builds on an earlier study (Matsaganis and Flevotomou 2010), estimating the size and distribution of evasion of personal income tax in Greece in 2004, by extending it to later years drawing on a new, larger sample of unaudited tax returns filed in 2007–2011 (incomes earned in 2006–2010). The paper combines an estimation of non-compliance patterns in terms of income under-reporting, with an estimation of the distribution of gains from tax evasion in the general population using a tax-benefit model.

We estimate the average rate of under-reporting in 2006 at 11.8 percent, resulting in a shortfall in tax receipts of 27.8 percent. We show that tax evasion causes inequality to rise, and the tax system to become significantly less progressive. We find little evidence of any significant change in patterns of income under-reporting since the onset of the current crisis.

The paper is structured as follows: the second section explains the methodology of the study and presents the data. Section three reports its results and discusses its main findings. The final section reflects on the policy implications of our findings, the limitations of our approach, and issues for further research.

[1] The interview contained the following exchange, widely reported in Greece:
"*Lagarde:* Do you know what? As far as Athens is concerned, I also think about all those people who are trying to evade tax all the time. All these people in Greece who are trying to evade tax.
Guardian: Even more than you think about all those now struggling to survive without jobs or public services?
Lagarde: I think of them equally. And I think they should also help themselves collectively.
Guardian: How?
Lagarde: By all paying their tax. Yeah".
(see "Christine Lagarde: Can the Head of the IMF Save the Euro?", *The Guardian*, 25 May 2012, http://www.guardian.co.uk/world/2012/may/25/christine-lagarde-imf-euro).

Methodology and data

There is compelling evidence that the rate of under-reporting of wages and salaries is much lower than in the case of self-employment earnings. The analysis of US tax audit data collected under the Taxpayer Compliance Measurement Program (TCMP) in 1988 estimated the former at 0.5 percent and the latter at 58.6 percent (Slemrod and Yitzhaki 2002). Similar data from the successor to TCMP, the National Research Program (NCP), estimated that 57 percent of self-employment income was under-reported, compared to 1 percent of wages and salaries (Slemrod 2007). These findings are supported by studies from other countries, or using different research designs (or both). Pissarides and Weber (1989) found that the self-employed in Britain spent a higher share of their reported income on food (other things such as household characteristics being equal), and attributed this to income under-reporting, rather than a higher propensity to consume food – a finding later replicated by Lyssiotou *et al.* (2004). Feldman and Slemrod (2007) used this insight to analyse the relationship between charitable contributions and reported income, and argued that the higher contributions of the self-employed at similar levels of reported incomes could only be explained by higher income under-reporting. In Italy, Fiorio and D'Amuri (2005) estimated the rate of under-reporting of self-employment income around the median of the distribution at 27.7 percent, compared to 1.9 percent for income from wages and salaries, while Marino and Zizza (2008) found self-employed earnings to be under-reported by as much as 56.3 percent. In Hungary, Benedek and Lelkes (2011) showed that 67 percent of self-employment income was under-reported, compared to 4 percent of wages and salaries. In Greece, Matsaganis and Flevotomou (2010) estimated these rates at 24.4 percent and 0.6 percent respectively.

While the evidence on patterns of non-compliance by income source seems robust, this is not the case with respect to non-compliance by income class. While the theory predicts that tax evasion should generally rise with income (Andreoni *et al.* 1998), the empirical evidence is mixed. Christian (1994) used data from the 1988 TCMP study to show that, relative to the size of their true income, higher-income taxpayers evaded less

than those on lower incomes. However, as Slemrod (2007) has shown, that study classified taxpayers with high permanent income reporting business losses as low incomes, while it failed to account for illegal tax shelters and for non-compliance in partnership and corporate tax returns. Fiorio and D'Amuri (2005) found that the share of unreported income in Italy fell with income. In contrast, Pashardes and Polycarpou (2008) showed that, once corrected for tax evasion, the income distribution in Cyprus was less equal than the distribution of reported incomes. In view of the above, we focus on under-reporting by income source, assuming no variation by income class (except, of course, that resulting from composition effect, i.e. the distribution of income by income source).

Our paper builds on the method applied in Fiorio and D'Amuri (2005). We also compare data from an income survey to a sample of tax returns, and assume that taxpayers concealing part of their income from tax authorities might consider declaring a higher figure to an anonymous interviewer. Nevertheless, the fact that Fiorio and D'Amuri (2005) had no direct access to their sample of tax data forced them to apply a post-stratification procedure that implicitly assumes away re-ranking effects, which in turn leads to an under-estimation of the regressive impact of tax evasion. On the contrary, we had direct access to a large sample of tax returns, provided to us in anonymised form by the Ministry of Finance.

More specifically, our work draws on two sets of data: (a) a large sample of unaudited income tax returns filed in 2007 (incomes earned in 2006) and (b) the European Union Survey of Income and Living Conditions (EU-SILC) of 2007 (incomes earned in 2006). The sample of tax returns covers 301,577 tax filers and 96,451 dependent children in 196,742 tax units (3.6 percent of population), while EU-SILC 2007 contains detailed information on personal incomes and demographic characteristics of 14,759 individuals in 5,643 households (0.13 percent of population).

We analyse recent trends in income under-reporting using the same sample of tax returns filed in 2011 (incomes earned in 2010). Since EU-SILC 2011 (incomes earned in 2010) had not been released at the time of writing, EU-SILC 2007 income variables were uprated to 2010 using official estimates provided by the Hellenic Statistical Authority and the Bank of Greece (Matsaganis and Leventi 2011). The relevant tax schedules for 2006 and 2010 are shown in Table 1.

Table 1

Income tax brackets and marginal tax rates

A. Financial year 2007 (incomes earned in 2006)		
Income brackets (€ p.a.)		
from	to	Tax rate (in %)
0	9,500	0
9,501	13,000	15
13,001	23,000	30
23,001	…	40
B. Financial year 2011 (incomes earned in 2010)		
Income brackets (€ p.a.)		
from	to	Tax rate (in %)
0	12,000	0
12,001	16,000	18
16,001	22,000	24
22,001	26,000	26
26,001	32,000	32
32,001	40,000	36
40,001	60,000	38
60,001	100,000	40
100,001	…	45

Notes: Personal income tax is individual. Spouses file a joint income tax return, but their income is separately recorded and individually taxed. The tax unit for the assessment of tax allowances and credits includes spouse and dependent child(ren). In 2007 the zero-tax threshold was €11,000 for employees or pensioners, and was raised for taxpayers with dependent children (by €1,000 for one child, by €2,000 for two children, by €10,000 for three children, and by an extra €1,000 for each subsequent child). In 2010 it was €12,000 for all taxpayers, and was raised for taxpayers with dependent children (by €1,500 for one child, by €3,000 for two children, by €11,500 for three children, and by an extra €2,000 for each subsequent child).

Source: Own calculations using EUROMOD version F4.32.

In order to make the two samples comparable, we restrict the EU-SILC sample to those eligible for submitting a tax return. In view of current tax rules, we narrowly define tax filers as those meeting at least one of the following criteria: (a) wage/salary earners with an annual income above 6,000 euros; (b) farmers earning more than 3,000 euros per year; and (c) persons with non-zero self-employment income. These rules are applied both to EU-SILC and the tax returns sample, reducing their sizes to 7,382 and 219,392 individuals respectively.

We ensure that income variables in the two datasets are consistently defined: in tax returns, incomes are reported gross of income tax and net of social insurance contributions; in EU-SILC, incomes are reported net of income tax *and* social insurance contributions. We use the European tax-benefit model EUROMOD to compute income taxes, which are then added to net incomes.[2]

With respect to correct incomes for tax evasion, we allocate the reference population into 16 categories (combinations of 4 macro regions and 4 income sources). The macro regions are Greater Athens, Northern, Central and the Islands. The four income sources are wages and salaries, pensions, farming and self-employment earnings.

In order to minimise measurement errors, in particular the unreliability of income surveys at the bottom of the income distribution, we restrict our comparison to employment income and pensions above 6,000 euros per year, and farming and self-employment earnings above 3,000 euros per year.

[2] See https://www.iser.essex.ac.uk/euromod.

Adjustment factors are ratios of income reported in tax returns to that observed in EU-SILC. More formally, let i denote region and j income source. Let $Y^T_{i,j}$ denote average income observed in region i by source of income j in EU-SILC, and $Y^R_{i,j}$ denote the corresponding average income as reported in tax returns. Adjustment factors are then defined as $a_{i,j} = Y^R_{i,j} / Y^T_{i,j}$.

Since tax returns are cross-checked against the records of benefit-paying agencies, it is impossible to misreport pension incomes in tax returns, except due to measurement (e.g. recall) error. In view of this fact, we have ignored over-reporting of pension incomes (4.2 percent in 2006). We have also ignored slight rates of over-reporting for wages and salaries in Athens and Northern region (1 percent and 1.6 percent respectively in 2006), setting the relevant factors to one. The resulting adjustment factors by income source and region are shown in Table 2.

The adjustment factors are used to estimate a 'synthetic' income distribution (i.e. adjusted for under-reporting) in EU-SILC data (say $\breve{y}^R_{i,j}$, where $\breve{y}^R_{i,j} = a_{i,j} \times Y^T_{i,j}$). In order to draw out the implications of income under-reporting for the resulting distribution of post-tax disposable incomes, and in terms of tax evaded, we use the European tax-benefit model EUROMOD.

Results and discussion

Table 3 shows how under-reporting varies by income group. The extent of income under-reporting seems to be greatest at the two ends of the income distribution. We (conservatively) estimate the average rate of

Table 2

Adjustment factors

A. Incomes earned in 2006				
	Greater Athens	Northern	Central	Islands
Wages/salaries	1.000	1.000	0.884	0.846
Pensions	1.000	1.000	1.000	1.000
Farming	0.533	0.574	0.489	0.490
Self-employment	0.702	0.701	0.624	0.553
B. incomes earned in 2010				
	Greater Athens	Northern	Central	Islands
Wages/salaries	1.000	1.000	0.886	0.831
Pensions	1.000	1.000	1.000	1.000
Farming	0.513	0.561	0.448	0.482
Self-employment	0.688	0.702	0.617	0.548

Notes: The adjustment factors are multiplied by survey incomes in order to derive a distribution of tax reported incomes.

Source: Own calculations using EUROMOD version F4.32.

Table 3

Under-reporting by level of income

	A. Incomes earned in 2006			B. Incomes earned in 2010		
	EU-SILC (€)	Tax data (€)	Under-reporting (%)	EU-SILC (€)	Tax data (€)	Under-reporting (%)
Decile 1	2,128	1,624	23.7	2,277	1,754	22.9
Decile 2	4,049	3,604	11.0	4,416	3,925	11.1
Decile 3	5,884	5,234	11.1	6,402	5,650	11.7
Decile 4	8,050	7,256	9.9	8,862	7,968	10.1
Decile 5	9,886	8,946	9.5	10,689	9,824	8.1
Decile 6	12,141	10,930	10.0	13,080	11,822	9.6
Decile 7	15,217	13,507	11.2	16,389	14,598	10.9
Decile 8	19,635	17,508	10.8	21,011	18,818	10.4
Decile 9	25,843	23,578	8.8	27,649	25,143	9.1
Decile 10	51,988	43,886	15.6	56,795	47,772	15.9
Top 1%	137,087	103,706	24.4	152,517	114,556	24.9
Top 0.1%	315,900	230,253	27.1	352,991	246,652	30.1
Total	15,422	13,600	11.8	16,739	14,723	12.0

Notes: Mean non-equivalised annual personal income by decile in current terms. Income deciles were constructed excluding those earning zero or negative incomes. Income is adjusted for under-reporting using the adjustment factors by region and income source as shown in Table 2. All figures are in nominal prices.

Source: Own calculations using EUROMOD version F4.32.

under-reporting for the entire population at about 12 percent.

Table 4 estimates taxable income and tax receipts under full compliance and tax evasion respectively. We show that tax evasion raises average disposable income by around 4.5 percent; and that it reduces the tax yield by approximately 28 percent (in 2006, rising to 30 percent in 2010).

Table 5 presents the distributional implications of tax evasion in terms of poverty, inequality, and tax progressivity. Since household disposable income is higher under tax evasion than it would have been under full compliance, the relative poverty line is also higher (by around 1.5 percent). Nonetheless, our results suggest that tax evasion causes relative poverty to rise slightly. All three inequality indicators (Gini, S80/S20, coefficient of variation) have higher values under tax evasion than under full compliance, indicating that the former results in a more unequal income distribution. Finally, our tax progressivity and redistribution indices (Kakwani, Reynolds-Smolensky) imply that income under-reporting renders the tax system considerably more regressive.

Table 4

Income tax variables under full compliance and tax evasion

	A. Incomes earned in 2006			B. Incomes earned in 2010		
	Full compliance (€)	Tax evasion (€)	Shortfall (in %)	Full compliance (€)	Tax evasion (€)	Shortfall (in %)
Reported income	15,422	13,600	– 11.8	16,739	14,723	– 12.0
Taxable income	15,621	13,701	– 12.3	16,746	14,611	– 12.8
Tax allowances	2,354	2,337	– 0.7	3,205	3,180	– 0.8
Tax reductions	240	238	– 0.9	268	265	– 0.8
Tax due (non-zero)	4,261	3,605	– 15.4	4,263	3,476	– 18.5
Tax due (all)	1,143	825	– 27.8	1,056	736	– 30.3
Disposable income	11,993	12,513	+ 4.3	13,063	13,632	+ 4.4

Notes: Mean non-equivalised annual personal income in current terms. 'Full compliance' provides an estimate of income tax variables assuming incomes are reported to tax authorities as observed in the survey. 'Tax evasion' provides estimates of the same variables assuming incomes are under-reported to tax authorities as implied by the adjustment factors as shown in Table 2. The share of positive non-zero income earners paying non-zero tax in 2006 was 40.3% and 34.4% under full compliance and tax evasion respectively (37.2% and 31.9% in 2010). All figures are in nominal prices.

Source: Own calculations using EUROMOD version F4.32.

Table 5

Fiscal and distributional implications of tax evasion

	A. Incomes earned in 2006			B. Incomes earned in 2010		
	Full compliance (€)	Tax evasion (€)	Difference (in %)	Full compliance (€)	Tax evasion (€)	Difference (in %)
Tax receipts (€ million)	12,131	8,753	– 27.8	11,210	7,817	– 30.3
Poverty line (€ p.a.)	6,041	6,146	+ 1.7	6,600	6,695	+ 1.4
poverty rate	19.7	20.0	+ 1.4	20.3	20.9	+ 2.9
Gini	0.340	0.357	+ 4.9	0.342	0.361	+ 5.4
S80/S20	5.845	6.262	+ 7.1	5.900	6.373	+ 8.0
Coefficient of variation	0.771	0.854	+ 10.8	0.761	0.861	+ 13.3
Kakwani	0.031	0.021	– 31.6	0.030	0.019	– 35.7
Reynolds-Smolensky	0.052	0.035	– 32.2	0.049	0.031	– 36.5

Notes: 'Full compliance' provides an estimate of income tax variables assuming incomes are reported to tax authorities as observed in the survey. 'Tax evasion' provides estimates of the same variables assuming incomes are under-reported to tax authorities as implied by the adjustment factors shown in Table 2. Fiscal effects (i.e. tax receipts) are non-equivalised. Distributional effects are computed on the basis of equivalised household disposable incomes. The poverty line is set at 60% of median equivalised household disposable income, and is calculated separately under full compliance and tax evasion. All figures are in nominal prices.

Source: Own calculations using EUROMOD version F4.32.

These results confirm our earlier findings that farming incomes and self-employment earnings account for the bulk of tax evasion in Greece, and that the pattern of income under-reporting by income class is U-shaped (Matsaganis and Flevotomou 2010). Moreover, although the crisis does not appear to be having a massive effect on under-reporting trends, changes in tax policy (i.e. the personal income tax schedule) appear to have caused a roughly similar level of income under-reporting (circa 12 percent) to translate into significantly higher loss of tax receipts in 2010 than in 2006 (30.3 percent vs. 27.8 percent respectively). The finding that the rate of income under-reporting at the top of the distribution seems to have risen recently is another pointer in the same direction.

Conclusion

The paper shows that tax evasion in Greece increases inequality and poverty, and reduces tax progressivity, while causing a considerable loss of tax receipts. Can these findings be trusted? One cause for caution is the distinction between the static and dynamic effects of tax evasion. It is important to remember that taxation (and, by implication, tax evasion) does not simply reduce disposable incomes; it also affects decisions concerning supply of, and demand, for labour, the allocation of disposable income between consumption and savings, the allocation of consumption between different goods and services and so on (Slemrod and Yitzhaki 2002; Sandmo 2005). Although the analysis of dynamic effects lies beyond the scope of this paper, we need to recognise that the implications of tax evasion exceed those that can be shown with a static arithmetical recalculation of the income distribution.

While our approach focuses on personal income tax, the distributional impact of evading other taxes (e.g. company tax, capital tax, value added tax) is likely to reinforce these effects. Evasion of social contributions, in particular, often taking place at the same time as income taxes, is likely to reinforce the regressive impact of tax evasion.

Our approach relies on matching data from tax returns with survey data. While we have made an effort to make the two sources comparable, our adjustment techniques offer at best good approximations. In particular, the truncated nature of tax records (i.e. low-income families pay no taxes) and the limited reliability of income statistics at either end of the income scale leave our estimates vulnerable to measurement error. Therefore, our results should be best seen as tentative estimates under an experimental research design.

Our key assumption is to treat incomes observed in EU-SILC as closer approximations of 'true income' on the grounds that people have no incentive to conceal their income from survey interviewers, since their disposable income would not be affected by their response. The intuition is reasonable, but not neces-

sarily correct. There are reasons to suspect that the actual but unknown level of tax evasion may be considerably higher than that implied by our estimates. In particular, there is some evidence that the very same factors causing tax evasion, combined with the wish of tax-evading individuals to be somehow 'consistent', may cause under-reporting in income surveys as well, albeit at a lower level (Elffers *et al.* 1987).

In spite of the above caveats, we believe our results capture essential aspects of the problem we set out to explore. Our core finding, that tax evasion in Greece has a regressive impact, seems reasonably robust. In view of that, and under conditions of severe crisis, the task of combating tax evasion assumes greater urgency than ever before.

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