CLEARING THE BAR:
IMPROVING TAX COMPLIANCE FOR SMALL FIRMS THROUGH TARGET SETTING

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ABSTRACT

We use a new dataset consisting of the universe of Greek corporate tax returns matched to financial statements to study a voluntary tax compliance program for small firms. This "self-assessment" program prescribed target taxable profit margins for different types of activity. Firms that reported profit margins above these targets in a given year were exempt from audits in that year. We find that the firms that take-up the program report significantly larger taxable profits than non-eligible firms, with some evidence of longer-lasting effects on tax reporting. Taxable profits increase by up to 70% of their pre-program levels. We also find that firms can easily and substantially manipulate reported revenue (decreasing it by up to 40%) to help meet prescribed profit margins. Overall, the program increased tax revenues collected from small firms, but points to a very large level of baseline under-reporting of profits and the ease of manipulating reported revenues.

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I Introduction

Tax compliance and enforcement have become one of the main foci of tax authorities to improve revenue collection across developed and developing economies alike. The challenge of collecting tax revenues is especially large when it comes to small firms. What programs can increase tax compliance without incurring too large administrative and enforcement costs?

In this paper, we investigate a tax compliance mechanism in Greece, designed to increase taxable income reporting. We are the first to use confidential corporate tax data for the universe of Greek firms, matched to financial accounting statements for a subset of them. This is also one of the first studies to evaluate a program for small firms focusing on government guidance on taxable profit margins.

The Greek economy is a particularly interesting setting to study tax compliance and evasion. The country had large budget deficits preceding the 2010 debt and financial crisis.[1] This crisis and a history of sovereign defaults were symptomatic of an inability to raise enough revenue and weak tax compliance – challenges that are faced by other countries too.[2] In fact, the country's tax compliance policy relies heavily on tax amnesty and forgiveness policies, especially when the government budget is in urgent need of raising revenue; Greece has offered 11 voluntary tax programs since 1978, mostly for individual taxpayers. The self-assessment program is an example and special type of such forgiveness policies. The program targets small firms and attempts to address the tax compliance needs of Greece as one of the largest shadow economies in the OECD with an unusually high number of small enterprises (OECD, 2011).

The self-assessment program studied here was a voluntary program for small firms. The government suggested taxable profit margins (the ratio of profits to revenues) for different economic activities and if firms reported profit margins at least as large as the guidelines in a given year, they were guaranteed to not be audited for that year. This program thus represents a partial, temporary "amnesty" from audits for the year the firms take-up the program.

Despite not passing as a typical amnesty program – since it only allows amnesty for the year of filing under prescribed margins – the self-assessment program is similar in principle to an amnesty program. The main rationale for tax amnesties in general is that governments can bring in a windfall revenue gain by collecting taxes that may otherwise fall outside the scope of tax enforcement. This benefit is especially tempting when government budgets are strained and there's a need to raise immediate revenue. Because the program was at its height in the years preceding the debt crisis, the self-assessment program was not a last gasp effort to raise revenue, but rather it was designed to guide firms through proper profits reporting based on their activities as seen through the lens of the tax administration.

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[1]The financial times and other news sources reported that Greece has in fact falsified its budget numbers leading up to the crisis (FT, 2010).

[2]Greece has defaulted five times on its sovereign debt since the beginning of the modern republic.

It is in general unclear whether amnesty policies have the intended effect of increasing compliance and tax revenues. Amnesty-type programs may in fact reduce compliance for non-amnesty firms or reduce compliance in post amnesty years for firms taking-up the program. The former is unlikely to be a drawback of the Greek self-assessment program since it does not include an amnesty for previous years and therefore does not encourage evasion or induce an expectation of forgiveness in the future. On the other hand, forgiveness or amnesty programs can increase compliance through adding formerly delinquent tax payers and smooth the transition between a regime of low enforcement into stricter tax enforcement laws by initially offering special treatment (Leonard and Zeckhauser, 1987). The net effect of amnesty policies on participating firms is therefore ambiguous.

The most important feature of the Greek self-assessment program is that it prescribes taxable margins for each economic activity, where firms have to comply by internally calculating their share of given activities and then reporting the prescribed government margins. Evidence on the effectiveness of setting targets for firms' taxable margins has until now been lacking. Firms have several ways of meeting the target taxable profit margins. They can for instance reduce revenues to mechanically reduce the profit level to comply with the margin target. One way to reduce reported revenue is through a real reduction in sales, by delaying recognition of legitimate sales or providing temporary discounts to consumers. Another way firms can reduce reported revenue is through manipulation; firms can avoid issuing invoices or may issue fictitious invoices where they under-report their revenue. Alternatively, firms can meet targets by increasing accounting profits or taxable profits. The latter in turn can be done by reducing deductions used to avoid taxes or by directly topping up profits with a "self-assessed" amount. Only increases in reported taxable profits represent gains for the tax administration; reduction of revenues through reducing real activities or outright manipulation of revenues does not.

We examine the effect of the program on all these margins, comparing eligible firms to non-eligible ones, as well as eligible firms in years in which they self assess and years in which they do not. We also show event studies around the first year of take-up of the self-assessment program.

We find that taxable profits increase significantly for self-assessing firms, with the main effect coming from firms with previously negative or zero profits, now reporting positive taxable profits. For firms that take-up the program for four years, for example, the increase in taxable profits is about 55% to 70% of the 2002 (the year before the program starts) average pre-self-assessment taxable profits. The increase is lower for firms who take-up less than four years. Yet reported revenue can decline on average by up to 40%, suggesting that firms do adjust revenues in order to make it easier to meet the target profit margin. This is an undesirable feature from the point of view of the tax authority. Self-assessing firms also meet the target by changing their additional "self-assessed" amount *after* adjusting taxable profits for expenses and deductions. We also note less use of the carry-loss deduction – the main tax deduction firms use in Greece to avoid taxation in years following losses. The results are heterogeneous by the number of take-up years a firm selects into self-assessment; firms that take-up more than once show a larger average

reporting response (percentage and amount of taxes) on their taxable profits. The findings highlight how challenging self-assessment can be when reported revenues are so easily manipulable. While the tax administration does collect more taxes thanks to this program, firms can still hide a substantial amount of their activity.

Although not the main focus, we make use of the new tax data to also provide a broad view of corporate tax filing in Greece, highlighting differences between small and larger firms, and the fall in corporate tax revenue during the Greek debt crisis.

The paper proceeds as follows: Section II frames the contribution of our paper relative to the literature, Section III describes the data, stylized facts, and major trends in tax reporting in Greece; Sections IV and V delve into the institutional features of the self-assessment program and describe take-up; Section VI shows non-parametric evidence on the effects of the self-assessment program using plots of revenue and profit distributions, followed by a formal estimation of the program's effects; Section VII discusses the margins of adjustment that firms employ and the tax revenue raised. Finally, Section VIII concludes.

II   Related Literature

This paper is related to the wider literature on compliance through offering tax amnesties and forgiveness. This literature has largely focused on combating individual tax evasion. Stella (1991) and Leonard and Zeckhauser (1987) offer discussions on the costs and benefits of tax amnesties, including the ability to generate additional revenue. Malik and Schwab (1991) explain amnesty choice through the existence of uncertainty about the dis-utility from tax evasion, while Alm and Beck (1990) use a prospect theory model to show that compliance effects are uncertain, especially if individuals can jointly chose the amount of tax evasion to disclose from the past and the amount of current taxable income to evade. More recently, Mikesell et al. (2012) re-examine U.S. state amnesty policies and claim a shift of tax amnesty policies from supporting systems of tax administrations to pure revenue generation.

There are a few papers in the literature that focus on forgiveness, more specifically types of amnesties that allow for the repatriation of foreign profits without penalties and by imposing a lower tax rate than the gap between foreign and domestic tax rates. Zucman (2014), for example, shows immediate and temporary (one year) repatriation effects as a result of the repatriation tax holiday, where multinationals would bring back foreign profits to the U.S. in exchange for a fixed tax rate that is significantly less than the prevailing tax rate. This paper therefore also relates to work on voluntary disclosure programs. Studying wealth repatriation, Alstadsæter et al. (2019) show that tax evasion is under-estimated for the very wealth in Norway by studying the increase in reported wealth by tax-payers selecting into a tax amnesty program.

Forgiveness or amnesty policies are therefore related to the large tax haven literature (see Hines, 2010; Dharmapala, 2008, for a review) and repatriation tax literature (e.g. Desai, Fo-

ley and Hines, 2001). Profit repatriation policies may backfire by discouraging both honest taxpayers or taxpaying firms and allowing for strategic relocation. Langenmayr (2017), for example, shows that tax evasion increases after the introduction of voluntary disclosure for individuals, while Desai, Foley and Hines (2004a) show evidence of multinationals shifting profits from their high tax rate parent countries to tax havens to strategically delay repatriating profits. Forgiveness policies must take into account the firm's calculation to strategically shift or report profits based on an overall cost including the income and non-income tax burden (Desai, Foley and Hines, 2004b, 2006).

A main feature of the Greek program – target taxable profit margins – is a *de facto* approximation by the Greek tax authority of how much firms should be reporting in profits based on their activities. This is a form of presumptive tax because the tax authority is using one tax base to approximate another tax base. Presumptive taxes are in fact as old as taxation itself, and early papers on optimal taxation have directly or indirectly addressed presumptive taxation. Tagging, for example, is a form of presumptive tax where the use of tags as imperfect proxies in the tax system can improve social welfare (Akerlof, 1978; Allingham, 1975). Other studies discuss more controversial tags using gender (Alesina et al., 2011) or height (Mankiw and Weinzierl, 2010).[3] Considering a more implicit presumptive tax embedded in modern income tax systems, Slemrod and Yitzhaki (1994) and Kaplow (1994) analyze the itemized deduction as a presumptive tax in the United States. Yitzhaki (2007) offers an analysis of the costs and benefits of using a presumptive tax and grapples with the trade-off between reducing monitoring costs and considerations of horizontal equity. Despite not analyzing them explicitly as a presumptive tax, other studies have discussed various firm deductions and their impact on firm responses and structure, such as the the carry-loss deduction (Auerbach and Poterba, 1987; Altshuler et al., 2009; Auerbach, 2007) and the interest deduction (Fatica et al., 2013). The benefits of presumptive taxes can generally outweigh the costs in settings of low compliance and enforcement capacity – Rajaraman (1995) provide an overview of forms of presumptive taxes used in developing countries. While the Greek tax system is more advanced than the typical developing country, and has improved since the crisis, the corporate tax system can be characterized by low compliance especially in the years preceding the debt crisis.

The paper therefore offers complementary evidence on tax reporting by focusing on taxable and accounting profits distributions around zero. Bilicka (2019) similarly uses taxable and accounting profit reporting around zero for multinationals versus domestic stand-alones in the UK to make a case for differential reporting and ultimately profit shifting. Using accounting data alone, Johannesen et al. (2016) and Dharmapala and Hebous (2018) examine bunching around zero profits for multinationals and also focus on profit shifting. Discontinuities around certain thresholds in the distributions of reported profits have also been used as the main identification strategy for detecting firms' misreporting activities in the accounting literature (for e.g. Burgstahler and Dichev, 1997).

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[3]In effect, most tax systems and designs use some form of presumptive taxes. For example, even a modern progressive income tax levies a presumptive tax on individuals by using their income as a proxy for un-observable ability.

By addressing compliance and corporate tax reporting, the paper also broadly contributes to an expanding literature studying the effects of government policies to tackle tax evasion for small firms (see Slemrod, 2019, for review). The most recent studies in the literature highlight the importance of third-party reporting especially for small firms (Slemrod et al., 2017; Naritomi, 2019; Best et al., 2015), electronic filing (Okunogbe and Pouliquen, 2018), and withholding taxes on credit card sales (Brockmeyer and Hernandez, 2016) and VAT (Waseem, 2020). Additionally, Okunogbe and Pouliquen (2018) highlight the low-compliance role of interactions between tax auditors when firms are "high-risk".

Finally, the paper contributes to the literature on the institutions and tax systems in Greece, measuring tax responses, compliance, and evasion. While there are studies examining the Greek payroll tax system and tax reform (Saez et al., 2012), the extent of evasion in the personal income tax system (Artavanis et al., 2016), and responses to inheritance taxation (Tsoutsoura, 2015), there are very few studies on corporate taxation and corporate tax compliance and no studies using wide administrative data. By looking at tax audits and penalties imposed, Kanellopoulos (2002) estimates a tax evasion rate of 20.4% for listed firms in the Athens stock exchange for 1991-1999. Stamatopoulos et al. (2017) use firm survey and financial statement data to provide correlations between compliance costs and characteristics of firms and industries. While this paper focuses on smaller firms and the results of a taxable profit margins targeting program to increase compliance, it also serves as the first study addressing tax reporting from the universe of corporate tax returns in Greece.

III   Data and Facts on Tax Reporting

A   Sources and Summary

This paper uses two main sources of data. First, we obtain confidential and novel income tax returns data from the tax administration for the years 1999-2016. Second, we complement this data with financial statements data for the years 2003-2016 from the leading firm in Greece, Hellastat.

The income tax returns data includes the universe of Greek Limited Liability Companies (LLCs) and Sociétées Anonymes (SAs), the equivalent of Public Limited Companies. The data contains all the main tax variables and firm characteristics, including taxable profits, financial revenue and income, and the legal status or the type of tax form for each firm. We can also observe the self-assessment program status of the firm, as well as any taxes withheld due to a government contract. We exclude observations with duplicate tax returns filed in the same year (about 1% of all firms are excluded) and those with near zero revenue – 24% of firms are extremely small by revenue (17.4% have only one tax return filed

between 1999-2016 while 6.6% have multiple returns).[4] We then exclude firms in the financial services, insurance, construction, and shipping industries (about 8% of firms) from the remaining sample because of their special status in the tax system.[5] Our final sample therefore covers about 67% of all Greek firms – a total of about 100,000 firms in the sample.

To obtain additional firm characteristics, we use financial statements data from Hellastat. We use accounting profits and revenue to match the datasets – two variables that should be exactly the same on financial statements and tax returns. We exclude firm-year observations where the tax year and financial statement year do not coincide.[6] About a third of the firms filing taxes have digitized financial statements. Larger firms usually have detailed financial statements, while smaller firms will have lower levels of detail, but the main firm characteristics that are proxies for size such as total assets and total employment are available for a large subset of firms. Detailed variables such as measures of different costs or research and development expenses are only available for a small subset of larger firms. Table 1 shows the summary statistics for the main tax variables and main controls we use in our analysis. The financial-matched-with-tax sample – henceforth "Financial Statement + Tax Sample" – includes larger firms (median revenue of about €820,000, equivalent to $1.05 million using the average euro/dollar exchange rate for 2003-2016) than the tax sample – henceforth "Tax Sample" (median revenue of about €420,000, equivalent to $538,000). Firms in the Financial+Tax sample also have higher reported accounting and taxable profits. However, mean, median, and the 25th and 75th percentiles of the taxable profit margins and accounting profit margins are similar in both samples. The Financial+Tax sample is also made up of older firms and more established firms. These differences are expected since very small and young firms may not file financial statements, and will certainly not file detailed financial statements.

The Greek corporate tax system is characterized by low compliance and includes complex and often uncertain rules on deducting expenses, which are also prone to abuse and mis-interpretation. The 1999-2016 period in question was subject to frequent changes in the statutory corporate tax rate; 40% in 1999, down to 20% by 2011, and back up to 29% in 2018. Additionally, and especially prior to 2013, tax collection did not rely on mandatory electronic filing, adding to the administrative costs of collection. In general, there have been a few changes in the Greek tax forms in 2003 and 2013, but these changes largely created a few different designated codes, mainly for special regimes; the main tax filing procedures are consistent across the time period.

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[4]Specifically, we exclude firm-year observations with less than €10,000 in revenue. Many firms with very low revenue reporting (near zero) are inactive firms. Firms who file multiple tax returns per year may do so for two reasons, namely either to amend incorrectly filed returns or simply by mistake. We have no way of disentangling the two.

[5]Construction firms, for example, use imputed or estimated incomes in tax returns.

[6]Some cases can be solved but with the risk of mis-matching other cases.

Table 1: Summary Statistics 2003-2016

	Tax Sample				Financial Statement + Tax Sample			
	Mean	25th perc.	Median	75th perc.	Mean	25th perc.	Median	75th perc.
	$/€ mean exchange rate (2003-2016) = 1.28							
Revenue (€)	3910168	113662	417543	1483815	4171447	233349	817142	2526255
Acc. Profits (€)	43331	-19607	8546	55449	77345	-20820	15320	92067
Tax Profits (€)	-291908	-58188	3912	47667	-157775	-65221	10788	84528
Acc. Margins (%)	-18.95	-8.41	1.79	10.02	-11.13	-5.30	1.85	8.41
Tax Margins (%)	-82.53	-22.52	0.83	8.13	-46.23	-15.02	1.29	7.43
Firm Age (years)	11.3	4	9	16	12.4	6	11	17
Assets (€)					4969703	476392	1255044	3268049
Employees					36	7	14	30
N (firm-year)	625044				280605			

Notes: Summary statistics for the full tax data sample (columns 2-5), and the tax data matched with financial statements sample (columns 6-9). Because the financial + tax sample is from 2003-2016, we limit the comparison in this table to those years, despite the availability of the tax data from 1999. Accounting and taxable profits refer to profits or losses (if negative). Firm age is in years. Assets refers to total assets. Employment refers to the number of employees. N refers to the maximum number of firm-year observations in each sample. The full-tax sample includes 774859 firm-year observations between 1999-2016.

B   Filing and Scrutiny by Tax Authorities

Greek tax returns are filed by initially reporting revenue and accounting profits, then applying several adjustments to obtain the taxable variables that add up to the taxable profits line, and finally the amount owed to the tax authority. As is common in most other countries, the process of adjusting financial to taxable outcome is due to different applications and interpretations of the tax law relative to financial accounting rules. Accounting standards usually capture transactions in order to provide useful information to all interested parties, whereas tax rules are written to discourage or encourage certain activities (see Hanlon and Heitzman, 2010, for a review of the differences). Two main sources of discrepancies arise between accounting variables and tax variables. One is due to the law allowing firms to carry their losses forward into future tax years, therefore allowing taxable profits to be lower than accounting profits in years when previous losses are deducted. The second is that the Greek tax corporate tax system does not allow for full deduction of certain categories of expenses and revenues, which are included in the annual financial statements in accordance with the accounting standards. These two main features imply that the financial outcome rarely coincides with the taxable outcome and create the so-called "book-tax difference". Taxable and accounting profits and corresponding profit margins are therefore defined as follows:

$$\pi_{it}^{Acc} = R_{it} - C_{it}, \qquad m_{it}^{Acc} = \frac{\pi_{it}^{Acc}}{R_{it}}$$

$$\pi_{it}^{Tax} = R_{it} - C_{it}^{a}, \qquad m_{it}^{Tax} = \frac{\pi_{it}^{Tax}}{R_{it}}$$

for firm i in year t, where π corresponds to profits, m to margins, R to revenue, C to costs, and C^a to adjusted costs (to tax rules and deductions). *Acc* denotes accounting and *Tax* denotes taxable.

Yet, each year before 2010 a large percentage of firms – nearly 35-40% – reported identical accounting and taxable profits, i.e., they make no adjustments to accounting profits (see Figure 1 below). This phenomenon appears to the same extent for both smaller and larger firms (above €300k in revenue). A possible explanation for this is that there was little scrutiny by tax authorities especially on deductions and expenses prior to 2010. In 2010, the fiscal crisis began and the tax system was under review and reform, culminating in the passing of Law 3842/2010. The law mandated that a certified accountant or tax consultancy office in the case of small firms, and auditing firms in the case of larger firms, co-sign on tax returns as well as financial statements (Karagounis & Partners, 2010). The law also required accountants to submit supplementary material to the tax form – a separate document displaying analytically all adjustments made to the financial figures adjusting accounting profits to reported taxable profits. If a tax audit reveals tax evasion, penalties are to be imposed on both the evading firms and the audit firms, certified accountants, or tax consultancy offices. As a result, a far lower percentage of firms simply reported accounting revenues and profits on their tax forms without adjusting them for tax purposes (about 15% for smaller firms and less than 10% for larger firms).

Figure 1: Percent of firms not adjusting tax returns
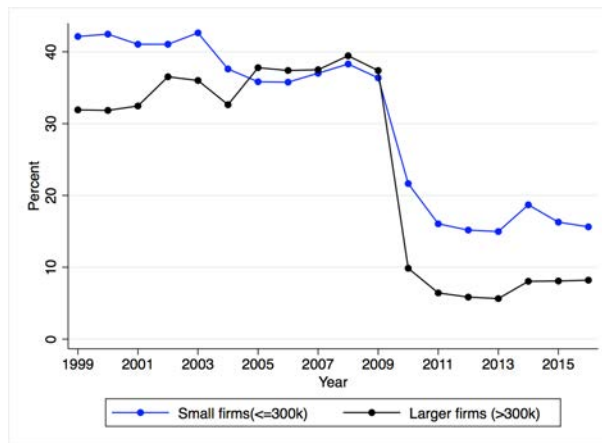
Notes: Detailed or adjusted tax returns refer to taxable income ≠ accounting income. Firms filing non-adjusted returns report the same taxable and accounting income.

C Negative and Zero Taxable Profit Reporting

An important feature of tax reporting is that firms can report negative taxable profits but do not obtain any tax credits for doing so. Instead a negative taxable profit tax return is equivalent to zero taxable income, and firms do not pay taxes. Figure 2 considers where negative or zero taxable profits come from mechanically: a firm beginning the tax form with positive accounting profits can use an adjustment that transforms the positive accounting profit figure to negative or zero taxable profits. The figure shows the percentage of firms reporting positive taxable profits ("+ taxable prof"), and those that report negative or zero taxable profits but would otherwise report positive profits if it weren't for (1) carried losses ("- taxable prof: carry-loss") or (2) all deductions other than carried losses ("- taxable prof: deductions"). In the case of negative accounting profits, there is no profit to tax, which is illustrated in the figure by the percentage of firms labeled "- taxable prof: no profits to tax".

The percentage of firms reporting positive taxable profits and paying taxes is steady at about 70-75% for larger firms and 45-50% for small firms in the pre-crisis years until 2009, when they begin to decline to reach below 55% for larger firms and less than 40% for small firms at the peak of the crisis in 2012. The source of this decline is almost entirely a lack of accounting profits by firms. Negative accounting profits allow firms to apply those losses to future taxable profits using the carry-loss rule. In fact this is a common feature of corporate tax systems, and has been extensively studied in the U.S. (Auerbach and Poterba, 1987; Altshuler et al., 2009; Auerbach, 2007). We see an increase beginning in 2013 in the percent of tax returns that report negative taxable profits despite having positive accounting profits in the same year. As a result, the economy's gradual rebound post-2012 did not see a proportional recovery in the percent of firms reporting positive taxable income.

Figure 2: Negative or zero taxable profits reporting by source
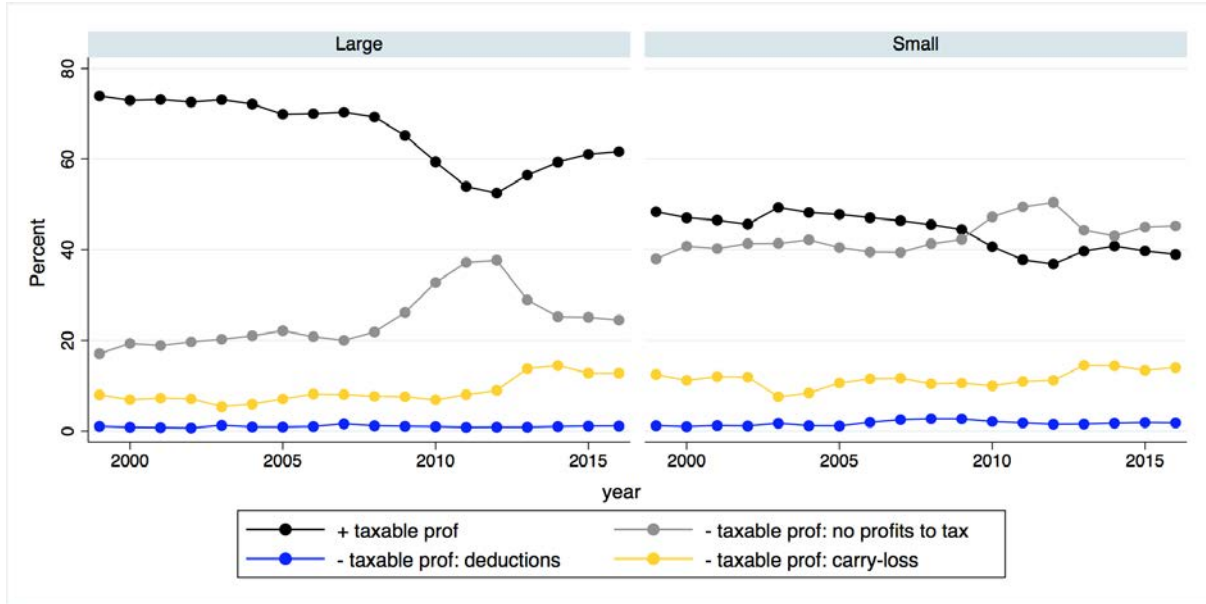
*Notes: Sources of zero **or** negative taxable profits in the tax returns sample by year. "+ taxable prof" shows the percentage of firms with positive taxable profits. "- taxable prof: no profits to tax" are firms reporting negative or zero accounting profits. "- taxable prof: carry-loss" refers to firms who have negative or zero taxable profits but would otherwise have positive taxable profits without using carry-loss forwards. "- taxable prof: deductions" who have negative or zero taxable profits but would otherwise have positive taxable profits without using all other deductions (except for carry-loss).*

D   Small versus Large Firms Profit Margins: Small Firms Bunch at Zero

Typically, and without self-assessment, accounting and taxable profits should differ slightly for every individual firm due to deductions and treatment of costs in the tax code. In Figure 3, we compare the distributions of accounting margins – the ratio of profits to revenue as computed from the accounting data – and taxable margins – the same ratio computed for taxable profits – by firm size (small versus larger firms). We also distinguish between firms with detailed tax returns (accounting profits are adjusted to reach taxable profits; $\pi_{it}^{Acc} \neq \pi_{it}^{Tax}$) versus non-detailed tax returns ($\pi_{it}^{Acc} = \pi_{it}^{Tax}$), and focus on the 1999-2002 time period because it precedes the first year of the self-assessment program aimed at increasing compliance for small firms.

We highlight several findings. First, larger firms' taxable and accounting margins distributions are almost identical. Second, the shape of the distributions for large firms is nearly the same whether firms file detailed or non-detailed tax returns. Larger firms filing non-detailed tax returns is therefore not a clear sign of evading or avoiding taxes. Third, for small firms, there is a clear bunching point at zero taxable margins, which is also seen from the large spike in the taxable profit margins distribution as compared to the accounting profit margins distribution. The excess mass between the two distributions

is equivalent to nearly 2.5-3.0% of tax-filers that fall between -0.25% and 0.25% profits margins reporting. The bunching also appears to come from the right of the taxable margins distribution. Finally, small firms that file the same accounting and taxable profits without detailing any adjustments bunch *both* taxable and accounting margins at zero, with an excess mass of around 2.2% of firms falling in the -0.25% and 0.25% margins range.

Figure 3: Profit Margins: detailed tax returns (left) and non-detailed returns (right)

Panel A. Small Firms

Panel B. Larger Firms
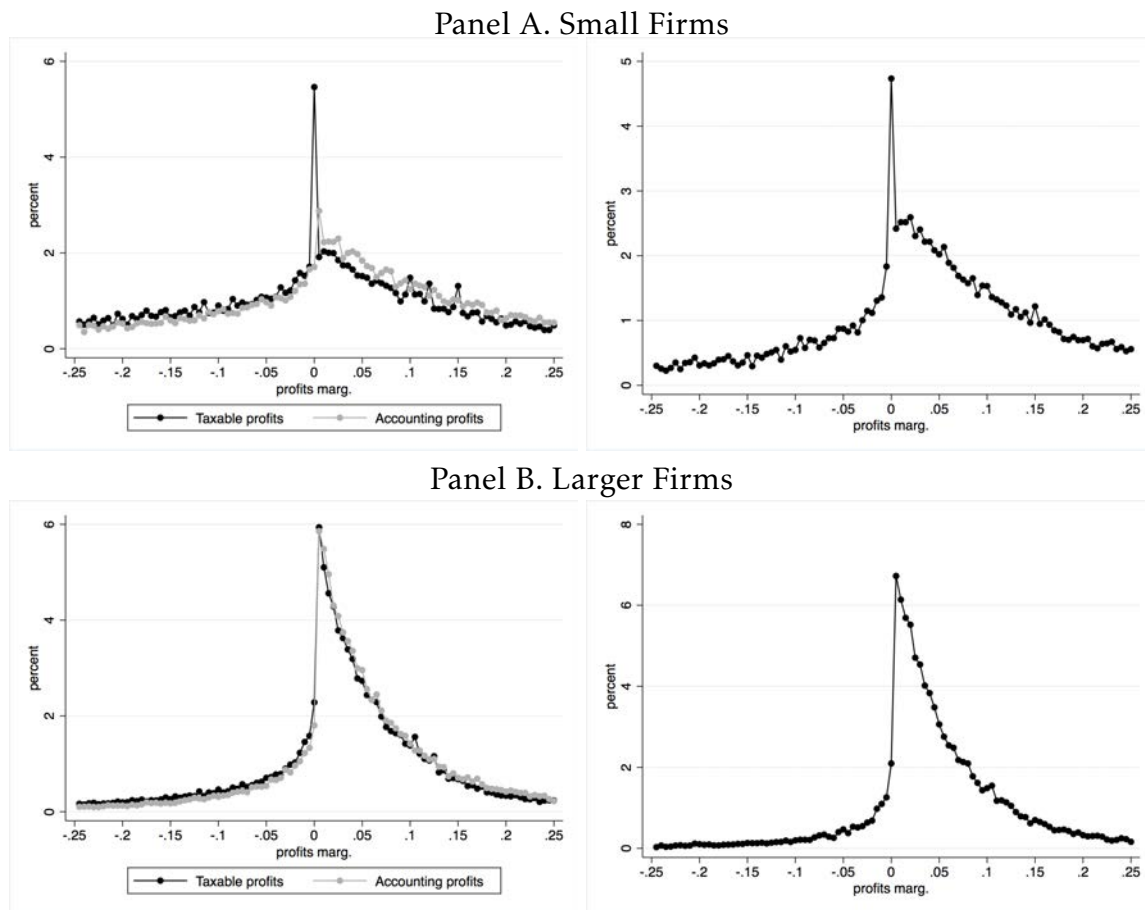
Notes: The distributions are pooled for years 1999-2002, preceding the self-assessment program. Detailed returns include different taxable margins and accounting margins distributions, while non-detailed returns have identical distributions for taxable and accounting margins. Small firm-year observations refer to a firm having less than or equal to €300,000 in a given year. Percent refers to the percent of all firms between -0.25% and 0.25% profits margins.

We contrast the taxable and account profit margins distributions with distributions of the ratio of profits to assets in 2003 to 2009 - scaled profits - since assets are less manipulable than revenue. We don't observe the same targeting pattern for scaled profits, suggesting the use of revenue as well as profits to target zero taxation (Figure A7 in the appendix).[7] Scaled profits distributions show that a substantially larger percentage of small firms

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[7]We use 2003-2009 since we do not have financial data before 2003.

report negative accounting and taxable profits (on the left side of zero) but do not show bunching at zero.

The gap between taxable and accounting margins for small firms is only one symptom of how firms can avoid or evade t axes. The fact that non-adjusting firms can bunch on both taxable and accounting profits equally suggests that accounting profits themselves may be manipulable for small firms, especially if they do not have to file detailed financial statements. In fact, Figure 2 highlights the disparity between small and larger firms in that a much larger proportion of smaller firms tend to report negative or zero accounting profits, suggesting that a main path to evade taxes in Greece begins with manipulating accounting profits. In fact, Greek firms have been found to manipulate accounting profits in accounting studies. For example, Leuz et al. (2003) estimate the highest mean aggregate profits manipulation score (28.3) for Greece in their study of 31 countries as benchmarked to the U.S. with the lowest score (2.0).

While it is possible that some firms bunching on zero taxable and accounting margins may be doing so due to lazy tax reporting (i.e. bunching from the left or the negative portion of the distribution), there is a stark disincentive for doing so. Namely, firms reporting zero profits while having negative true profits are unable to carry losses forward – a main tool for avoiding future taxation. It is therefore unlikely that the sharp bunching in the distributions can be explained by lazy reporting, and it is highly suggestive of a phenomenon of tax avoidance or evasion by small firms relative to larger ones.

IV Institutional Background Self-Assessment

Greece has a long history of tax forgiveness and amnesty programs dating back to 1978. The government's rationale for these tax amnesty programs was to be able to collect tax revenues from previous years' non-audited tax returns, without incurring the costs of mass audits. Three main programs preceding the crisis fall under tax amnesties or tax compliance programs targeting higher revenues from evading firms in return for audit exceptions or forgiveness. The first is a full amnesty program used in 2002 for general partnerships and freelancers, which erased the probability of audits for previous years by using a rule which allowed firms to count 2% of gross revenues as their taxable income and then subject that income to a 20% tax rate. The second is a program targeting mid-sized firms with a cutoff at 8.8 million, where the tax can be estimated according to a rule in return for closing pending cases or providing forgiveness for previous years. The third is the self-assessment program targeting smaller firms. The self-assessment program is in line with this trend because it attempts to guide firms to their expected taxable margins without incurring additional costs of audits. Yet it falls short of a typical amnesty program since it does not consider years that are not "self-assessed" and therefore does not erase the possibility of catching previous tax evasion.

The self-assessment decision and eligibility: Self-assessing firms are provided a list of

taxable margins that the government deems "reasonable" per economic activity.[8] Firms choosing to "self-assess" in year t must report at least the prescribed taxable margins, but have some control over what activities to report and what percentage of their total operations is under their chosen activities.[9]

There are three additional eligibility criteria of the program as it was introduced in 2003: (1) firms selecting into the program will be excluded if submitting a late tax form or providing a tax form with clear tax violations, (2) firms randomly selected for audits before filling the tax form are excluded, and (3) firms with fines on previous tax reforms are excluded from self-assessing.[10] In return, self-assessing firms are excluded from being randomly chosen in potential audits in the same year t; they are not subject to any threat of corporate tax or VAT audit at least for the initial years of the program, before the program was reformed.

Firm i can choose to self-assess in year t if it reports the following average taxable margins in year t:

$$m_{it}^{Tax} \geq \sum_j m_j^g w_j$$

where m_j^g is the government-prescribed margin on each of the firm's activities j, and w_j is the share of revenue generated from activity j. A firm is then faced with the following audit probability $\tilde{p}_{it}$ for year t:

$$p_{it}^{audit} = \begin{cases} 0 & \text{if eligible and self-assessing in } t = 2003 - 2005 \\ \tilde{p}_{it} > 0 & \text{if eligible and self-assessing in } t \geq 2006 \\ p_{it} > 0 & \text{otherwise} \end{cases}$$

where p_{it} is the audit probability the firm would have faced absent the self-assessment take-up, and $\tilde{p}_{it}$ is the separate audit probability it faces in $t \geq 2006$.[11]

Steps of Corporate Tax Filing and Self-Assessing: The tax form is designed for self-assessment in the following order:

1. Firms will complete their tax returns as usual, starting from accounting profits and taking out tax deductions to reach their initial taxable profits before self-assessment

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[8] Activities are not directly translatable into industries or sectors within an industry. The direct translation may be available to tax authorities but is not publicly available.

[9] Firms self-report activities to the tax authority. While activities may be manipulated, we cannot observe these in our data. However, there are certain industries that may have less leeway to report false activities if they only offer one service.

[10] In effect, firms with fines includes a small number of firms in the tax returns data who have the revenue eligibility for the program. Usually firms selected for an audit are notified ahead of time of the actual audit.

[11] As in other countries, the audit algorithm is not publicly known. It is thus not entirely clear what the baseline audit probability, absent self-assessment depends on. Presumably, it would depend on the gap between taxable margins and the target taxable margins per activity.

adjustments. We call this the "pre-self-assessment" taxable profits. For firms that do not self-assess, it is equal to the final taxable profits, or taxable profits for short.

2. Firms will then calculate their taxable margins as a result of the revenue and pre self-assessment taxable profits reported.

3. To meet the prescribed government margins, firms with taxable margins *below* the prescribed margins will add the missing amount of taxable profits in a special field in the tax form. This is intended to result in higher taxable profits reporting. This is "self-assessed" so firms have control over the missing amount to full-fill their taxable margins. Pre-self-assessment taxable profits plus the self-assessed amount yield taxable profits.

Firms use the following steps to file corporate taxes by reporting revenue and accounting profits, and then adjusting as below:

$$R_{it} \quad \text{Revenue (taxable = accounting)}$$

$$\pi_{it}^{Acc} \quad \text{Accounting profits (on financial statements = on tax returns)}$$
$$+E_{it} \quad \text{Adjusted expenses, e.g.: depreciation adjustments, equipment expenses}$$
$$-D_{it} \quad \text{Deductions, e.g.: losses carried forward, profits taxed from other sources}$$
$$=\pi_{it}^{Self} \quad \text{Pre self-assessment taxable profits}$$
$$+S_{it} \quad \text{Self-assessment amount}$$
$$=\pi_{it}^{Tax} \quad \text{Taxable Profits}$$

Meeting taxable margins: Despite this design by the tax authority, firms can meet the prescribed taxable margins in multiple ways. The first way to reach higher margins is through downward adjustment of revenue before filling the tax form, either by actually managing real earnings and revenues or by misreporting sales. The latter may be easier when transactions lack a paper trail, which is not uncommon. The second way is the one actually intended by the tax authority, namely to increase taxable profit margins by reporting more profits on the tax forms. To increase their final taxable profits, firms can add the "missing" profits in the self-assessment field, or reduce adjusted costs to reach a higher profits figure without relying on the self-assessment field. Finally, firms can report higher accounting profits. To provide graphical evidence on the source of adjustment in section VI, we decompose taxable profits into two components for self assessing firms:

$$\underbrace{\pi_{it}^{Tax}}_{\text{Taxable profits}} \quad = \quad \underbrace{\pi_{it}^{Self}}_{\text{Pre self-assessment taxable profits}} \quad + \quad \underbrace{S_{it}}_{\text{Self-assessment amount}}$$

where S_{it} is the self-assessment added amount for firm i in year t to fill the taxable profits gap required to meet the prescribed margins. $S_{it} = 0$ in years firms do not self-assess.

Table 2: Examples of Prescribed Taxable Margins by Activity

Activity	Industry	Taxable Margins
Luxury hotels	Section I: Accommodation and food	16%
Non-luxury hotels	Section I: Accommodation and food	13%
Pharmaceuticals	Section C: Manufacturing	11%
Economic studies	Section M: Professional, scientific, technical	26%
Courier services	Section G: Wholesale and retail	30%

Notes: Industry classifications - called "sections" – according to European NACE codes. Activities classified according to Greek tax authorities.

Table 2 lists examples of activities with the prescribed taxable margins by the tax administration. While the list is not comprehensive, it shows that each industry can have more than one activity, and in fact often has a large number of activities, with different prescribed margins. It also highlights the variance in prescribed taxable margins: courier services are expected to report 30% of their revenue in taxable profits, for example, while pharmaceuticals are expected to report 11%. A large number of firms may operate with multiple activities, but there are very specialized firms who take-up the program - for example, non-luxury hotels tend to report a single activity and therefore report taxable margins at 13%.

Program timeline and rule changes: The main self-assessment program took effect in 2003 and remained in high take-up until 2009 (see Figure 4). In 2010, there was a simultaneous increase in the attempt to enforce tax collection, mainly through introduction of auditors and auditor liability, and declining economic activity and therefore declining true firm profits due to the debt and economic crisis. These patters are identical for the Financial+Tax sample (see appendix Figure A2).

However, two main changes to the program could explain the fall in take-up and the phenomenon of low-frequency of take-up. In 2005, Ministerial Decree 1027 prohibited self-assessing firms from carrying accounting losses forward to set off against future profits. In 2006 the law was changed so that firms could be subject to a separate audit process, whereby a small portion of firms taking up self-assessment are chosen at random to be audited on their self-assessment year or previous self-assessment years. A handful of articles in the press released the intent of the Ministry of Finance to conduct these audits and therefore alarmed firms to the possibility of being caught if not self-assessing truthfully. However, while the threat of audit was salient, the number of audits in these cases were in effect few in number.

The law allowed self-assessment for firms with revenue less than or equal to €300,000.

Figure 4: Total take-up and number of first-time take-ups

Total take-up   Number of first-time take-ups
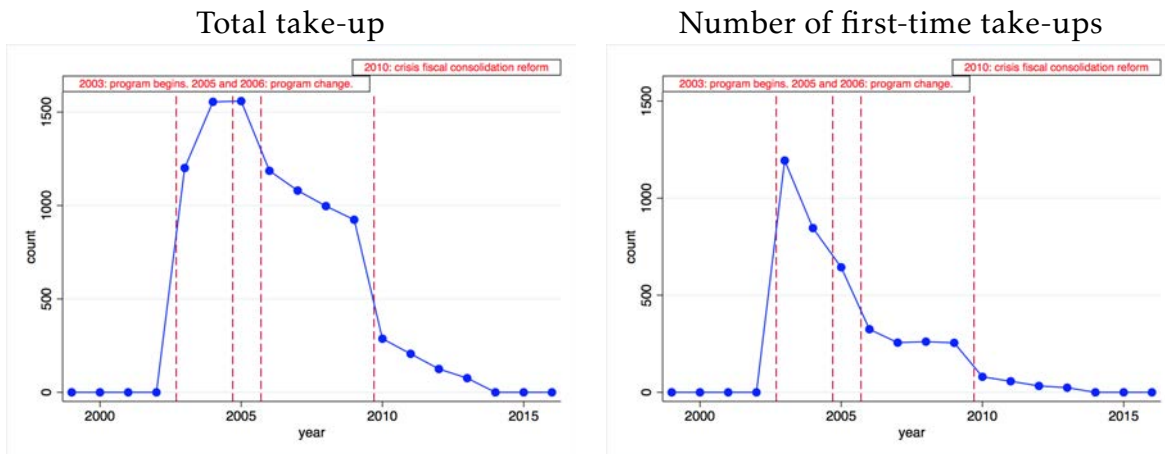
Notes: the 2005 change prevented self-assessing firms from concurrently using the carry-loss forward deduction, and the 2006 change introduced separate audits on self-assessment.

We therefore use this cutoff to broadly call firms that fall below it as "small" firms, and those that are above it as "large" firms.[12] This cutoff remained consistent across all years of the program.

A Note on the VAT: Firms that participate in the self-assessment program are also subject to a VAT adjustment, whereby they pay an additional amount of VAT taxes applied to their cost of goods (see the exact formula for the additional tax in Appendix A). This clearly raises the cost of participating in the program and creates an incentive to decrease or manipulate the cost of goods. The VAT adjustment has the potential to also incentivize firms to change revenue. On the one hand, decreasing the cost of goods would reduce the VAT burden. On the other hand, for a given level of revenue and other expenses, it would increase accounting profits and potentially taxable profits. Below, we show that there is no clear increase in accounting profits. Coupled with the reduction in revenue we will document, this suggests that firms may have decreased their cost of goods. Because we do not have the VAT data or any measure of the cost of goods, we leave the VAT adjustment out of our analysis. However, when it comes to total revenue loss, note that the additional adjustment to the VAT collected has the potential to balance out any reduction effect in the VAT tax base due to firms reducing their revenue. In addition, the incentives for firms to reduce revenues (in order to meet the target margins more easily) are intrinsic to the compliance program, even if there were no VAT.

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[12]The law also specifies a lower threshold of €150,000 euros for a subset of firms, usually some service firms. However, there was effectively no way for the tax authorities to identify the revenue source of a given invoice. This essentially allowed these firms to report revenues higher than €150,000 and remain eligible for the program. We therefore use the higher cutoff of €300,000 as the clear cutoff for all firms. Figure A8 shows that while some service industry firms bunch at €150,000, the distribution of firms in these industries does not end at €150,000 and in fact continues in the €150,000 and €300,000 range.

V Which Firms Take Up the Self-Assessment Program?

A number of factors may cause a firm to take up the self-assessment program, even if it implies having to report a much larger profit level and margin than without it. Some characteristics may allow particular firms to shoulder the higher tax burden. Recall also that the changes in the nature of the program itself in 2005 and 2006 can explain a large part of the heterogeneity in take-up *frequency*.

For instance, more established or older firms may find it more difficult to simply ignore the government's attempt to increase compliance through the self-assessment. Older firms are more salient to the tax collector, more established in their market, and may have more knowledge of the tax code and government policies. In fact, older firms are likely to have more organized accounting preparation and monitoring mechanism; for example, Zwick (2018) claims that sophisticated tax preparers can increase tax refunds for small firms. New firms have lower *real* revenues, and therefore have a lower incentive to manipulate reported revenues. Additionally, in some cases, new firms may be subject to special tax treatment – special programs or rules based on firm age – in Greece decreasing their compliance costs.[13]

Another variable we can observe in the Tax data is whether a firm sells to the government, i.e., is on a government contract. On average each year, about 30-40% of firms in Greece sell a good or service to the public sector or government, and therefore can have a government contract in a given year. A percentage of the sale value of the contract a firm has with the government is withheld at source. Government contracts therefore have a withholding mechanism embedded, which increases revenue and compliance. The government contract status of a firm can change from year to year. Firms on government contracts may be more aware of government compliance programs, and more inclined to take-up these programs either because of the withholding mechanism where they are taxed at source, or because they want to remain in good standing with the government. This is consistent with the positive effect on taxable profit reporting we show for small firms on government contracts. Finally, firms with high running costs may end up avoiding the program, or take-up the program initially and then opt out if they cannot adjust enough to be able to pay the required tax (e.g., if their initial reported profit margin was much lower than the government target one).

The peak of the self-assessment program was between 2003 and 2009, and particularly in the program's early years of 2003 and 2004. Splitting take-up by the number of years a firm self-assesses - i.e., frequency of self-assessment - shows a clearer picture of the response to changes in the program in 2005 and 2006. In particular, firms that self-assess

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[13]For example, new firms have special treatment with regard to tax payments and advanced tax payments. While most firms in Greece pay some advanced amount on taxes for the following year, new firms (age 3 and younger) are subject to a lower advanced tax amount.

in few years tend to so predominantly in the early years. The changes in 2005 and 2006 are therefore likely to have been a key cause of why many firms self-assess only once or twice. Figure 5 also shows that the percentage of government contract takers - firms who have held a contract at least once in the sample years - who self assess is consistently higher than the percentage of those who have never held a contract. This is consistent with self-assessing firms having higher accounting profits on average than firms who are eligible but never self-assess especially in the years prior to the program (see Figure 6).

Figure 5: Take-up of the self-assessment program
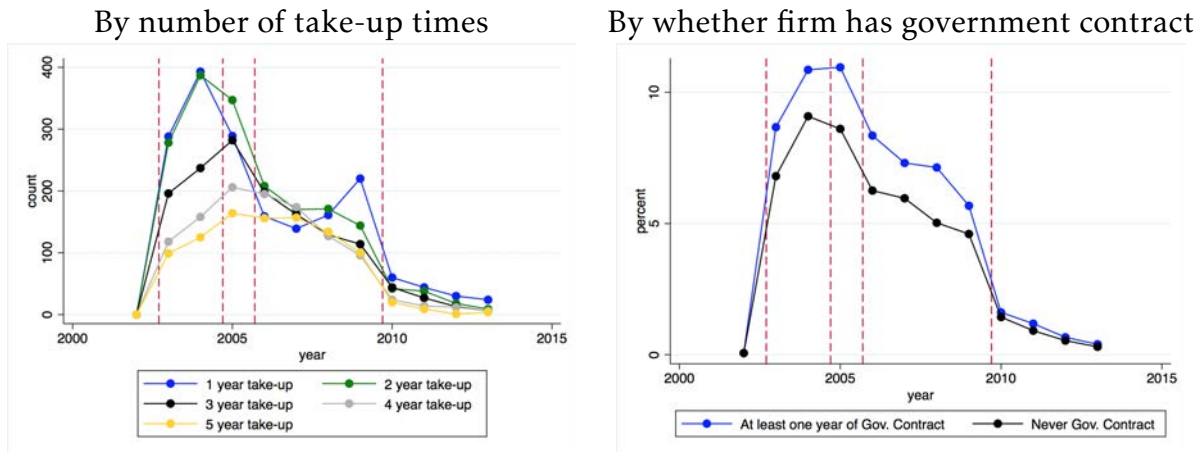
Notes: At least one year of government contract refers to a firm with a withholding tax on its sales to the government in at least one year in the tax returns data.

The main take-up industries by the number of firms are food and accommodation, manufacturing, wholesale and retail, professional and scientific, information and communication, and mining (see Figure A4 in the appendix). The food and accommodation industry stands out for the largest percentage of eligible firms taking up the program (see Figure A5 in the appendix). We also see heterogeneity in the frequency of take-up and the number of consecutive years firms take-up the program. The majority of firms take-up the program once or twice, while many firms take-up the program in non-consecutive years (see appendix Figure A3). We therefore divide firms into take-up groups in this section and in section VI where we estimate the reporting responses to self-assessment.

Is eligibility manipulable? We then turn to studying the revenues for self-assessing firms. We condition on the firm self-assessing in at least one year between 2003 and 2009, and show the distribution of revenues for three different settings in Figure 10: (1) revenue reporting before the self-assessment program was in place (1999-2002), (2) revenue reporting during years in which the program was in place for *only* firms in which they self-assess, and for firms which were self-assessing in at least one year (2003-2009), and (3) revenue reporting during program years when firms do not self-assess. We first note that the revenue distribution for self-assessing firms shows a clear cutoff at €300,000 and

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Figure 6: Mean Accounting Profits by Take-up Group
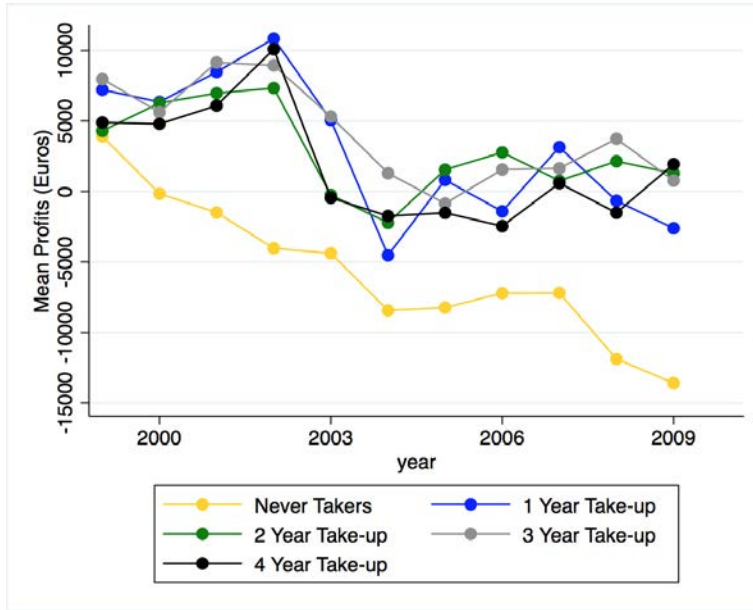
Notes: Accounting profits are winsorized at the 5% and 95% levels. We condition on firms eligible in the program (≤€300,000 in revenue). The never takers are therefore eligible firms who never take-up the program. The one to four year frequency groups time series is the mean for firms belonging to those self-assessment groups and self-assessing in those years.

another at €150,000 with a clear spike at exactly €300,000 suggesting bunching at that revenue level.[14] We show the revenue distributions and excess mass in the distribution of self-assessing years, versus pre-program years conditional on firms self-assessing in Figure 7. Second, the 1999-2002 distribution - the most realistic counterfactual - flattens out around €400,000 in revenue. We therefore exclude €300,000 - €400,000 revenue firms from the main control group and use €400,000 as an important cutoff in our event study estimation in section VI.

In Appendix Figure A8, we construct revenue distributions for self-assessing years separately by industry. We can confirm that the vast majority of service industries follow the €150,000 cutoff, while non-service industries are more continuous around the €150,000 cutoff and their distributions have more mass until the €300,000 cutoff. The information and communication sector shows the clearest bunching behavior around €150,000 while manufacturing shows the clearest around €300,000. Manufacturing and retail trade firms tend to have higher revenue and are generally larger – therefore it is likely that ineligible firms in these industries have decreased their revenue from above €300,000 to target at exactly the program cutoff or report below it.

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[14]As explained earlier, the €150,000 is not binding for all firms in those industries, either because firms can carry out multiple activities or because there's no way for the tax administration to verify the exact activities. The distributions are continuous between €150,000 and €300,000.

Figure 7: Bunching on the €300,000 Revenue Cutoff
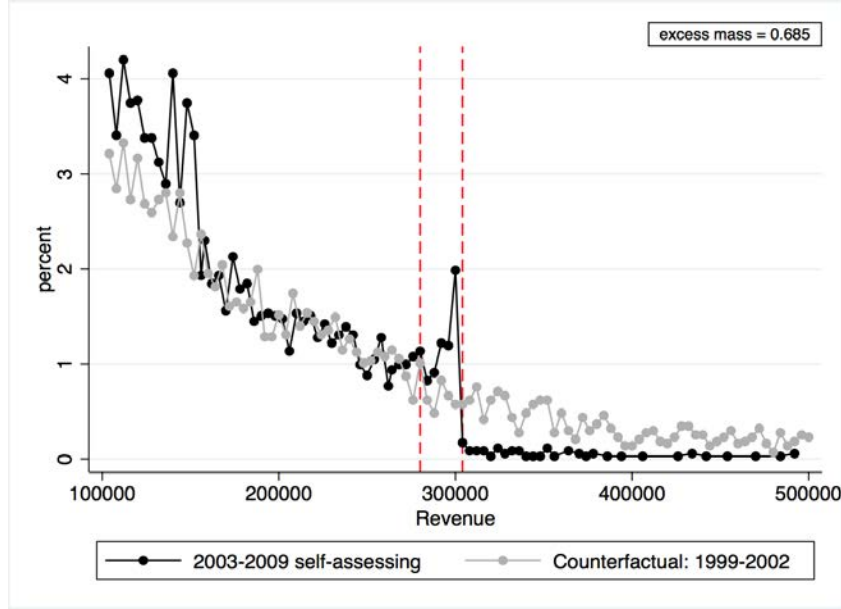
Revenue distributions conditional on firms taking up the self-assessment program between 2003-2009. Excess mass is calculated as a ratio. The numerator is the difference between the percentage of firms in the chosen window and the counterfactual empirical distribution where firms would have reported revenue in this window in the absence of the 300,000 cutoff. The denominator is the empirical counterfactual distribution – the firms' distribution of revenue pre-program (1999-2002). The window contains 6 bins and is between €280,000 and €304,000 in revenue. We use 100 bins for both distributions.

What characteristics determine take-up? To test for the characteristics of firms that take up self-assessment, we estimates a linear probability model (Table 3) with a self-assessment dummy as the dependent variable, and firm characteristics available in our data on the right-hand side. We estimate the model for the Tax sample and then for the Financial + Tax sample to include more observable variables, conditional on being eligible for the program (i.e. reporting less than or equal to €300,000 in revenue). We control for revenue in regressions (1) to (5), and include firm age and a dummy for having a government contract in all regressions. We use missing dummies to impute for missing values in firm age, assets, and employment. We also estimate the same table without missing imputation in the appendix (Table A1). Finally, we include year fixed effects to control for aggregate trends, and industry fixed effects in several regressions to control for industry-specific shocks. The main model specification is therefore the following:

$$\text{Self-assessment}_{it} = \alpha A_{it} + \psi X_{it} + \beta_t + \delta Z + \varepsilon_{it}$$

where Self-assessment$_{it}$ is a dummy equal to one if firm i self-assesses in year t. A_{it} is a vector of firm-level variables that include revenue, a dummy for withholding equal to one

if the firm has a government contract, and firm age is a dummy equal to one if the firm is older than five years. β_t denotes calendar year dummies, Z denotes industry dummies, and X_{it} is a vector of financial variables (assets and employment, and costs in the case of the final regression). We use a dummy variable for "missing" in the case of missing values for assets, employment, and firm age.

While we take these results as suggestive of the types of firms taking up self-assessment, we can note several implications. First, firms selecting into self-assessment have lower revenue. This is not a firm trait, but rather a firm response to the policy as we demonstrate in Section VI. Second, for the Financial+Tax sample, employment and assets are negatively associated with selecting into the program, even when controlling for revenue or costs. This is consistent with the ability to be flexible in tax reporting in the year of self-assessment. Having a lower number employees allows firms to both adjust costs easier and require less people for cooperation on adjusting tax reporting. In fact, Stamatopoulos et al. (2017) argue that lower employment is associated with lower compliance costs for the Greek corporate tax. It may also suggest that firms with lower assets and a lower number of employees were more likely to avoid or evade taxes in previous years. In fact, Kleven et al. (2016) provide theoretical and empirical justification for why larger firms with more employees will be less likely to avoid taxes; as the number of employees increases, the probability of a whistle-blower increases as well.

Firms on a government contract are more likely to select into the program, as seen by their consistently positive and significant coefficients in all regressions in the table, even after controlling for revenue, age, assets, and employment. One potential explanation is that firms on government contracts are generally paying higher taxes and may find it easier to meet prescribed margins. Another explanation could be that these firms are more established in their markets; however, controlling for age may already capture this. Since most small firms are not highly reliant on government contracts, self-assessing firms on government contracts may still be able to manipulate revenue as long as they do not report revenue below the revenue generated from the government. The higher take-up by firms on government contracts may also suggest that these firms have a general tendency to comply with any programs by the tax authority to maintain a good tax status and reputation for the sake of procuring future contracts.

Table 3: Policy Take-up by Firm Characteristics

	Tax		Tax and Fin.			
	(1)	(2)	(3)	(4)	(5)	(6)
Log Revenue	-0.0063***	-0.0077***	-0.0180***	-0.0186***	-0.0163***	
	(0.0005)	(0.0005)	(0.0014)	(0.0014)	(0.0015)	
Older Firm	0.0132***	0.0116***	0.0218***	0.0151***	0.0189***	0.0198***
	(0.0008)	(0.0008)	(0.0019)	(0.0018)	(0.0021)	(0.0021)
On Gov. Contract	0.0072***	0.0075***	0.0071***	0.0096***	0.0097***	0.0063**
	(0.0013)	(0.0013)	(0.0026)	(0.0026)	(0.0026)	(0.0026)
Log Assets					-0.0047***	-0.0082***
					(0.0009)	(0.0009)
Log Employment					-0.0113***	-0.0115***
					(0.0026)	(0.0026)
Log Costs					0.0002	-0.0008***
					(0.0003)	(0.0003)
N (firm-year)	332399	332394	82686	82686	82686	82686
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	Yes	Yes

Notes: Firm-level regressions for eligible firms (at or below the 300,000 revenue cutoff). Columns 1-2 use all tax returns, and columns 3-6 use tax returns matched with financial statements. The dependent variable is a dummy equal to 1 in a year a firm uses the government policy to avoid being audited. The older firm variable is a dummy equal to one if the firm is 5 years or older. Costs are calculated as the difference between sales and gross operating profits. Standard errors are clustered at the firm level. We control for missing observations in the age, assets, and employment variables by using missing variable dummies in controls. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

VI   Reporting Response to the Self-Assessment Program

We first provide graphical evidence on the reporting responses to self-assessment for self-assessing firms. We then turn to the formal estimation of these reporting responses using regressions and event-study designs.

Recall that, purely mechanically, firms can hit the targets for the profit margin by i) reporting higher accounting profits; ii) reporting higher pre-self-assessment profits (i.e., lower deductions or higher adjusted costs), iii) by adjusting downward the revenue reported (which is accounting revenue), or iv) by reporting a higher self-assessed amount. They can also do a mix of all or several of these. We discuss below how to interpret these findings in light of true effects versus avoidance or evasion.

## A   Graphical Evidence: the Distributions of Accounting and Taxable Profits and Revenue

In the next figures we contrast the distributions of taxable and accounting profit margins and profits, first for all firms taking up self-assessment and, second, specifically for firms in the accommodation and food industry. We condition on firms taking up self-assessment in at least one year, and therefore the distributions include the same firms during the peak program years, 2003-2009, and the pre-program years, 1999-2002. Figure 8 shows that taxable profit margins are much higher in years in which firms take up the program than in years in which they do not. More so, the margins are not random; there are clear spikes in the distribution corresponding to the main prescribed margins by the tax administration. In contrast, accounting margins are reported in a similar manner to the pre-program distributions. The distribution of pre self-assessment taxable profit margins is almost exactly the same as accounting margins when margins are positive, and shows a large spike at zero for firms with negative accounting profits.

Figure 9 shows a clear right shift in the taxable profits distribution (relative to accounting profits) and in contrast to the non-take-up years, indicating a positive effect on compliance for taxable profit reporting. Figure 9 also decomposes the taxable profits distribution into pre-self-assessment taxable profits and the self-assessment amount. The distribution of pre-self-assessment taxable profits is almost identical to the positive side of the accounting profits distribution, which suggests that most of the adjustment is coming directly and simply from the self-assessment amount. However, where many firms report negative accounting profits, they report exactly zero pre-self-assessment taxable profits, indicating an additional adjustment through cost and deduction reporting for firms with negative accounting profits. Appendix Figure A9 shows the main targeting point for most firms in the industry at 13% of taxable margins – the exact prescribed margin for non-luxury hotels.

Do firms also adjust their reported accounting revenues to lower their tax burden while targeting the prescribed margins? Comparing revenue distributions of self-assessing firms with their own closest counterfactual distribution – their revenue reporting in years prior to the self-assessment policy, 1999-2002, Figure 10 shows a leftward shift in revenues from before self-assessing. In fact, the 1999-2002 revenue distribution and the 2003-2009 for non-self-assessing years are very similar in shape. The 2003-2009 distribution for self-assessing years represents a clear leftward shift. We also use reported accounting profits as an approximation to taxable profit reporting for the case without self-assessment and construct the "full revenue adjustment" distribution. We do so to illustrate the hypothetical case in which firms would have adjusted entirely on revenue to meet prescribed profit margins, and not raised taxable profits in response to self-assessment.

Figure 8: Profit Margins of Firms that Self-assess at Least Once
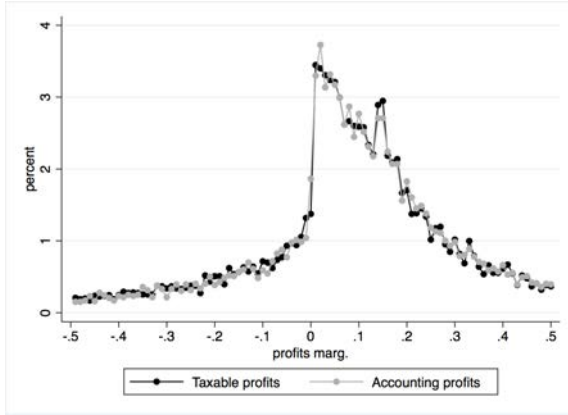
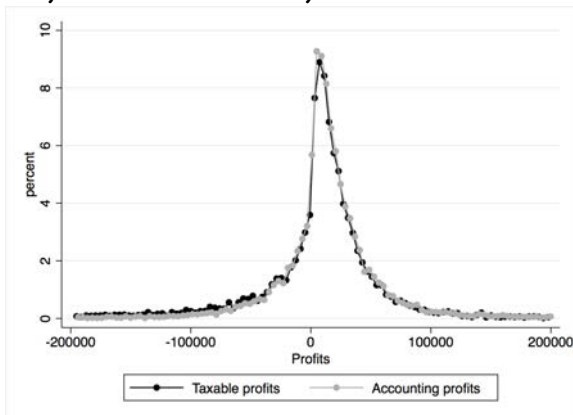In years in which they do not self-assess

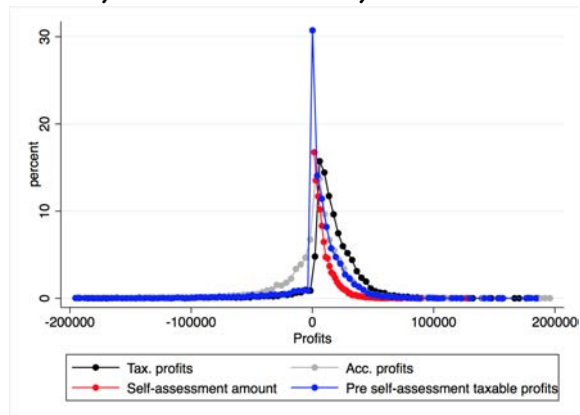In years in which they self-assess
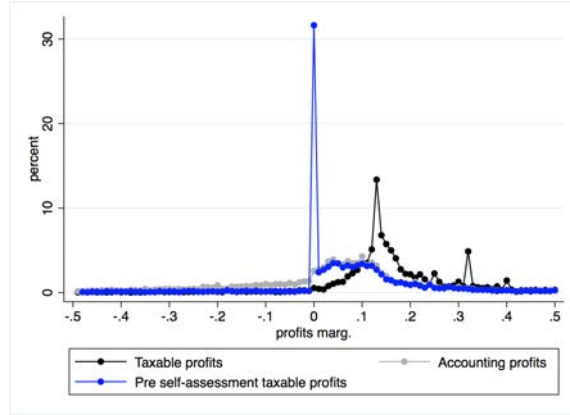
Notes: The distributions are conditional on self-assessing in at least one year. The distributions (left and right) are for the same firms, pooled for the self-assessment policy years 2003-2009. A firm's accounting or taxable profit margin is the firm's accounting or taxable profit to revenue ratio.

Figure 9: Profits of Firms that Self-assess at Least Once

In years in which they do not self-assess

In years in which they self-assess

Notes: The distributions are conditional on self-assessing in at least one year. The distributions (left and right) are for the same firms, pooled for the self-assessment policy years 2003-2009. Taxable profits in self-assessment years (right) are decomposed into pre self-assessment taxable profits and the self-assessment amount.

Figure 10: Revenue Distributions Before and During Policy Years
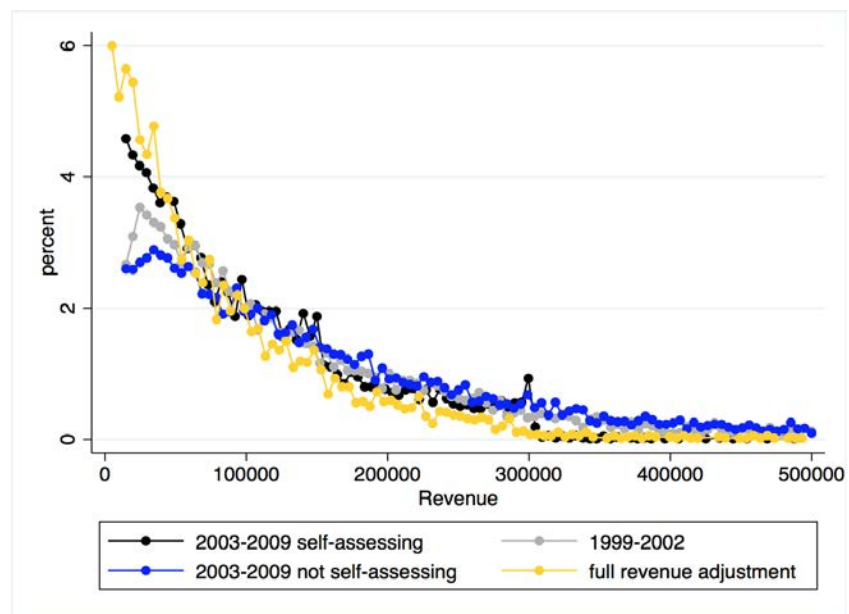
Notes: The three distributions are for the same firms, and are pooled for the labeled years conditional on firms taking up the self-assessment program in at least one year between 2003 and 2009. "2003-2009 self-assessing" refers to firm-year observations when they self-assess. "2003-2009 not self-assessing" refers to firm-year observations when they do not self-assess. We construct the "full revenue adjustment" series as a counterfactual distribution where firms report prescribed margins, but place the entire adjustment on lowering revenue (we use reported accounting profits as the counterfactual for taxable profits without self-assessing).

B   Event Study

We also use an even study design to estimate the effects of self-assessment on profits and revenues. Our setting is not a classical event study setting, since a firm that chooses to self-assess in a year t does not necessarily continue to choose so in subsequent years. We thus divide eligible firms into three groups for any given year t: "never treated" firms are those that never choose to self-assess; "treated in year t" firms are those that choose to self-assess in year t (regardless of whether they continue to choose so later); and "treated but not in year t" are firms that choose to self-assess in a year other than year t. We then consider "never treated" and ineligible firms as the main control group. Precisely, our main control group consists of firms between €400,000 and €1,000,000.

We divide firms into four "take-up frequency" groups, i.e., by whether they take up from one year to four years consecutively. We do so to point out any difference in reporting response between those groups. We test for systematic differences between the take-up frequency groups and the control group prior to take-up (Table A2), and as a result of these differences we control for firm age and whether a firm is on a government contract – the two main firm characteristics available in the tax data.[15]

We then run the following regression separately by these take-up groups (i.e, we run it for firms that take up in one year only, then for firms who take up for two years consecutively, etc.). Using this estimation, we choose to discard firms that may self-assess with gaps and focus on the first consecutive years of self-assessment to provide direct comparisons between take-up groups (i.e. self-assess in year t, not do so in year $t+1$, and then self-assess again in year $t+2$).[16]

$$Y_{it} = \alpha_i + \beta_t + \sum_{t=E_i-3}^{E_i+3} \gamma_k 1\{K_{it} = k\} + \psi X_{it} + \delta Z + \varepsilon_{it}$$

where α_i denotes firm fixed effects, β_t denotes the calendar year dummies, E_i is the first year in which a firm chooses to self-assess (regardless of whether it keeps doing so in subsequent years), and $K_{it} = t - E_i$ are dummies for the relative time to the event defined by the first-year of self-assessment. X_{it} is the set of firm characteristics as described above. The set of coefficients γ_k are the main coefficients of interests. For $k < 0$, they capture pre-trends (or lead effects); for $k > 0$ they capture the dynamic correlation between self-assessment and the outcome variable Y_{it}. They measure the change in the outcomes of self-assessing firms relative to the pre self-assessment reference year, over and above the change observed for the control group made of firms that never self-assess. The control group allows the use of year fixed effects. We use industry dummies Z to control for differences across industries and therefore compare control and self-assessment groups within industries.

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[15]In Section V, we show that there's heterogeneity in program take-up. Some of it is due to change in program rules (i.e. some firms may take-up once or twice at the beginning of the program and then stop due to higher compliance costs).

[16]We later include those firms in the pooled estimation.

This specification enables us to test the parallel trends assumption – i.e. whether firms taking-up the program were on the same outcome or tax reporting trajectory than firms not taking up the program, before taking up self-assessment for the first time. We can also examine any longer-lasting impacts of self-assessment. Specifically, splitting self-assessing firms into groups corresponding to take-up frequency allows us to measure tax reporting in years after the first self-assessment, and compare reporting responses by group.

On all three outcomes – taxable margins, taxable profits, and revenue – and for all four groups by frequency of take-up, pre-trends prior to the first year of take-up - labeled year zero - are not substantial relative to the large reporting responses while taking-up the program. In fact, visually, trends are generally parallel, with minor deviations only appearing in Table 4. Nevertheless, despite that fact that these pre-trends do not appear concerning, we can still improve the analysis if we focus on the first year the program was offered, which we show in Table 5.

Using log profit outcomes, the largest effect on taxable margins is for four-time takers, followed by two-time and three-time takers, and the lowest increase in margins is for one-time takers. Taxable profits increase by at least 600% on average for one-time and two-time takers, but increase by nearly 800% for three-time and four-time takers in the first year of the program, and continue to rise for those groups as they self-assess in later years.[17] On the other hand, one-time takers are most able to manipulate revenue in their one year of take-up (Figure 11). Looking at pre self-assessment taxable profits, we do not see any substantial responses with the exception of one-time takers where there is a slight decline. Therefore the increase in taxable profits is almost entirely driven by the self-assessment amount.

There are no long-lasting reporting responses for one-time takers – their self-assessment creates a one time increase in revenue for the government but those firms return to the same profit and revenue reporting relative to the control group. In fact, one-time takers have higher baseline taxable profits in 2002 than the other groups and therefore did not require a large profit response to reach the target margins. On the other hand, two-time and three-time takers end up with lower margins in the post-take-up years but they remain higher than in years prior to the program. Those higher margins are in large part driven by both a lower revenue reporting in the post-take-up years, and by an increase in taxable profits (Figure 11 and Figure 12). Table 4 shows the coefficients on the time dummies relative to the control group.

The firm response on taxable profits is very large in percentage terms. However, this is in the most part driven by the fact that a large percentage of firms reported zero or negative taxable profits before self-assessing.[18] We therefore repeat our estimation using

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[17]To convert large coefficients to percentage change with log outcomes: $\%\Delta Y = 100(e^{\text{coeff}} - 1)$.

[18]For example, a firm reporting taxable profits of €1 in year $t-1$ before self-assessing and reporting taxable profits of €5,000 in the self-assessment year will have a 5000% increase in taxable profits.

Figure 11: Event Study Results
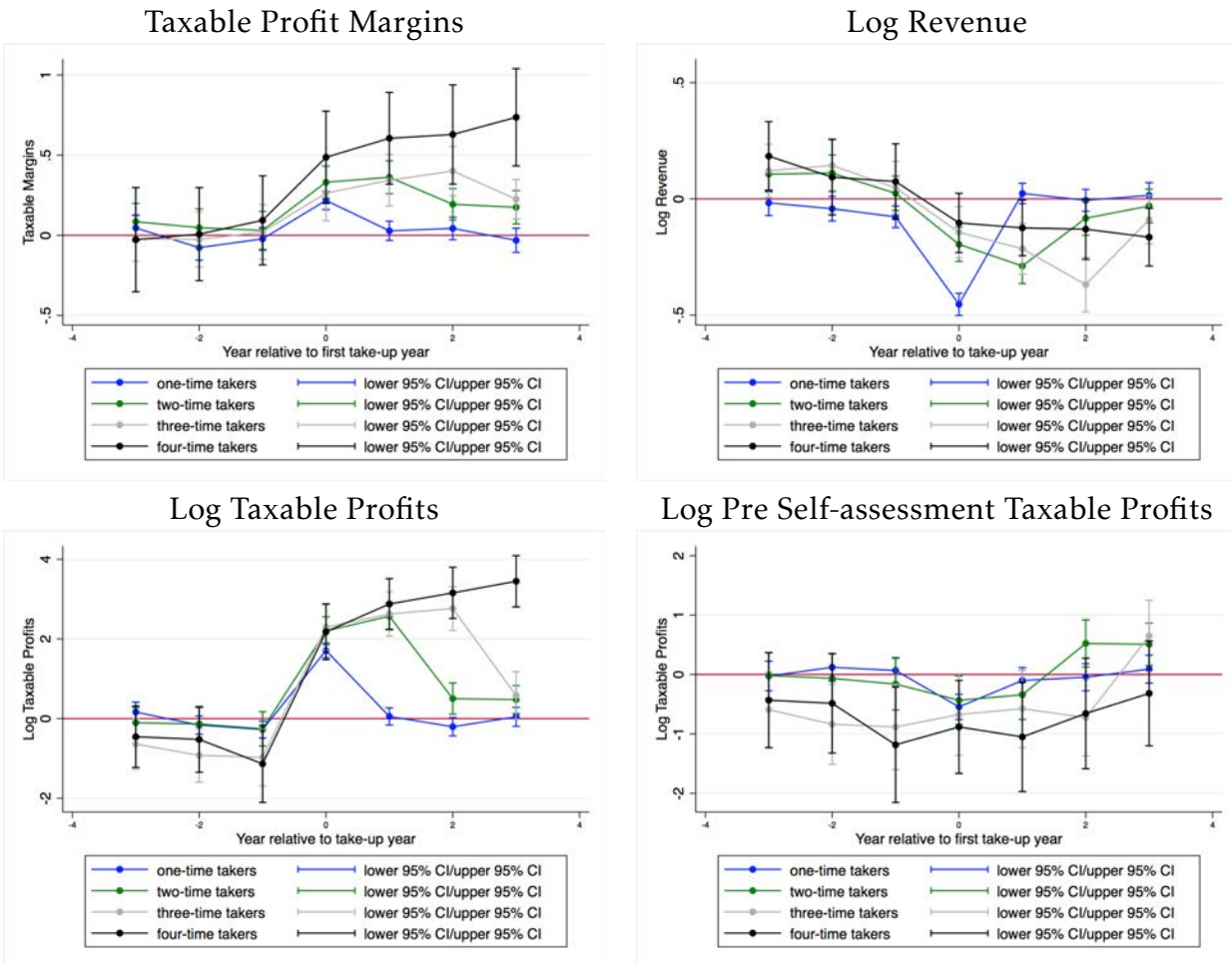
Taxable Profit Margins

Log Revenue

Log Taxable Profits

Log Pre Self-assessment Taxable Profits

Notes: Each group only includes consecutive take-ups and is evaluated alone against the control group of non-takers (€400k-1m firms). Our specification includes year, firm, and industry fixed effects. Controlling for firm age and whether firm has a government contract. Negative and zero taxable reported profits treated as zero (+1 when taking logs). Firm age is imputed for missing observations by a missing dummy. Logs refer to natural logs. Margins are winsorized at the 1 and 99% levels.

taxable profits rather than log taxable profits to obtain a better sense of the magnitude of the change. Figure 12 shows that one-time takers increase taxable profits only by a few thousand Euros relative to the control group, but one-time takers report higher baseline taxable profits to begin with. On the other hand, four-time takers have the lowest baseline taxable profits and tend to increase taxable profits by nearly €38,000, on average, in the first year and continue to increase profits in the following years. However, theses firms start with a baseline of significantly negative average taxable profits and therefore a large part of the increase in taxable profits does not lead to higher tax payments. In fact, when we treat negative profits as zero profits, four-time takers increase taxable profits by by only nearly €8,300 from the year prior to take-up to their first year of take-up, while one-time takers show a slight decrease in taxable profits. Finally, while there are no long-lasting effects on one-time takers, we confirm that two-time and three-time takers increase taxable profits substantially on average in self-assessing years, and remain at those higher levels in years after self-assessing, relative to the control group.

Figure 12: Taxable Profits Levels Response to Self-Assessment by Take-up Groups
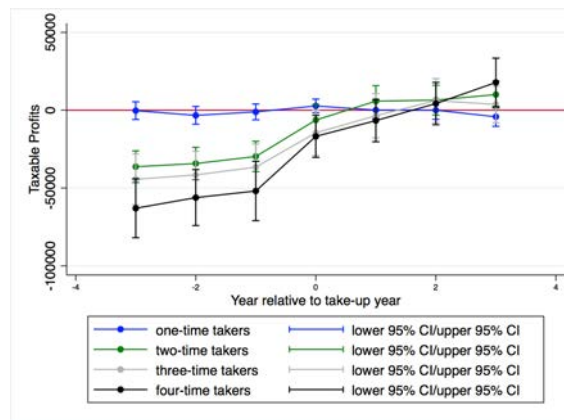
Notes: Taxable profits are winsorized at the 5% and 95% levels. Each group only includes consecutive take-ups and is evaluated alone against the control group of non-takers (€400k-1m firms). Our specification includes year, firm, and industry fixed effects. Controlling for firm age and whether firm has a government contract. Firm age is imputed for missing observations by a missing dummy. Logs refer to natural logs. Margins are winsorized at the 1 and 99% levels.

C   Robustness: Addressing Pre-Trends

The pre-trend in firm revenue may be due to differences in the self-assessment and control groups or it may be due to slower adjustment by firms before they take-up self-assessment when they have prior knowledge of the program. We therefore estimate the model for one-time takers in 2003, the first year of the program. The significant coefficient on year $t-1$, though small in magnitude, for both taxable profits and revenue may suggest some slight anticipation effect or planning before taking-up the program. When we only consider the first year of the program, any slight anticipation as suggested by a significant coefficient entirely disappears for both outcomes (Table 5).

Table 4: Policy Effects on Treated by Take-up Frequency

	Log Taxable Profits				Log Revenue			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
T-3	0.1636	-0.1047	-0.6400**	-0.4542	-0.0170	0.1064***	0.1209**	0.1839**
	(0.1281)	(0.1947)	(0.3220)	(0.3933)	(0.0279)	(0.0392)	(0.0581)	(0.0757)
T-2	-0.1620	-0.1339	-0.9213***	-0.5230	-0.0423	0.1110***	0.1438**	0.0934
	(0.1162)	(0.2096)	(0.3438)	(0.4209)	(0.0269)	(0.0395)	(0.0589)	(0.0825)
T-1	-0.2742**	-0.2579	-0.9741***	-1.1353**	-0.0772***	0.0239	0.0480	0.0747
	(0.1090)	(0.2205)	(0.3642)	(0.4945)	(0.0237)	(0.0377)	(0.0581)	(0.0828)
T	1.7110***	2.2035***	2.2958***	2.1809***	-0.4535***	-0.1955***	-0.1436**	-0.1034
	(0.0943)	(0.1800)	(0.2895)	(0.3580)	(0.0244)	(0.0376)	(0.0563)	(0.0650)
T+1	0.0547	2.5707***	2.6269***	2.8778***	0.0233	-0.2887***	-0.2146***	-0.1248**
	(0.1099)	(0.1725)	(0.2846)	(0.3254)	(0.0224)	(0.0386)	(0.0558)	(0.0609)
T+2	-0.2033*	0.5019**	2.7643***	3.1570***	-0.0061	-0.0832**	-0.3686***	-0.1304**
	(0.1180)	(0.2001)	(0.2807)	(0.3282)	(0.0240)	(0.0375)	(0.0601)	(0.0661)
T+3	0.0465	0.4777***	0.5783*	3.4487***	0.0154	-0.0306	-0.0890*	-0.1648***
	(0.1220)	(0.1797)	(0.3055)	(0.3284)	(0.0278)	(0.0370)	(0.0532)	(0.0633)
N	145690	138050	133551	131649	145690	138050	133551	131649
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Firm-level regressions. N refers to firm-year obs. The outcome variable is taxable profits for columns 1-4 and revenue for columns 5-8. Regressions are by number of years of take-up from lowest (one on the left) to highest (four on the right). All regressions control for firm age and whether a firm is on a gov. contract and impute for missing age using a dummy variable. Log refers to natural logs. Standard errors are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Effects for One-Time Takers in the First Year vs. All Years

	Log Taxable Profits		Log Revenue	
	(All years)	(First year)	(All years)	(First year)
T-3	0.1636	0.1817	-0.0170	-0.0188
	(0.1281)	(0.3274)	(0.0279)	(0.0753)
T-2	-0.1620	-0.1693	-0.0423	-0.0474
	(0.1162)	(0.2712)	(0.0269)	(0.0779)
T-1	-0.2742**	-0.2535	-0.0772***	-0.0874
	(0.1090)	(0.2499)	(0.0237)	(0.0670)
T	1.7110***	1.9353***	-0.4535***	-0.5053***
	(0.0943)	(0.2098)	(0.0244)	(0.0681)
T+1	0.0547	0.3169	0.0233	0.0462
	(0.1099)	(0.2773)	(0.0224)	(0.0619)
T+2	-0.2033*	-0.0818	-0.0061	0.0474
	(0.1180)	(0.2580)	(0.0240)	(0.0630)
T+3	0.0465	-0.6010*	0.0154	-0.0304
	(0.1220)	(0.3116)	(0.0278)	(0.0742)
N (firm-year)	145690	131283	145690	131283
Year, Firm, and Ind. FEs	Yes	Yes	Yes	Yes

Notes: Firm-level regressions. The outcome variable is taxable profits for columns 1 to 2 , and revenue for columns 3-4. All years refers to all years of the program and first year is 2003 take-up. Regressions are by number of years of take-up from lowest (one on the left) to highest (four on the right). All regressions control for firm age and whether a firm is on a gov. contract and impute for missing age using a dummy variable. Log refers to natural logs. Standard errors are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

D   Robustness: Other Control Groups

In the previous estimation, we used one main control group: firms with revenue between €400,000 to €1,000,000 because they are most comparable by revenue while being ineligible for the program. We repeat the main specification using two other control groups; we consider the control group of eligible firms that are never takers (i.e. never self-assess), and we also consider eligible firms that do self-assess in some years but use them as controls only for those years in which they do not self-assess. We do so for two main self-assessment groups: one-time takers and four-time takers, which happened to be the most distinct groups in their response to the policy in the previous estimations. The parallel trends generally hold similarly for all cases. In fact, changing the control group produces almost identical results for the one-time takers. The four-time takers reporting responses are also similar, with the main distinction being the pre-take-up level relative to the control groups (see Figure A11 and Figure A12 in the appendix).

E   Heterogeneity Across Time Periods

We previously noted that the changes in the program such as introducing a separate audit probability for self-assessing firms have increased the cost of tax evasion, and therefore led to a decrease in take-up, notably after 2005. We also highlighted the very low take-up period after 2009 when firms are deeper into the Greek crisis and after the 2010 fiscal consolidation reform when the tax authority treated revenue collection with increased scrutiny following the urgent need to raise revenue. We therefore split the sample period into three time periods – 2003-2006, 2006-2009, and 2010-2013 – to allow for differences in responses across time and as a result of the changes in the program and the low-take-up period during the Greek crisis.

We show the results for one-time takers of self-assessment and three-time takers in Appendix Figure A13.[19] The earlier period of 2003-2006 has the largest sample size and, therefore, the results for this period only largely resemble the results for the entire sample. In the later program periods, one-time takers show both lower revenue during the pre-trend years than the control group, and higher taxable profits. This combination suggests that the type of firms choosing to self-assess after 2005 is both already paying higher taxes than the control and is therefore more able to reach target taxable margins. Therefore, in later years of the program, the type of firms that entered into the program are likely to have been more able to comply with higher taxes.

F   Correlations of Self-Assessment with Revenue and Taxable Profits by Industry

We use a two-way fixed effects model to gauge differences in response to the self-assessment policy and estimate correlations between self-assessment and taxable profits and revenue

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[19]We choose three-time takers to obtain a higher sample size than four-time takers in this case. Despite this, the period of 2010-2013 has only 7 firms that take-up three times. We therefore do not rely on the results for three-time takers in that period.

of self-assessing firms by industry. We focus on industry differences and therefore do not distinguish between firms by the number of years of take-up. We run the following simple form of the model (without taking into account dynamic effects or pre-trends), separately for each industry:

$$Y_{it} = \alpha_i + \beta_t + \gamma E_{it} + \psi X_{it} + \varepsilon_{it}$$

where α_i denotes firm fixed effects, β_t denotes the calendar year dummies, and E_{it} is a dummy equal to one if firm i self-assesses in year t. X_{it} is a set of firm characteristics including firm age and whether the firm is on a government contract in year t. We also add financial controls for firms we have financial statement data for, which include assets and employment. Y_{it} is either taxable margins, log taxable profits, or log revenue, the latter two being the levers a firm can choose to reach the targeted taxable margins. γ is the main coefficient of interest and measures the correlation between profits or revenues and being in the self-assessment program in that year.

Because the purpose of this estimation is to shed light on industry differences, the sample choice in effect is not restrictive; we compare treated years with all other non-treated years. We focus on the control group of firms who are eligible but not choosing to take-up in this case: eligible firms that do self-assess in some years. We therefore condition on firms having at most €400,000 in revenue in order to include eligible firms and those who may bunch to the lower cutoff of €300,000 for the purpose of being eligible. In a previous subsection we addressed the choice of the main control group and showed that the results are not sensitive to choice of the control group. We also note that we would obtain similar correlations and ranking of correlations for each industry with an event study.

Using log outcomes, the results show the largest gains in taxable profits (more than 5000%) and among the smallest change in revenue reporting (11%) for the food and accommodation industry. Food and accommodation is also the industry with the highest percentage of take-up, suggesting that firms in this industry are more able to take advantage of the self-assessment. The large average percentage change in taxable profits reporting is driven by a large extensive margin response; firms who were reporting zero or negative taxable profits are now reporting positive and significant profits. In fact, Figure 13 shows that the food and accommodation industry included the largest percentage of firms reporting negative or zero profits in the pre self-assessment years (1999-2002). It is possible that the food and accommodation industry is under increased scrutiny in Greece, and felt more pressure to comply with the policy both in take-up and tax reporting in the case of smaller firms. Another plausible explanation is that large fast-food restaurants, for example, rely heavily on internal and external paper-trails making it difficult to under-report sales (Artavanis, 2015). Credit card sales may be checked and need to match up. On the other hand, the information and communication industry and the professional and scientific industry show the lowest taxable profit reporting gains (nearly 600%) and the largest drop in revenue reporting (22% and 20% respectively) in percentage terms, on average (Table 6). These two industries are reporting revenue in self-assessing years primarily below €150,000 and are therefore smaller than manufacturing or wholesale and retail.

Figure 13: Pre-Self-Assessment Taxable Profits for Firms who Self-Assess at Least Once
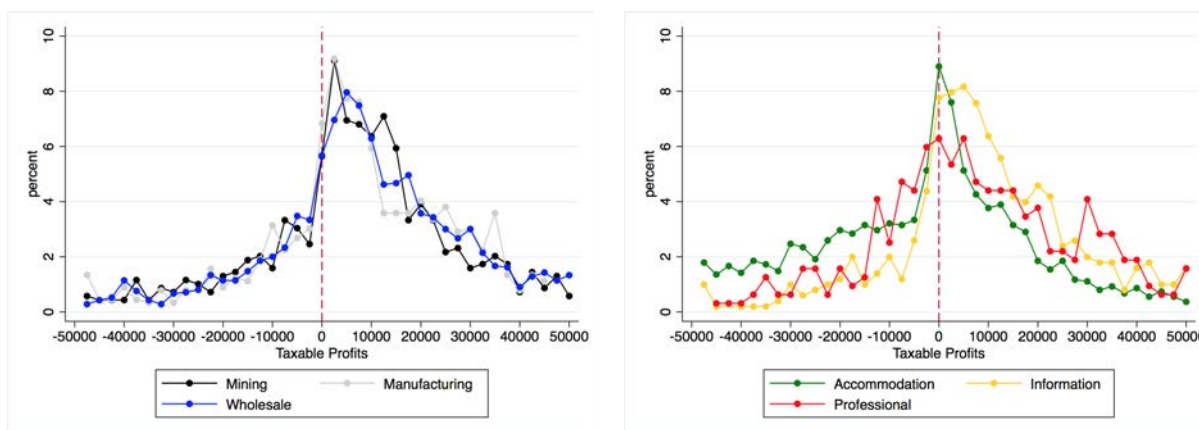
Notes: Figures includes only firms who self-assess at least once for the six main industries with the highest percentage take-up in self-assessment. The distributions are for years 1999-2002 before self-assessment. For clarity we separate into two figures with profits from three industries in each. All industries are the main six industries we chose to focus on because of their substantial take-up; "Accommodation", for example, refers to the "Food and Accommodation" industry.

In Panel B of Table 6, we use the Financial and Tax sample since it provides additional controls – mainly assets and employment – to the variables available in the Tax sample. Despite the change in coefficients, the ranking of industries from largest to smallest response is generally unchanged. The information and communication industry remains with the lowest change in taxable profits (400%) and largest decrease in revenue (26%). However, the Financial and Tax sample has a much lower sample size and this means we don't have reliable results for the mining industry using this sample, for example. This is in part due to conditioning on revenue of less than or equal to €400,000, while the Financial and Tax sample consists of larger and older firms, on average (see Table 1).

Table 6: Self-Assessment and Tax Reporting Correlations by Industry

	Mining	Manufact.	Wholesale & Retail	Accommod. & Food	Inform. & Communic.	Prof. & Scient.
Panel A						
Log Taxable Profits	3.3579***	2.7321***	2.9203***	4.0773***	2.1198***	2.0180***
	(0.2414)	(0.1584)	(0.0956)	(0.1272)	(0.2202)	(0.1586)
Log Revenue	-0.1119***	-0.1371***	-0.1678***	-0.1266***	-0.2663***	-0.2344***
	(0.0415)	(0.0297)	(0.0189)	(0.0147)	(0.0441)	(0.0358)
Tax N (firm-year)	19755	34800	83003	55476	18094	31988
Panel B						
Log Taxable Profits	2.3536	2.3990***	3.4751***	2.8120***	1.6482**	2.6468*
	(2.8189)	(0.6171)	(0.5799)	(0.3889)	(0.6756)	(1.4157)
Log Revenue	0.2146	0.0965	-0.2074**	-0.0803**	-0.2976**	-0.3047**
	(0.2138)	(0.1192)	(0.0969)	(0.0311)	(0.1358)	(0.1410)
Fin. N (firm-year)	308	3188	4812	5907	1293	1496
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Firm-level regressions limited to eligible firms and firms slightly above the cutoff (up to 400,000 in revenue). Panel A uses all tax returns, while Panel B uses tax returns matched with financial data. Columns represent effects by industry. The dependent variable is either taxable profits (rows 1 and 3) or revenue (rows 2 and 4) as indicated in the columns. Financial data uses controls for log assets and log employment, and all regressions control for firm age. We impute for missing values in controls variables by using missing dummies for assets, employment and age. Standard errors are clustered at the firm level. $* \ p < 0.10$, $** \ p < 0.05$, $*** \ p < 0.01$

G Staggered Difference-in-Difference Estimator Pooling All Firms

Our analysis can be further fine-tuned by using a staggered difference-in-differences estimator by de Chaisemartin and d'Haultfoeuille (2019). We choose this estimator for several reasons: (1) their specification is designed for diff-in-diff with staggered adoption where treatment is binary, (2) it allows for treatment effects to be heterogeneous over time and between groups, and (3) it computes dynamic treatment effects taking into account switchers / leavers which are fitting to our setting.[20]

For this part, we pool all take-up groups. The results for all three outcomes (taxable margins, taxable profits, and revenue) show that these variables generally follow a parallel trend prior to first take-up. We then observe a large and increasing effect for additional years of take-up for taxable margins and taxable profits, driven by the higher take-up groups. Taxable profits rise by an average of 450% in the first year to 5000% in the fourth year, translating directly into an increase of tax payments by firms (see appendix Fig-

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[20]Several recent papers attempt to modify the standard staggered difference-in-differences estimator, especially to solve for the problem of negative weights in estimation (see Callaway and Sant'Anna, 2019; Abraham and Sun, 2018; Borusyak and Jaravel, 2017, for example). de Chaisemartin and d'Haultfoeuille (2019) is the main one accounting for leavers.

ure 18). This reflects a weighted average of the estimations in the previous sections, where we divided the sample into four take-up groups. Again, the percentage changes are large but do not reflect huge magnitudes because we use log taxable income as the outcome variable; the large percentage change is mostly driven by an increase of compliance for firms who reported zero or negative taxable profits. We also see a large initial revenue adjustment and declining revenue relative to the control group with additional years in the program (from an average of a 18% decline in the first year to 27% for firms in the fourth consecutive year of self-assessment). Confidence intervals are wider with more program years because of the lower sample size of firms taking-up the program more than once or twice (Figures 14 and 15).

Figure 14: Pooled Responses to Self-assessment for Taxable Profit Margins
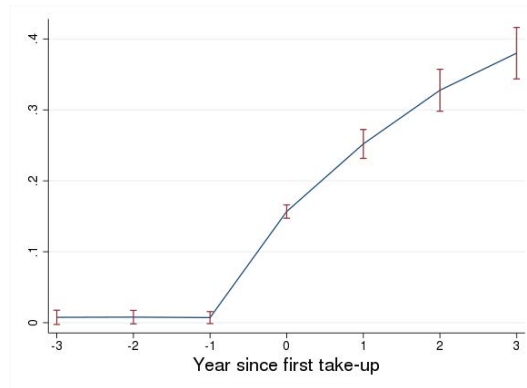
Notes: Year, firms, and industry FEs, and bootstrapped standard errors. Confidence intervals at 95% level.

Figure 15: Pooled Reporting Responses on Taxable Profits and Revenue
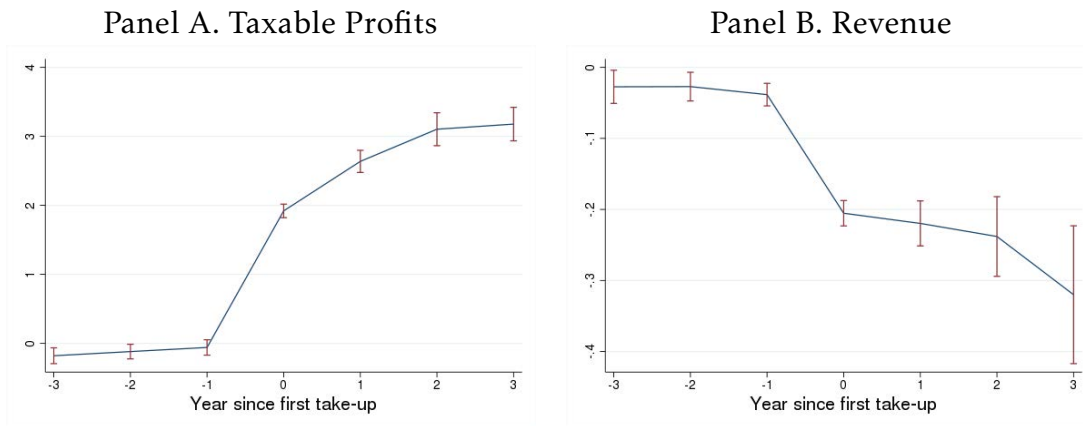
Notes: Staggered diff-in-diff estimator with year, firms, and industry FEs, and bootstrapped standard errors. Confidence intervals at 95% level.

VII Margins of Adjustment, Discussion, and Tax Revenue

A Margins of Adjustments: Accounting Profits, Costs, and Tax Adjustments

The fact that taxable profits and revenue reported move in opposite directions raises a question about what implied accounting costs and adjusted costs (for taxable profits) firms are actually entering. Thinking back to our accounting equations in Section IV, we can look at the event study of each of the components of taxable profits separately, i.e., accounting profits, accounting costs (defined as revenues minus accounting profits), taxable deductions and cost adjustments and pre-self-assessment taxable profits. We already considered the responses of pre-self-assessment taxable profits, revenues, and taxable profits above. In this subsection, we further look at accounting profits, accounting costs, and total tax adjustments.

We first examine the response of accounting profits. While the policy does not address accounting profits per se, any change in revenue reporting may require an adjustment in accounting profits or implied costs to remain consistent from a pure accounting point of view. We therefore estimate the specification in subsection B and also use the pooled estimation in subsection G for accounting profits (Figure 16).

The first two years of the program see a clear decline in accounting profits, largely driven by one-year and two-year frequency firms. This is also consistent with the fact that those observations are largely in the first two years of the program, before stricter laws on reporting came into effect beginning in 2005. For example, lower accounting profits early in the program are consistent with the ability to use the carry-loss forward in later years. The higher frequency take-up groups do not exhibit the same pattern and also self-assess beyond the first two years.

We do not observe direct cost measures in our data, with the exception of a small percentage of large firms. We therefore construct an implied cost measure for accounting costs. The implied costs (C_{it}) for firm i in year t are constructed using reported revenue and profits as follows:

$$C_{it} = R_{it} - \pi_{it}^{Acc}$$

We normalize this measures by revenue and plot the median costs for self-assessing firms (in self-assessing years) by their frequency group. We also include "never-takers."
We can also construct the sum of cost adjustments and tax deductions adjustments, called "total tax adjustments" i.e., the total difference between revenues and pre self-assessment profits as:

$$\text{Adj}_{it} = R_{it} - \pi_{it}^{Self}$$

Figure 17 shows the time series of the median firm's implied accounting costs and total tax adjustments. Accounting costs for self-assessing firms' implied costs are higher beginning

Figure 16: Reporting Response on Accounting Profits

A. By Take-up Group
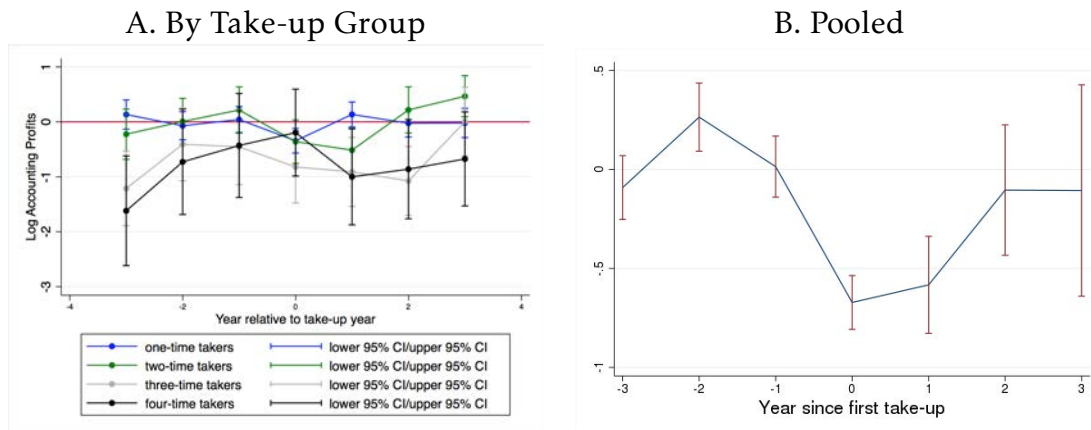
B. Pooled

Notes: Both estimations include year, firms, and industry fixed effects. We treat negative accounting profits as zero. Clustered standard errors at the firm level for the estimation by take-up group. Bootstrapped standard errors for pooled estimation, and confidence intervals at 95% level. We control for firm age and whether a firm is on a government contract.

in 2003 – the start of self-assessment, although they were noticeably lower than those for never-takers before the program. This is consistent with self-assessing firms reporting higher mean accounting profits than eligible "never-takers" (Figure 6).

Firms do not substantially change their tax adjustments following self-assessment in their self-assessing years, while firms who never self-assess have generally stable or rising adjustments. This is consistent with the profits distributions in Figure 9, where almost the entire increase in total taxable profits is due to the self-assessing amount.

The same figure (9), shows a spike in the pre self-assessing distribution at zero that is most likely coming from the left (negative accounting profits), suggesting some tax adjustments that increase reporting relative to the negative accounting profits. This spike at zero of pre self-assessment taxable profits coming from firms with negative accounting profits in Figure 9 can be explained by non-deductible expenses (for tax purposes). Non-deductible expenses in the Greek tax law are designed to limit firms from excess deduction of costs in their taxable profit calculations, and include expenses such as depreciation in excess of that foreseen by the tax code, and equipment expenses such as vehicles. Negative profit firms are more likely to report higher non-deductible expenses since they have no tax benefit from not doing so, while positive accounting profit firms may under-report these non-deductible expenses. Still, these adjustments are not large by any means as seen in Figure 17, with the exception of four-time takers.[21] Thus, when accounting profits are negative, firms first adjust their accounting costs to bunch exactly at zero before applying the self-assessment payment. When accounting profits are positive, the only adjustment is

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[21]Though four-time takers have the smallest sample size of the groups and their medians may still be sensitive to the small sample.

through the self-assessment amount directly.

It is also worth noting that self-assessing firms used the carry-loss deduction – the main avoidance tool – less than non self-assessing firms (see Appendix Figure A14). This is consistent with reporting higher profits, on average, in the program years, suggesting an unintended positive benefit on taxable income in the following years from reducing carry-loss deductions.

Figure 17: Implied Accounting Costs and Total Tax Adjustments (Median)
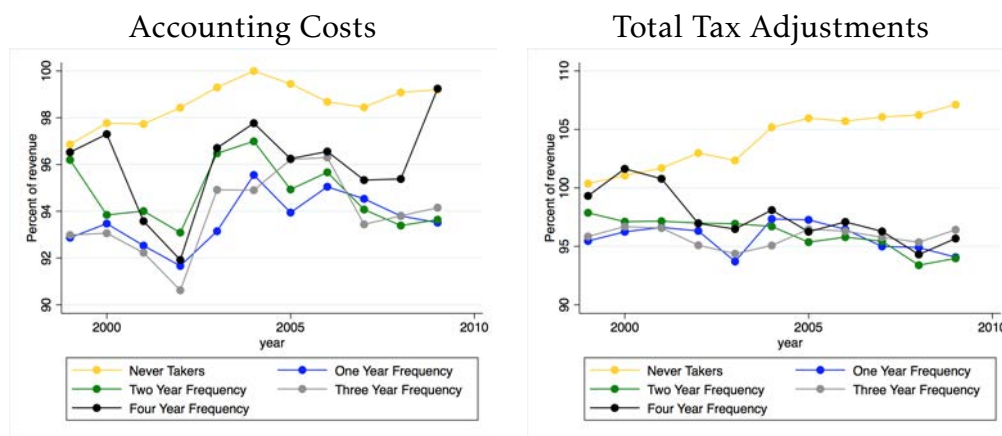
Notes: We condition on firms eligible in the program (≤ €300,000 in revenue). The never takers are therefore eligible firms who never take-up the program. The one to four year frequency groups time series is the median for firms belonging to those groups and self-assessing in those years. We normalize by dividing the implied costs by reported revenue. Both implied costs and adjusted costs are winsorized at the 5% and 95% levels.

B   Interpretation and Discussion

Our results, whether by take-up group or by pooling all take-up groups, show an increase in taxable profits reporting of at least 450% (coefficient of 1.7 in log-level regression) in response to self-assessment, and in some cases up to an average of 5000% (coefficient of 4 in log-level regression), in most part driven by the fact that negative and zero profits firms report positive profits in self-assessment years. That is, most of the average change is coming from firms reporting profits instead of losses in taxable terms. The change in levels, however, provides a better indication for tax revenue. If we include negative profits in our regressions, we measure the following: for one-time takers, the increase in taxable profits is about an average of €4,000 from their pre-self-assessment profits which is about 20% of their 2002 pre-self-assessment average taxable profits. Similarly, for four-time takers, firms show an increase of about €38,000 in taxable profits – almost 255% of their

2002 pre-self-assessment average taxable profits.[22]

If we treat negative taxable profit firms as zero profit firms, then one-time takers show a decrease in taxable profits of about an average of €2200 from their pre-self-assessment profits. Four-time takers in this case show an average increase of €8,300 (55% of 2002 average profits) in their first year of take-up to €10,600 (70% of 2002 average profits) in their fourth year. Because negative taxable profits do not differ substantially from zero profits, we rely on those results. The response of self-assessing firms on taxable profit reporting is substantial relative to other firm tax compliance studies, and in fact suggests that a large number of self-assessing firms were reporting very low or negative taxable profits. In contrast, Slemrod et al. (2017) find that electronic filing raises reported receipts by up to 24% and reported expenses by as much as 13%. Naritomi (2019) find that a consumer reward system can raise tax revenues by 9.3%, and find stronger effects for the retail sector. Best et al. (2015) consider changing the tax system from profit to turnover taxation and find this could reduce evasion by 60-70% in Pakistan. Unlike Slemrod et al. (2017) and Naritomi (2019), tax reporting in this paper does not only change *positively* for taxable profits, but we show adverse effects on revenue and possible manipulation in revenue reporting. On the revenue side, we observe a decline in revenue reporting of up to 40%. These effects, however, are smaller than the percentage increase generated in taxable profits. This is consistent with the findings of Best et al. (2015) that revenue is less manipulable than taxable profits.

The revenue adjustment is indicative of at least some avoidance or evasion, especially given the sharp bunching at the revenue eligibility thresholds, which suggests that revenues are not difficult to reduce or manipulate. The relative ease of revenue manipulation is also supported by evidence of bunching on zero taxable margins (profits to revenue ratio) for the population of small firms, but not profits to assets ratio (appendix Figure A7).

The increase in taxable profits due to the direct self-assessment amount on the other hand represents a gain for the tax administration. There are two important and related issues here: first, is this increase in taxable profits a true increase in profits (a real effect) or rather an increase in reported profits (a reporting effect). Second, if it is a reporting effect, is it the case that firms are now reporting *higher* profits than they actually make ("over-reporting") simply to get above the threshold and avoid being audited; or are they reporting profits they were previously hiding (correcting under-reporting).

On the first question, the sharp bunching at the target profit margins suggests that firms do have very strong control over their profit margins and at least partially over their profits. As real profits are presumably not so easy to control, this points to a reporting rather than a real profit effect. In addition, the adjustment comes from the self-assessed amount, not from actual real accounting profits, which points again towards a reporting

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[22]We treat negative profits as zero profits when we calculate the average profits prior to self-assessment. When we do so, the average 2002 taxable profits is €19,591 and and €14,860 for one-time and four-time takers respectively. If we treat negative profits as negative, the average taxable profits for all one-time and four-time takers will be negative in 2002.

rather than a real effect.

On the second question, it seems unlikely that for "honest" firms, the hassle costs of audits are so large that they decide to over-report profits simply to avoid being audited. It's much more likely that firms were engaging in routine avoidance and evasion and simply try to reveal a bit more of their (possibly much larger) profits to avoid being audited and have a higher penalty imposed on them. Firms that self-select into the program tend to be older and healthier than other eligible firms, suggesting that if the tax authorities looked at non self-assessing small firms, they may uncover even more under-reporting.

Did the program on balance generate more tax revenues? The final issue is whether the increase in taxable profits, accompanied by a reduction in revenues, actually lead to an increase in tax receipts by the government. For self-assessing firms, Panel A of Figure 18 shows a similarly large increase in the final tax owed (at least 450%) to the increase in taxable profits, relative to our main control group of firms with €400,000 to €1,000,000 in revenue.[23] Similarly, we show mean final taxes owed in the tax form in Panel B of Figure 18. Reported taxes owed to the government for eligible firms have increased noticeably in 2003 by about 60% on average, and remained at that level until 2007 before declining from 2007 to 2009. In contrast, mean taxes owed by the main control group increased slightly in 2003 but declined and continued to decline from 2003 to 2009. On balance, then, the self-assessment program increased government revenues from self-assessing firms, and increased government revenues on net from eligible firms.

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[23]These are taxes "owed" rather than taxes actually paid. While it is relatively possible for many Greek firms to not pay their owed taxes, self-assessing firms are likely to pay simply because they are attracting more attention from the tax administration by taking up the program and reporting higher profits.

Figure 18: Taxes Owed

A. Eligible firms
B. Self-assessing firms
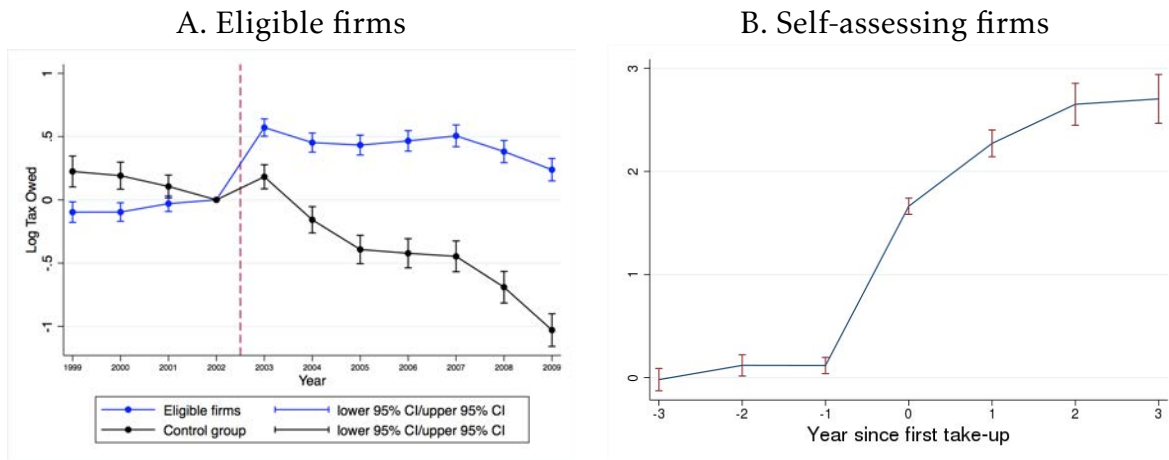
Notes: In Panel A, eligible firms refer to all firms with ≤ €300,000, and the main control group refers to firms with revenue of €400,000 to €1,000,000. Panel A uses 2002 as the reference year, and uses firm and industry fixed effects. In panel B, we use the staggered diff-in-diff estimation with year, firms, and industry fixed effects, and bootstrapped standard errors. Confidence intervals at 95% level. Taxes owed on the tax form are the tax amounts the firm reports that it owes based on its final taxable income (post adjustments and self-assessment). This measure excludes refunds.

C Putting the Increase in Tax Revenues into Perspective: Tax Revenue and the Greek Fiscal Crisis

We show a significant increase in tax receipts form self-assessing firms and the population of eligible firms, relative to firms in the higher revenue bracket. We turn to thinking about these tax receipts in the context of total Greek tax revenue from taxing corporations. Larger firms contribute the lion's share of total corporate tax revenue. Yet examining tax receipts from small firms and self-assessing firms before and during the Greek debt crisis can offer important evidence on the appropriate timing of introducing self-assessment, and the expected relative revenue windfall from focusing on small firm tax compliance.

Figure 19 shows total taxable income and total tax revenue by year as reported on the corporate tax forms in our sample. Total taxable profits in panel A for all firms in our sample peak around 2007 at about €12 billion before falling by a staggering 50% to a low of €6 billion in the trough of the financial crisis.[24] Reported taxable profits remained at the 2011 level for three additional years before showing signs of a recovery, despite attempts at fiscal consolidation especially in 2010. The corresponding tax revenue in panel B of the figure also show a near 50% decline in reported taxes owed in the tax form from 2007 to 2011. In contrast, taxable profits from smaller firms increased steadily during the time period and inclusive of the crisis, while taxes owed declined only in 2011 and 2012. However, this trend is driven by the increase in the number of small firms in Greece from

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[24]The sample excludes construction, financial, and accounting firms revenue and declared taxable profits.

less than 16,000 in 2003 (in our sample) to more than 21,000 in 2012. We therefore do not interpret this trend as a sign of smaller firms remaining healthier during the crisis. In fact, the crisis decreased firm revenue and size, on average, and contributed directly to an increase in the number of smaller firms.

Figure 19: Total Taxable Income and Total Tax Revenue

A. Taxable Income   B. Tax Revenue
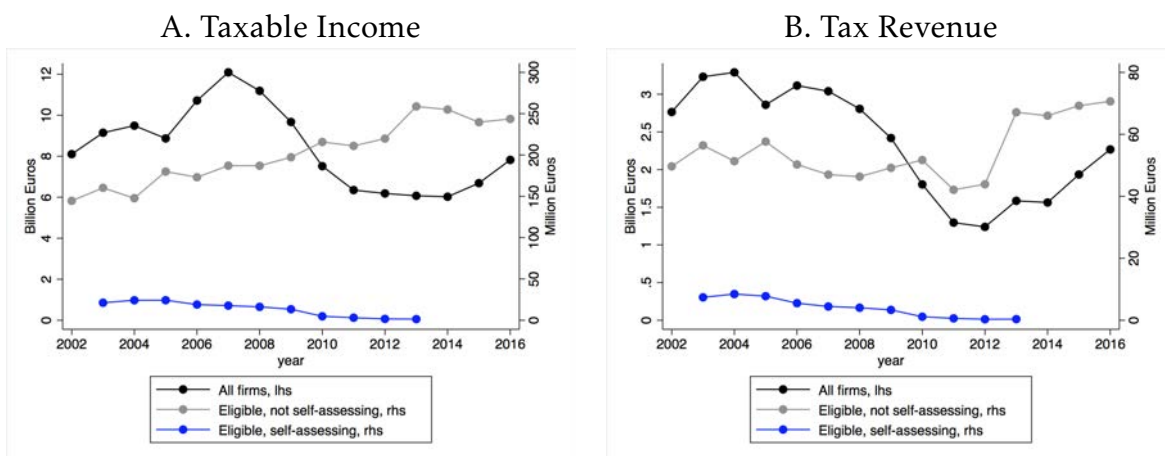
Notes: The series are the sum of taxable income and taxes owed to the tax administration reported on the tax forms. "All firms" refers to all firms in the tax data sample and uses the left-hand side axis (lhs). Eligible firms are those with revenue below or at €300,000, and self-assessing refers to revenue from firms who self-assess in the given year, and use the right-hand side axis (rhs). The sum of taxable income excludes firms who report negative taxable income. The sample excludes construction, financial and accounting firms.

Despite the limited take-up of the program whereby self-assessing firms comprise less than an average of 3% of small firms in Greece per year, the tax revenue raised from self-assessing firms over the 2003-2013 program period is more than 7% of total tax revenue from small firms. The total revenue generated from self-assessment (about €45 million collected from 4,023 self-assessing firms over a ten year period) is higher than the average per year tax revenue generated by *all* small firms at the height of the crisis between 2011 and 2015. The lower take-up beginning in 2010, however, suggests that implementing a similar program is more optimal in periods of growth when the tax administration is seeking to incorporate more firms into the habit of reporting positive taxable profits and thereby increase long term compliance.

VIII   Conclusion

Our new and confidential corporate tax data allows to uncover firms' responses to a compliance policy in Greece, namely a temporary "self-assessment" policy, which encourages and guides firms to pay higher margins in return for immunity from audits. To meet prescribed profit margins, our analysis shows that firms raise their taxable profits, a desired response by a tax compliance program, but also lower their revenue, an undesirable

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reporting response. The main channel for raising taxable profits is the self-assessment payment itself, rather than a change in accounting profits or tax deduction adjustments. In fact that seems to be the only channel when accounting profits are positive. When accounting profits are negative, firms first adjust their accounting costs to bunch exactly at zero before applying the self-assessment payment.

The results on self-assessment could therefore shed light on the broader Greek tax compliance picture. Self-assessing firms are older and healthier firms on average, with higher accounting profits. Yet, they reduce revenue easily by up to 40% to decrease their tax burden. While we may not be able to distinguish between revenue reductions from reducing sales (avoidance) and manipulation (evasion), the finding shows a substantial potential for a reduction in the corporate tax base, and have unintended consequences on lowering VAT revenue due to lower sales. The avoidance or evasion problem for the smaller firms may therefore be even deeper.

Future research could explore two additional aspects of such amnesty-like policies. First, the impacts of such programs are effectively driven by a combination of two effects: the self-assessment itself, but also the possible resources freed up for tax enforcement for other (non self-assessment) firms. Disentangling the gains from self-assessment or amnesty programs that come from these two channels would be very valuable. Second, the presence of a VAT can affect the incentives to self-assess or, more generally, to participate in an amnesty in subtle and complex ways. This interaction between the VAT and such tax compliance programs could affect the overall gains in tax revenues.

References

Abraham, S. and Sun, L. (2018), 'Estimating dynamic treatment effects in event studies with heterogeneous treatment effects', *Available at SSRN 3158747* .

Akerlof, G. A. (1978), 'The economics of" tagging" as applied to the optimal income tax, welfare programs, and manpower planning', *The American economic review* **68**(1), 8–19.

Alesina, A., Ichino, A. and Karabarbounis, L. (2011), 'Gender-based taxation and the division of family chores', *American Economic Journal: Economic Policy* **3**(2), 1–40.

Allingham, M. G. (1975), 'Towards an ability tax', *Journal of Public Economics* **4**(4), 361–376.

Alm, J. and Beck, W. (1990), 'Tax amnesties and tax revenues', *Public Finance Quarterly* **18**(4), 433–453.

Alstadsæter, A., Johannesen, N. and Zucman, G. (2019), 'Tax evasion and inequality', *American Economic Review* **109**(6), 2073–2103.

Altshuler, R., Auerbach, A. J., Cooper, M. and Knittel, M. (2009), 'Understanding us corporate tax losses', *Tax Policy and the Economy* **23**(1), 73–122.

Artavanis, N. (2015), 'Vat rates and tax evasion: Evidence from the restaurant industry in greece', *Research paper, University of Massachusetts Amherst Department of Finance. doi* **10**.

Artavanis, N., Morse, A. and Tsoutsoura, M. (2016), 'Measuring income tax evasion using bank credit: Evidence from greece', *The Quarterly Journal of Economics* **131**(2), 739–798.

Auerbach, A. J. (2007), 'Why have corporate tax revenues declined? another look', *CESifo Economic Studies* **53**(2), 153–171.

Auerbach, A. J. and Poterba, J. M. (1987), Tax loss carryforwards and corporate tax incentives, *in* 'The effects of taxation on capital accumulation', University of Chicago Press, pp. 305–342.

Best, M. C., Brockmeyer, A., Kleven, H. J., Spinnewijn, J. and Waseem, M. (2015), 'Production versus revenue efficiency with limited tax capacity: theory and evidence from pakistan', *Journal of political Economy* **123**(6), 1311–1355.

Bilicka, K. A. (2019), 'Comparing uk tax returns of foreign multinationals to matched domestic firms', *American Economic Review* **109**(8), 2921–53.

Borusyak, K. and Jaravel, X. (2017), 'Revisiting event study designs', *Available at SSRN 2826228* .

Brockmeyer, A. and Hernandez, M. (2016), *Taxation, information, and withholding: evidence from Costa Rica*, The World Bank.

Burgstahler, D. and Dichev, I. (1997), 'Earnings management to avoid earnings decreases and losses', *Journal of accounting and economics* **24**(1), 99–126.

Callaway, B. and Sant'Anna, P. H. (2019), 'Difference-in-differences with multiple time periods', *Available at SSRN 3148250* .

de Chaisemartin, C. and d'Haultfoeuille, X. (2019), Two-way fixed effects estimators with heterogeneous treatment effects, Working paper, National Bureau of Economic Research.

Desai, M. A., Foley, C. F. and Hines, J. (2001), 'Repatriation taxes and dividend distortions', *National Tax Journal* **54**(4), 829–51.

Desai, M. A., Foley, C. F. and Hines, J. R. (2004*a*), Economic effects of regional tax havens, Working paper, National Bureau of Economic Research.

Desai, M. A., Foley, C. F. and Hines, J. R. (2004*b*), 'Foreign direct investment in a world of multiple taxes', *Journal of Public Economics* **88**(12), 2727–2744.

Desai, M. A., Foley, C. F. and Hines, J. R. (2006), 'The demand for tax haven operations', *Journal of Public economics* **90**(3), 513–531.

Dharmapala, D. (2008), 'What problems and opportunities are created by tax havens?', *Oxford Review of Economic Policy* **24**(4), 661–679.

Dharmapala, D. and Hebous, S. (2018), A bunching approach to measuring multinational profit shifting, Working paper, mimeo, IMF and University of Chicago.

Fatica, S., Hemmelgarn, T. and Nicodème, G. (2013), 'The debt-equity tax bias: consequences and solutions', *Reflets et perspectives de la vie économique* **52**(1), 5–18.

FT (2010), 'Greece condemned for falsifying data', *Financial Times* .
URL: *https://www.ft.com/content/33b0a48c-ff7e-11de-8f53-00144feabdc0*

Hanlon, M. and Heitzman, S. (2010), 'A review of tax research', *Journal of accounting and economics* **50**(2-3), 127–178.

Hines, J. R. (2010), 'Treasure islands', *Journal of Economic Perspectives* **24**(4), 103–26.

Johannesen, N., Tørsløv, T. and Wier, L. (2016), Are less developed countries more exposed to multinational tax avoidance? method and evidence from micro-data, Working paper, WIDER Working Paper.

Kanellopoulos, K. (2002), 'Tax evasion in corporate firms: estimates from the listed firms in athens stock exchange in 1990s', *Centre of Planning and Economic Research (CPER).*, *Study* (75).

Kaplow, L. (1994), 'The standard deduction and floors in the income tax', *Tax Law Rev.* **50**, 1.

Karagounis & Partners (2010), '2010 amendments to tax and corporate laws in greece', *Primerus* .
URL: *https://www.primerus.com/business-law-articles/2010-amendments-to-tax-and-corporate-laws-in-greece-11042010.htm*

Kleven, H. J., Kreiner, C. T. and Saez, E. (2016), 'Why can modern governments tax so much? an agency model of firms as fiscal intermediaries', *Economica* **83**(330), 219–246.

Langenmayr, D. (2017), 'Voluntary disclosure of evaded taxes—increasing revenue, or increasing incentives to evade?', *Journal of Public Economics* **151**, 110–125.

Leonard, H. B. and Zeckhauser, R. J. (1987), 'Amnesty, enforcement, and tax policy', *Tax policy and the economy* **1**, 55–85.

Leuz, C., Nanda, D. and Wysocki, P. (2003), 'Investor protection and earnings management: An international comparison', *Journal of Financial Economics* **69**(3), 505–527.

Malik, A. S. and Schwab, R. M. (1991), 'The economics of tax amnesties', *Journal of Public Economics* **46**(1), 29–49.

Mankiw, N. G. and Weinzierl, M. (2010), 'The optimal taxation of height: A case study of utilitarian income redistribution', *American Economic Journal: Economic Policy* **2**(1), 155–76.

Mikesell, J. L., Ross, J. M. et al. (2012), 'Fast money? the contribution of state tax amnesties to public revenue systems', *National Tax Journal* **65**(3), 529–562.

Naritomi, J. (2019), 'Consumers as tax auditors', *American Economic Review* **109**(9), 3031–72.

OECD (2011), 'Oecd economic surveys. paris: Oecd.'.

Okunogbe, O. M. and Pouliquen, V. (2018), 'Technology, taxation, and corruption: evidence from the introduction of electronic tax filing', *World Bank Policy Research Working Paper* (8452).

Rajaraman, I. (1995), 'Presumptive direct taxation: lessons from experience in developing countries', *Economic and Political Weekly* pp. 1103–1124.

Saez, E., Matsaganis, M. and Tsakloglou, P. (2012), 'Earnings determination and taxes: Evidence from a cohort-based payroll tax reform in greece', *The Quarterly Journal of Economics* **127**(1), 493–533.

Slemrod, J. (2019), 'Tax compliance and enforcement', *Journal of Economic Literature* **57**(4), 904–54.
URL: *http://www.aeaweb.org/articles?id=10.1257/jel.20181437*

Slemrod, J., Collins, B., Hoopes, J. L., Reck, D. and Sebastiani, M. (2017), 'Does credit-card information reporting improve small-business tax compliance?', *Journal of Public Economics* **149**, 1–19.

Slemrod, J. and Yitzhaki, S. (1994), 'Analyzing the standard deduction as a presumptive tax', *International Tax and Public Finance* **1**(1), 25–34.

Stamatopoulos, I., Hadjidema, S. and Eleftheriou, K. (2017), 'Corporate income tax compliance costs and their determinants: Evidence from greece', *Advances in Taxation* **24**, 233À270.

Stella, P. (1991), 'An economic analysis of tax amnesties', *Journal of Public Economics* **46**(3), 383–400.

Tsoutsoura, M. (2015), 'The effect of succession taxes on family firm investment: Evidence from a natural experiment', *The Journal of Finance* **70**(2), 649–688.

Waseem, M. (2020), The role of withholding in the self-enforcement of a value-added tax: Evidence from pakistan, Technical report, Working Paper.

Yitzhaki, S. (2007), 'Cost-benefit analysis of presumptive taxation', *FinanzArchiv/Public Finance Analysis* pp. 311–326.

Zucman, G. (2014), 'Taxing across borders: Tracking personal wealth and corporate profits', *Journal of economic perspectives* **28**(4), 121–48.

Zwick, E. (2018), The costs of corporate tax complexity, Working paper, National Bureau of Economic Research, Inc.

Appendix

A VAT adjustment

Firm i in period t has the following accounting variables:

- Revenue: R_{it}

- Cost of goods: G_{it}

- Other expenses: E_{it}

- Net accounting profits: $\pi_{it}^{Acc} = R_{it} - G_{it} - E_{it}$

The firm faces average government prescribed margins of m^g. Then calculates a VAT profit coefficient that it applies on the cost of goods to obtain adjusted additional revenues A_{it} to pay an additional VAT tax on:

$$A_{it} = \frac{m^g}{100 - m^g} * G_{it}$$

B Figures and Tables

Figure A1: Small versus larger firms industry composition (percent)
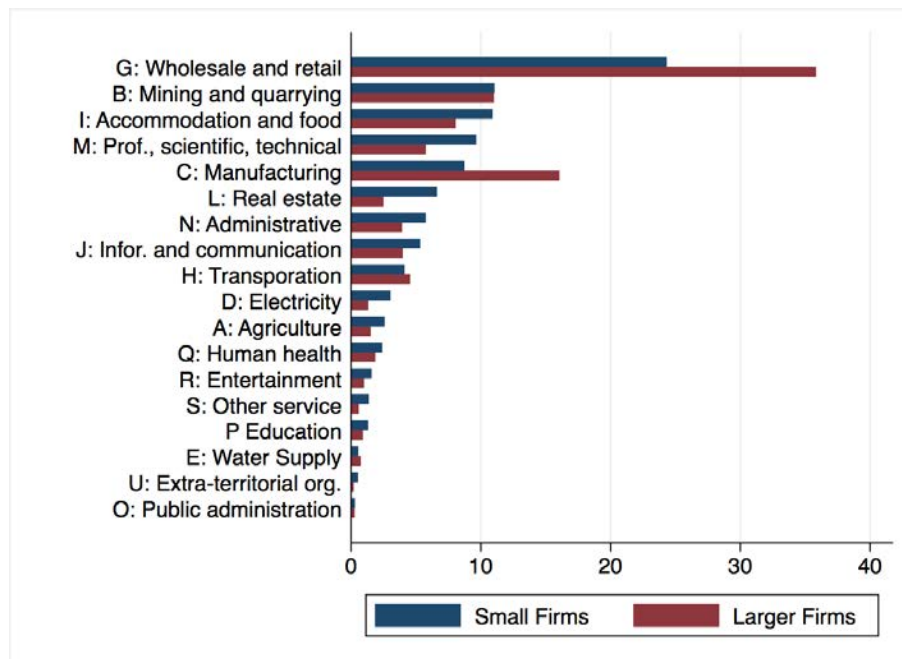
Figure A2: Program take-up for tax data matched with financial statements
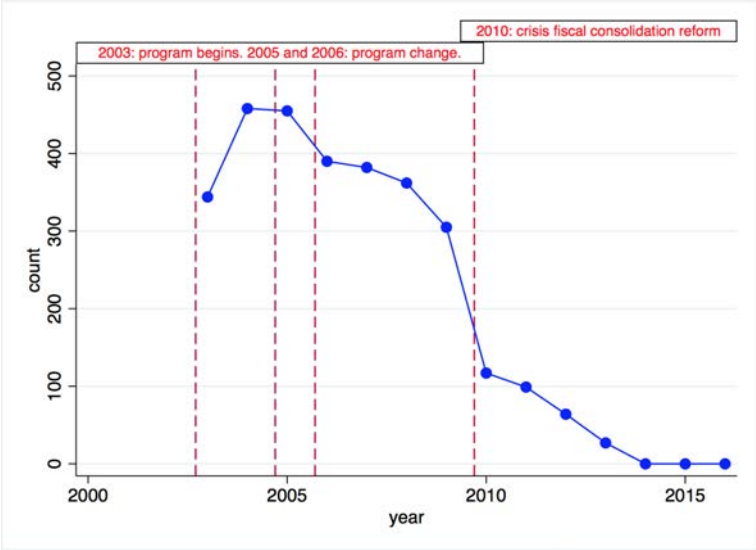
Notes: Financial data is available from 2003 while tax data is available from 1999.

Figure A3: Distributions of take-up

Take-up frequency

Consecutive take-up years
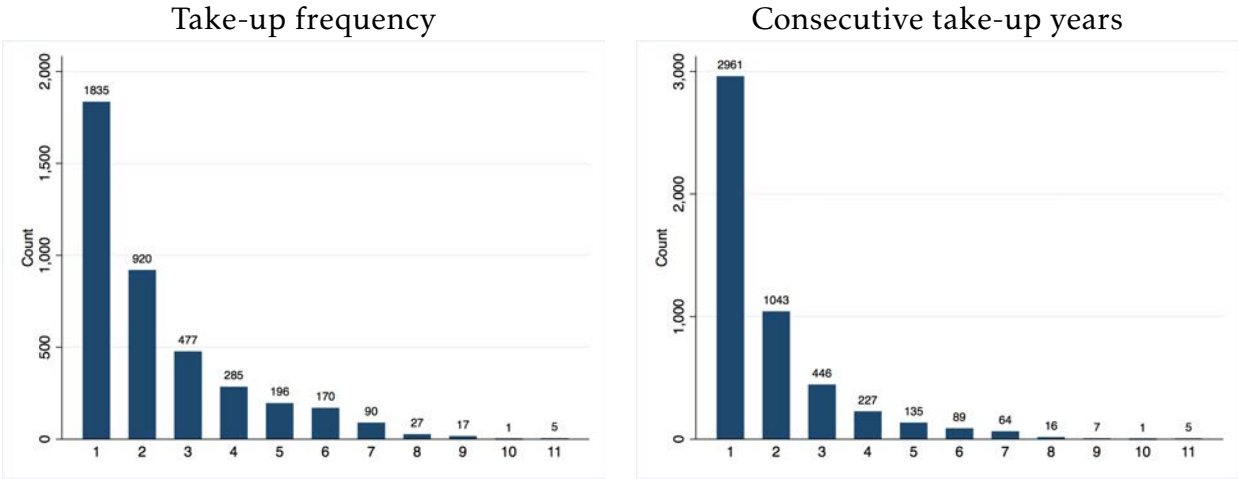
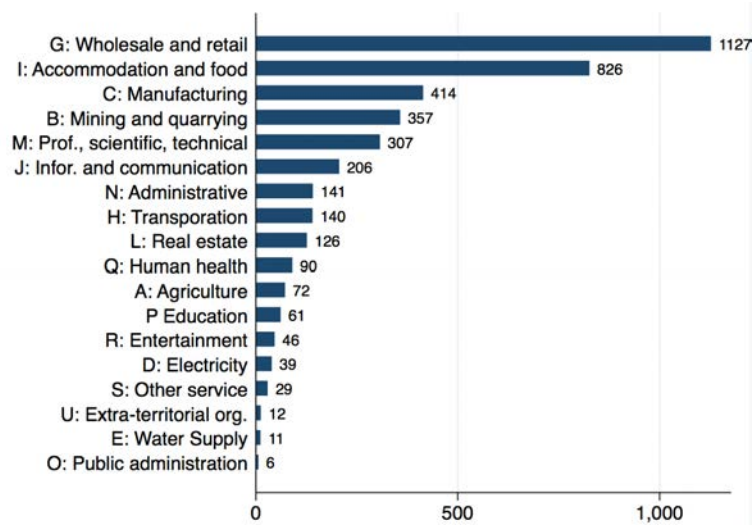Figure A4: Number of firms taking-up by industry: 2003-2013

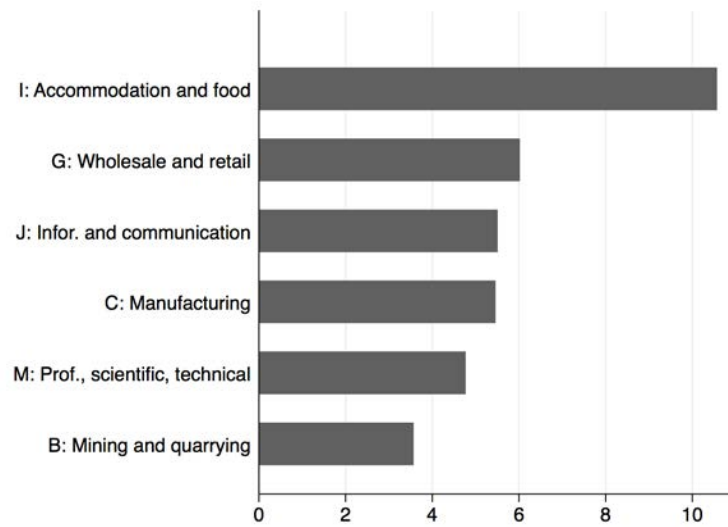Figure A5: Percent of small firms taking-up by industry

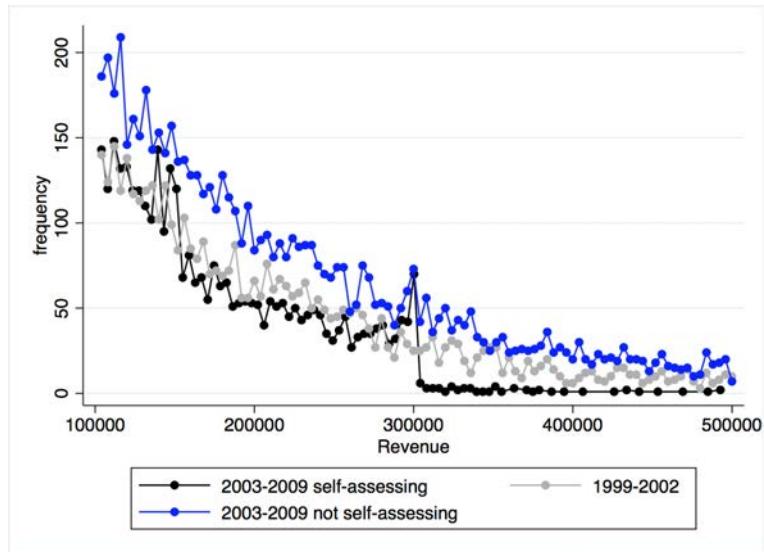Figure A6: Revenue distributions using frequency

Figure A7: Profits to assets ratio: detailed tax returns (left) and non-detailed returns (right)

Panel A. Small Firms

Panel B. Larger Firms
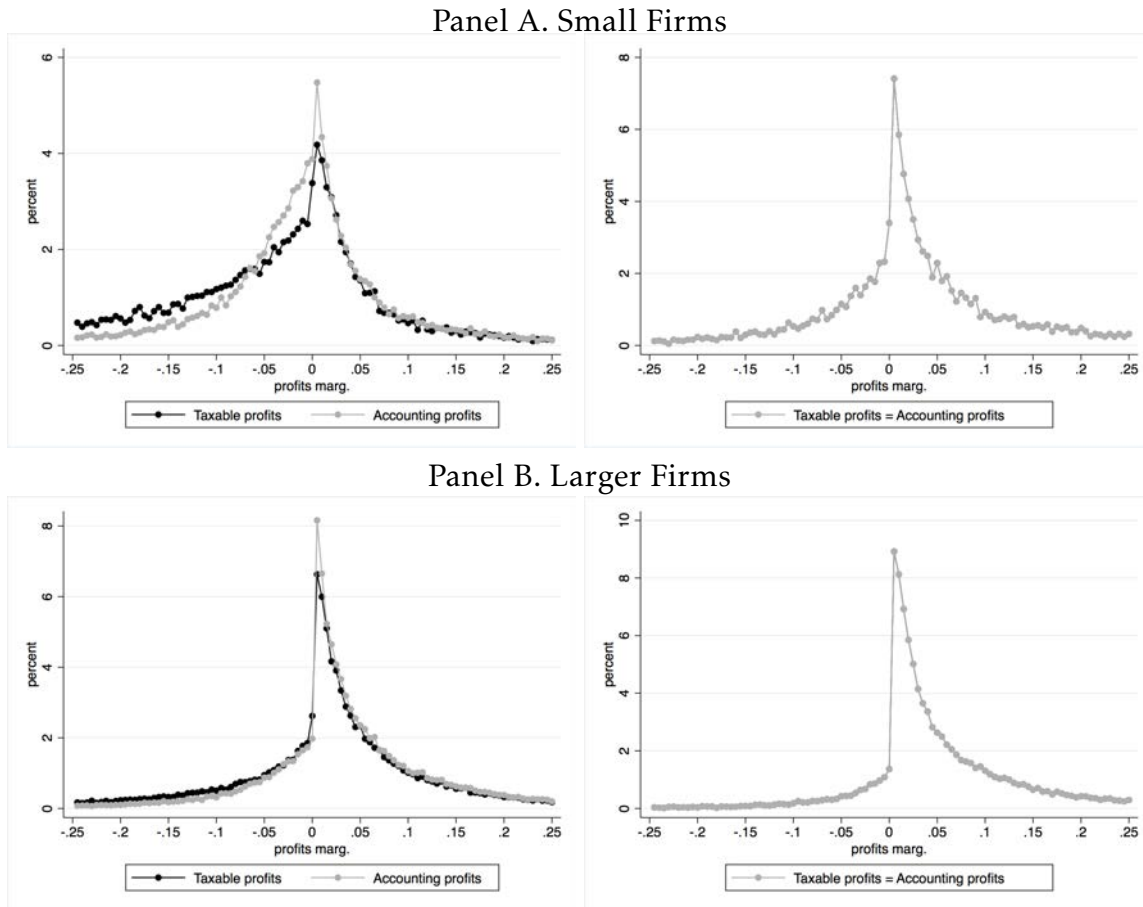
Notes: The distributions are pooled for years 2003-2009 for the fin-tax sample. Small firm-year observations are defined as firms having less than or equal to €300,000 in a given year. Detailed returns include different taxable margins and accounting margins distributions, while non-detailed returns have identical distributions for taxable and accounting margins. Percent refers to the percent of firms' scaled profits to assets ratios of -0.25% and 0.25%.

Figure A8: Revenue distributions for self-assessing firms by main industries
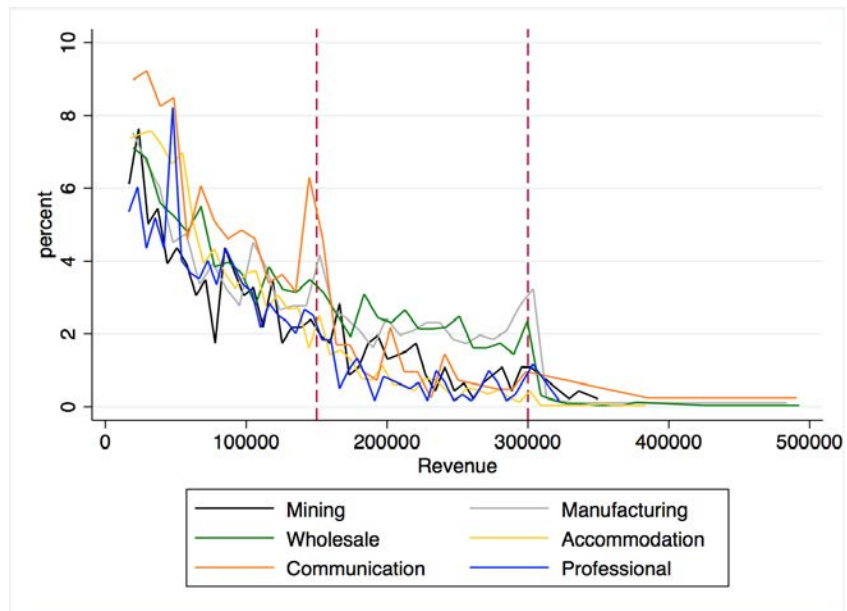

Revenue distributions by industry for firms taking up the self-assessment program in 2003-2009.

Table A1: Policy Take-up by Firm Characteristics: No Missing Imputation

	Tax		Tax and Fin.			
	(1)	(2)	(3)	(4)	(5)	(6)
Log Revenue	-0.0063***	-0.0077***	-0.0180***	-0.0186***	-0.0236***	
	(0.0005)	(0.0005)	(0.0014)	(0.0014)	(0.0037)	
Older Firm	0.0132***	0.0116***	0.0218***	0.0151***	0.0106	0.0106
	(0.0008)	(0.0008)	(0.0019)	(0.0018)	(0.0068)	(0.0068)
On Gov. Contract	0.0072***	0.0075***	0.0071***	0.0096***	0.0137**	0.0090
	(0.0013)	(0.0013)	(0.0026)	(0.0026)	(0.0057)	(0.0058)
Log Assets					-0.0038*	-0.0069***
					(0.0021)	(0.0022)
Log Employment					-0.0111***	-0.0118***
					(0.0026)	(0.0026)
Log Costs					0.0017***	-0.0000
					(0.0006)	(0.0006)
N (firm-year)	332399	332394	82686	82686	17320	17320
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	Yes	Yes	Yes

Notes: Firm-level regressions for eligible firms (at or below the 300,000 revenue cutoff). Columns 1-2 use all tax returns, and columns 3-6 use tax returns matched with financial statements. The dependent variable is a dummy equal to 1 in a year a firm uses the government policy to avoid being audited. The older firm variable is a dummy equal to one if the firm is 5 years or older. Costs are calculated as the difference between sales and gross operating profits. Standard errors are clustered at the firm level. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure A9: Profit Margins of Firms in The Accommodation and Food Industries that Self-assess at Least Once

In years in which they do not self-assess   In years in which they self-assess
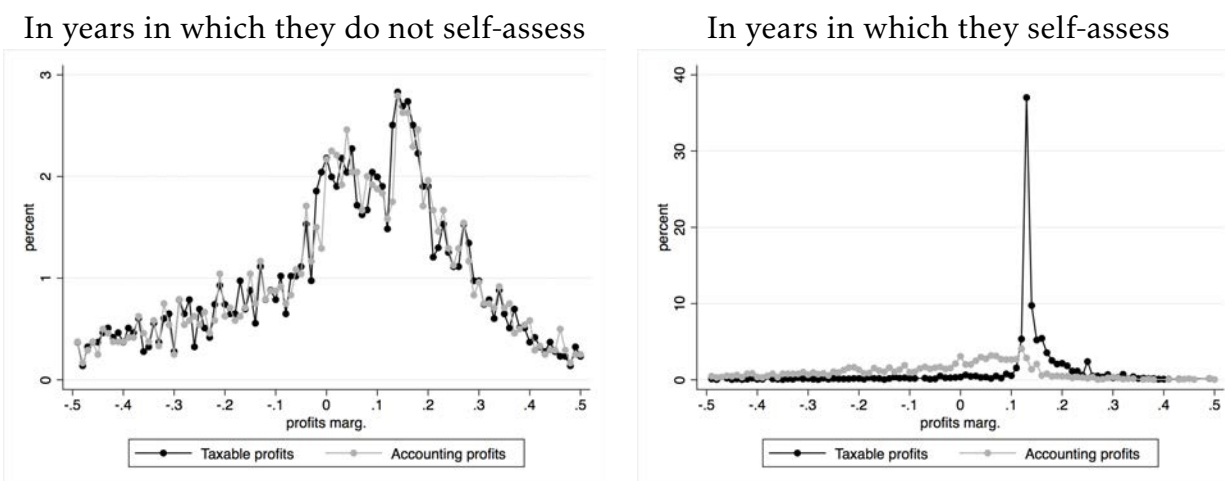
Notes: The distributions are for firms in the accommodation and food industry and are conditional on self-assessing in at least one year. The distributions (left and right) are for the same firms, pooled for the self-assessment policy years 2003-2009. A firm's accounting or taxable profit margin is the firm's accounting or taxable profit to revenue ratio.

Table A2: Balance Table

|	Mean					Difference				N
	Control	Freq1	Freq2	Freq3	Freq4	Freq1-Con	Freq2-Con	Freq3-Con	Freq4-Con	
Age (months)	103.254	102.616	112.835	114.071	120.205	-0.638	9.581***	10.817**	16.951***	696314
	[83.835]	[76.155]	[82.181]	[79.314]	[71.129]	(2.887)	(3.593)	(4.645)	(6.064)	
Gov. Contract	0.350	0.271	0.213	0.207	0.229	-0.079***	-0.138***	-0.143***	-0.121***	774859
	[0.477]	[0.445]	[0.410]	[0.406]	[0.421]	(0.015)	(0.019)	(0.025)	(0.032)	

Notes: Statistics refer to year 2002, the year before self-assessment. Standard deviations are in brackets and standard errors in parentheses. Control is the €400,000-1,000,000 revenue group. "Freq" groups refers to the number of years of take-up during the program duration (2003-2013); Freq1 is therefore the group of firms that took up the program exactly once. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

## Figure A10: Effect on Accounting Margins
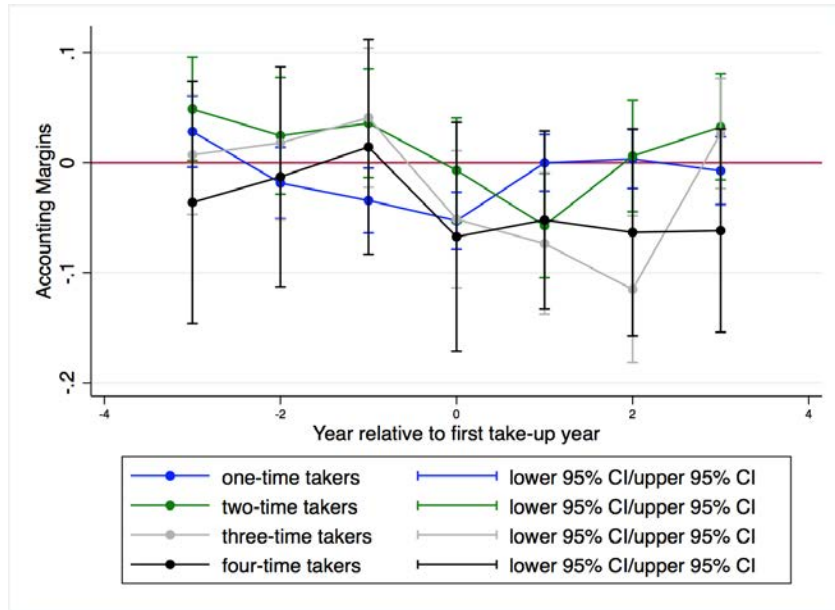
Notes: Each group only includes consecutive takeups and is evaluated alone against the control group of non-takers (€400k-1m firms). Year, Firm, and Industry FEs. Controlling for firm age and whether firm has a government contract. Negative and zero taxable reported profits treated as zero (+1 when taking logs). Firm age is imputed for missing observations by a missing dummy.

Figure A11: One-Time Takers: Other Control Groups
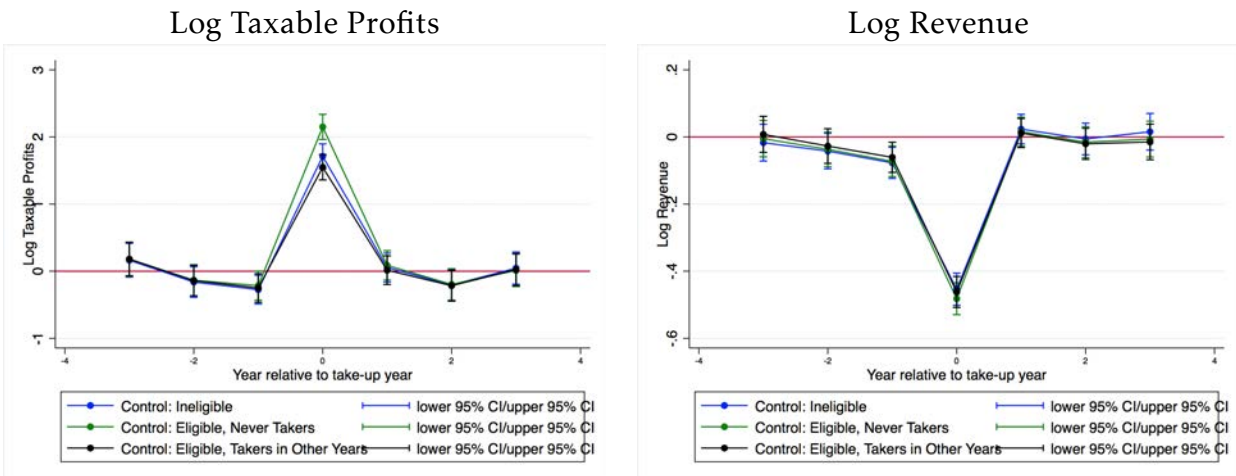
Log Taxable Profits   Log Revenue

Notes: Year, Firm, and Industry FEs. Controlling for firm age and whether firm has a government contract. Negative and zero taxable reported profits treated as zero (+1 when taking logs). Firm age is imputed for missing observations by a missing dummy.

Figure A12: Four-Time Takers: Other Control Groups
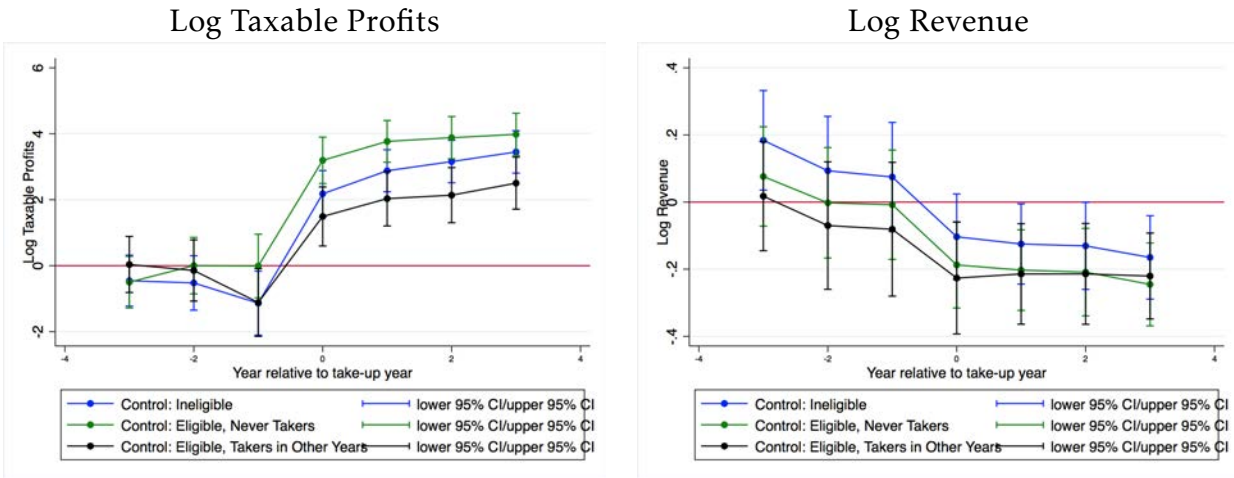
Log Taxable Profits   Log Revenue

Notes: Year, Firm, and Industry FEs. Controlling for firm age and whether firm has a government contract. Negative and zero taxable reported profits treated as zero (+1 when taking logs). Firm age is imputed for missing observations by a missing dummy.

Table A3: Take-up Frequency by Industry

| Industry | Take-up Frequency | | | | | | | | | | | |
| | 0 | | 1 | | 2 | | 3 | | 4 | | Total | |
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mining	12,449	97.1	214	1.7	96	0.7	38	0.3	29	0.2	12,826	100.0
Manufacturing	12,106	96.8	215	1.7	95	0.8	54	0.4	30	0.2	12,500	100.0
Retail & Trade	29,962	96.6	574	1.9	292	0.9	136	0.4	58	0.2	31,022	100.0
Food & Accommodation	9,339	93.4	266	2.7	180	1.8	122	1.2	95	0.9	10,002	100.0
Communication & Information	4,759	96.0	110	2.2	52	1.0	20	0.4	15	0.3	4,956	100.0
Professional & Scientific	7,990	96.4	159	1.9	83	1.0	35	0.4	22	0.3	8,289	100.0
Total	76,605	96.2	1,538	1.9	798	1.0	405	0.5	249	0.3	79,595	100.0

Notes: summary statistics for the number and percentage of firms in each industry by take-up group. The table includes the six main take-up industries. Industry classifications use European NACE codes.

Figure A13: Reporting Responses on Taxable Profits and Revenue Across Time Periods
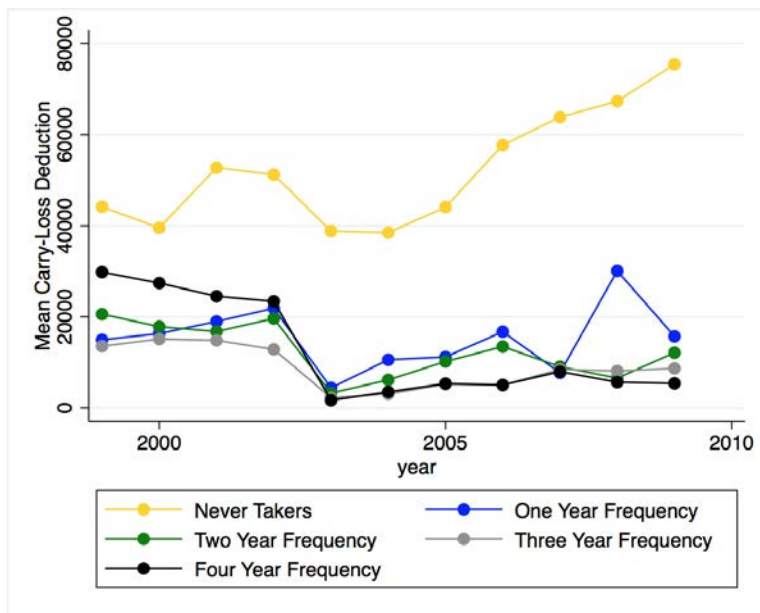
One-time Takers
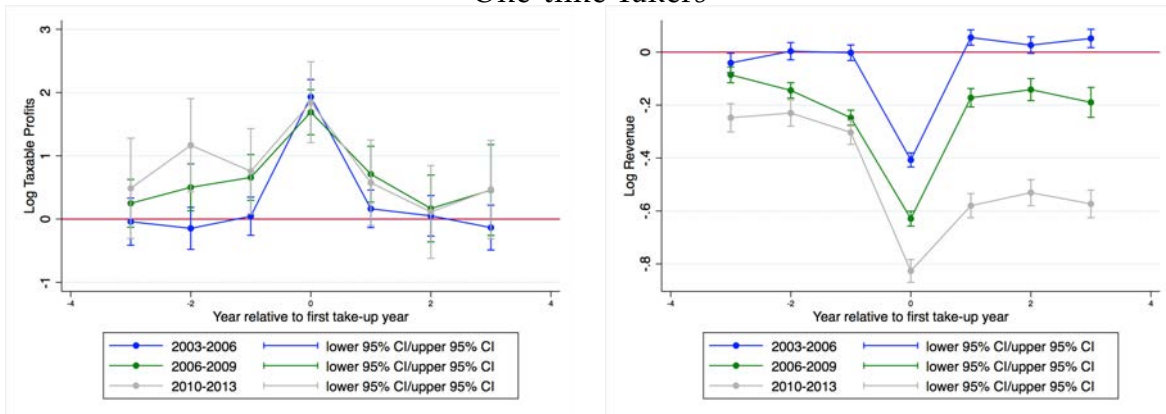
Three-time Takers
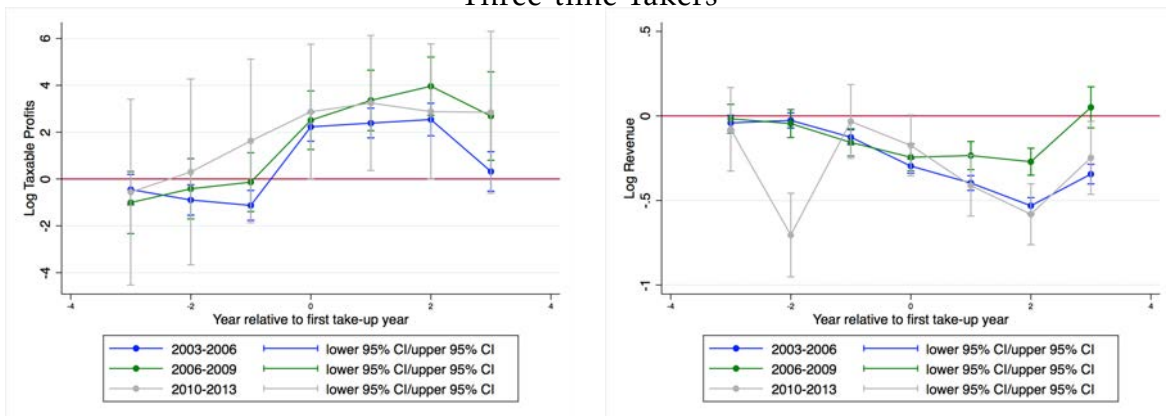
Notes: Each group only includes consecutive take-ups and is evaluated alone against the control group of non-takers (€400k-1m firms). The specification includes year, firm, and industry fixed effects. Controlling for firm age and whether firm has a government contract. Negative and zero taxable reported profits treated as zero (+1 when taking logs). Firm age is imputed for missing observations by a missing dummy. Logs refer to natural logs.

Figure A14: Carry-Loss Deduction

Notes: We condition on firms eligible in the program (<=€300,000 in revenue). The never takers are therefore eligible firms who never take-up the program. The one to four year frequency groups time series is the mean for firms belonging to those groups and self-assessing in those years.