

Tax Enforcement and the Intended and Unintended Consequences of Information Disclosure

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ABSTRACT

We quantify the intended and unintended consequences to firms of increasing tax information disclosure to the IRS. Our empirical strategy leverages an exogenously staggered adoption of a redesigned tax form. We find that the redesign was successful at increasing compliance after 2011 among some firms, the intended consequence. At the same time, we find that firms changed their reporting in a way that decreased expected tax liability, an unintended consequence. We estimate that this unintended behavior reduced corporate receipts by \$1.3 billion.

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1. Introduction

There is a burgeoning discord over claims that seemingly profitable companies can avoid paying tax.¹ These fears were fanned by revelations contained in the Lux Leaks in 2014, the Panama Papers in 2016, and the Paradise Papers in 2017, which revealed the extent to which corporations and wealthy individuals exploited a lack of transparency to avoid taxes.² Morris Pearl, former managing director at BlackRock Inc., said, “If we are going to protect the integrity of the market, we should start by requiring companies to report exactly how they are doing business, including where they pay taxes and how much.”³ However, information disclosure must strike a balance: while increased disclosure decreases asymmetric information and increases oversight, disclosure is costly and may distort behavior. In an effort to evaluate the effectiveness of increased mandatory disclosure, we investigate a specific case of the US tax authority (the Internal Revenue Service IRS), increasing mandatory disclosure for businesses.

Although there is a rich empirical literature investigating the impact of corporate disclosure in the context of financial market regulations, there is little evidence of the impact of corporate *tax* disclosure. Key complications include the difficulty, by definition, of studying non-transparent actions by corporations, and limited access to data from the tax authorities. Previous work in this area has exploited data leaks, such as the Panama Papers, and focused on activities undertaken in tax havens (Hines Jr. and Rice, 1994; Desai et al., 2006; O’Donovan

¹“Profitable Giants Like Amazon Pay \$0 in Corporate Taxes. Some Voters Are Sick of It. New York Times. 4/29/2019. <https://www.nytimes.com/2019/04/29/us/politics/democrats-taxes-2020.html>.

²International Consortium of Investigative Journalists. “Luxembourg Leaks: Global Companies’ Secrets Exposed -ICIJ.” <https://www.icij.org/investigations/luxembourg-leaks>. International Consortium of Investigative Journalists. “The Panama Papers: Exposing the Rogue Offshore Finance Industry.” <https://www.icij.org/investigations/panama-papers/>. International Consortium of Investigative Journalists. “Paradise Papers: Secrets of the Global Elite.” <https://www.icij.org/investigations/paradise-papers>.

³The New York Times. “How Companies Like Apple Dodge taxes and Their Own Investors.” <https://www.nytimes.com/2016/09/21/opinion/how-companies-like-apple-dodge-taxes-and-their-own-investors.html>.

et al., 2019). Additional work has investigated the success of new tax disclosures required for large, publicly-traded firms (Henry et al., 2016; Towery, 2017). We complement this work by studying the effects of a change in mandatory tax disclosure for all corporations, public and private, using US administrative tax data.

Empirical evidence suggests that information disclosure has both intended and unintended consequences. On the one hand, improved tax disclosures can reduce tax aggressiveness⁴ (Henry et al., 2016; Blouin et al., 2010; Slemrod et al., 2017; Slemrod, 2019).⁵ On the other hand, firms respond to disclosure requirements by adjusting their operations, including real responses and earnings management. For example, firms adjust their reported size in order to avoid disclosure thresholds (Honaker and Sharma, 2017; Hoopes et al., 2018; Hasegawa et al., 2013; St. Clair, 2016). Importantly, a recent empirical literature has found that tax disclosure does not necessarily improve compliance as intended, especially over the long-run (Alm, 2012; DeBacker et al., 2015, 2018; Langenmayr, 2017; Honaker and Sharma, 2017).

We find that there are large intended and unintended consequences of increasing tax information disclosures. When firms are required to disaggregate information, the most tax-aggressive firms increase tax compliance in the years after the change. At the same time, the new disclosure regime may have inadvertently revealed to firms that increased disclosure was needed for the IRS to improve its oversight. As a result, tax compliance decreased for most firms in the year of the change. We estimate that the cost of this unintended consequence was \$1.3 billion.

In 2011, the Internal Revenue Service (IRS) redesigned the tax disclosure required to claim the general business credit. In particular, the new Form 3800 required carry-forward general

⁴We use the term “tax aggressiveness” to refer to a continuum of tax planning activities that include all behavior intended to reduce tax liability, legal or otherwise Hanlon and Heitzman (2010).

⁵Additional important articles on this topic include Hoopes et al. (2012); Gleason et al. (2018); Gupta et al. (2014); Donohoe and McGill (2011); Hope et al. (2013); Kubick et al. (2016).

business credits to be reported in a disaggregated manner. Prior to 2011, carry-forward credits were subject to aggregate reporting. Newly disaggregated reporting requirements were likely intended to improve administrative oversight because the general business credit is a complex aggregation of more than thirty credits, including those targeting research and experimentation and low-income housing. Using US tax data for subchapter C corporations from 2001–2016, we ask whether and how the redesign of Form 3800 impacted the reporting of general business carry-forward credits.⁶

Firms generate carry-forward credits when their credits exceed tax liability in the current tax year. These credits can be used to offset future tax liability. General business carry-forward credits are generated for several reasons: the business is in a loss position (46% of firms from 2001–2016), the business does not have sufficient tax liability after the use of the Foreign Tax Credit, or the business is limited by the Alternative Minimum Tax. Finally, firms can strategically elect to retain their general business credits, reserving them for future use; this approach may be beneficial given the progressive corporate tax schedule in place during this period.⁷ For these reasons, roughly 30% of firms engaging in qualified general business credit activity hold a stock of carry-forward credits.

The stock of carry-forward credits is deterministic. Despite this, we find that lagged activity does not perfectly predict reported carry-forward credit during the aggregate disclosure regime, 2001–2010, as it should. In particular, 9% of firms report *more* carry-forward credits during this period than could be explained by lagged tax returns. Moreover, this statistic masks substantial heterogeneity, as 22% of large firms and 30% of public firms report more carry-forward credits than expected. We refer to the difference between expected carry-forward credits and reported carry-forward credits as undisclosed adjustments. Some possible causes

⁶We focus exclusively on subchapter C corporations. Throughout the paper, we will refer to C corporations as businesses, firms, and corporations synonymously.

⁷We note, however, that the progressive nature of the corporate returns is only relevant to smaller firms, and most firms engaging in these activities are large.

of undisclosed adjustments include the expiration of unused carry-forward credits (negative), newly acquired credits via mergers and acquisitions (positive), changes in firm tax position after the time of initial tax filing (positive or negative), and over-reporting (positive).

The timing of the introduction of the 2011 Form 3800 implies there was no scope for real adjustments to 2011 carry-forward credits. The IRS released a draft of the redesigned Form 3800 in mid-2011 after firms had already made tax decisions that fully determined their 2011 stock of carry-forward credits. On the other hand, we may expect an increase or decrease in undisclosed adjustments if there were reporting responses. For example, firms may reduce undisclosed adjustments if the increase in disclosure had the intended consequence of improving transparency and, therefore, compliance. An unintended consequence of the disclosure change, however, may be that firms increased undisclosed adjustments in 2011. This could occur if firms interpret the form redesign as a signal of historically weak audit capabilities. In this case, firms may have an incentive to increase undisclosed adjustments because the 2011 stock of credits set a baseline for future tax positions. This counter-intuitive behavior is consistent with a literature that finds that high-income taxpayers have unique tax avoidance technologies available to them (Landier and Plantin, 2017) and can behave in a perverse manner in response to the threat of audit (Slemrod et al., 2001; Gerardino et al., 2017). Firms may also increase undisclosed adjustments in 2011 if the credits became more salient as a result of the form change. Divergent predictions highlight the importance of empirical evidence.

We use a control group to estimate the effect of the change in disclosure requirements on firm behavior. Specifically, our identification strategy leverages the institutional detail that firms can define their tax year as any consecutive 12-month period (Guenther, 1994).⁸ Het-

⁸In practice, firms choose different tax years for a myriad of reasons most commonly related to industry-specific business cycles. We show that the treated and control groups of firms have common trends before the policy change, and the results are robust to industry and firm fixed effects. Once established, the tax year can only be adjusted with the explicit permission of the IRS. As a result, it is very uncommon for firms to adjust their tax year.

erogeneous tax years resulted in a staggered implementation of the new disclosure regime because firms adopted the new Form 3800 at different times. We exploit this staggered implementation within a difference-in-differences empirical design to control for variation across time and firms.

Contrary to the naive hypothesis of no change, we find that firms reported 20–25% more carry-forward credits in 2011 as a result of the change in disclosure requirements. This result is persistent across several groups: young and old firms, large and small firms, and public and private firms. This increase in credits could be driven by tax-aggressive behavior or increased salience in the general business credit. In either case, this increase in carry-forward credits may significantly dampen future tax revenues.

We implement two suggestive tests to provide insights into the mechanism driving the increase in carry-forward credits. In particular, we investigate a salience channel and a compliance channel. The salience channel suggests that firms learned about complexities in managing general business credits due to the form change. This could explain the increase in carry-forward credits in 2011. This channel, however, cannot explain persistent undisclosed adjustments in periods outside 2011. The compliance channel suggests that firms updated their beliefs about the audit technology of the tax authority, potentially encouraging increased tax avoidance through general business credits. This could also explain the increase in carry-forward credits in 2011 and, unlike the salience channel, is consistent with persistent undisclosed adjustments in periods outside 2011. We find suggestive evidence consistent with the compliance channel and inconsistent with the salience channel.

By analyzing the impact of a change in mandatory tax disclosure, our paper contributes to the literature in several important ways. We shed light on compliance issues in an important tax policy context by providing evidence for how all firms, both public and private, respond to a change in the mandatory tax disclosure environment. In this way, our results contribute

to a growing literature evaluating the success of business tax enforcement (Pomeranz, 2015; Carrillo et al., 2017; Almunia and Lopez-Rodriguez, 2018; Alm et al., 2019) and a growing tax policy agenda aimed at increasing transparency between businesses and tax administrators (see, for example, the OECD’s Base Erosion and Profit Shifting (BEPS) project). In addition, our evidence is based on directly observable tax behavior. This evidence adds to a literature that typically must infer tax aggressiveness based on a summary measure, such as the effective tax rate (Plesko, 2000; Hanlon et al., 2007; Dyreng et al., 2018).

General business credits play an underappreciated but prominent role in American social policy. Examples include credits for the provision of low-income housing and paid family leave. The government also uses general business credits as Pigouvian subsidies to correct for externalities and market underprovision. Most prominent among these is the investment tax credit for research and experimentation. Finally, the federal government leverages temporary credits as a fiscal stimulus to smooth the business cycle during periods of economic downturn. All told, the general business credit represents a significant tax expenditure. For example, in 2010, firms carried forward \$43 billion in credits, earned \$28 billion in credits, and claimed \$15 billion in credits, reducing corporate tax receipts by 7%.

2. Background

The US tax system provides for a suite of business tax credits to encourage certain activities. These business tax credits are an important social policy tool designed to promote, for example, low-income housing, paid family leave, and employer-sponsored health insurance. They also provide Pigouvian subsidies (e.g., research and experimentation and renewable energy) and fiscal stimulus (e.g., temporary hiring and localized regional development). In order to claim a specific tax credit, businesses document contemporaneous qualifying activity in great

detail on specialized tax forms.⁹ Each form is used to determine a firm's current-year credit, which is reported in disaggregated detail on IRS Form 3800. This level of disaggregated detail allows the IRS to observe and monitor qualified activity undertaken in a given tax year.

In 2010, firms engaged in \$27 billion worth of qualifying business activity across 33 separate credits.¹⁰ The four largest credits account for 72% of total general business credits: \$9 billion for research and experimentation, \$7.2 billion in low-income housing, \$1.5 billion for qualified investment, and \$2.8 billion for the development of renewable electricity. General business credits are used to offset positive tax liability. All told, firms offset \$15 billion in positive tax liability with the general business credit in 2010 or roughly 7% of nearly \$223 billion in total corporate tax receipts.

2.1. General Business Credits: Institutional Details

General business credits face several frictions that limit their use in the year they are earned. For example, a firm must be in a taxable position to use a general business credit. In addition, the Net Operating Loss (NOL) deduction, the Foreign Tax Credit (FTC), and, before 2018, the Alternative Minimum Tax (AMT) all restrict general business credits. [Carlson and Metcalf \(2008\)](#) documents the sizable impact of these frictions on the ability of firms to use energy credits.

In general, unused business tax credits may be carried back one year and carried forward up to twenty years. However, unlike current-year business tax credits, firms were not required to disaggregate reported carry-forward credits across the various business tax credits before 2011. Instead, they reported a single, aggregate carry-forward general business credit. In

⁹For example, activities qualifying for the Research and Experimentation credit are detailed on Form 6765.

¹⁰These figures are documented in the annual IRS Statistics of Income Corporate Line Counts. For 2010: Form 3800 Line 2 + Line 30. The 2010 Form 3800 can be downloaded at <https://www.irs.gov/pub/irs-prior/f3800-2010.pdf>

2010, for example, firms carried forward \$43 billion worth of unused general business credits from prior tax years. Together with current-year credits, firms had roughly \$70 billion in available, or “tentative,” general business credits available to offset positive tax liability. However, firms claimed just \$15 billion in general business credits in 2010, or 21% of total available credits. These statistics are consistent with the importance of frictions in claiming the general business credit. The remaining \$55 billion were carried forward for use in future tax years.

2.2. Carry-Forward General Business Credit Mechanics

Firms disclose their carry-forward general business credits using Form 3800. Two components determine their carry-forward credits: (1) lagged real behavior disclosed on Form 3800 in the previous tax year and (2) undisclosed adjustments to carry-forward credits

$$\text{Carry-Forward}_t = \underbrace{\text{Carry-Forward}_{t-1} + \text{Earned}_{t-1} - \text{Claimed}_{t-1}}_{\text{Lagged Real Behavior}} + \text{Undisclosed Adjustment}_t. \quad (1)$$

Undisclosed adjustments can be induced for several reasons, including the expiration of carry-forward credits (negative adjustment), newly acquired credit due to merger activity (positive adjustment), changes in firm tax position after the time of initial tax filing (positive or negative), or misreporting by inflating carry-forward credits (positive adjustment).

If a firm carries a positive stock of credits into the current tax year, this stock must be fully exhausted before using current-year earned credits, following a first-in-first-out (FIFO) method. In addition, the IRS requires that multiple credits be used according to a predetermined stacking order.¹¹ For example, in 2010, the investment credit was to be used first, followed by the research and experimentation credit, and then the low-income housing tax

¹¹The GBC stacking order is documented in the instructions for Form 3800 in the section titled “Credit Ordering Rule”

credit. In light of these parameters, disaggregated accounting of carry-forward credits has always been necessary for firms to correctly determine their general business credit.

2.3. 3800 Form Change: A Quasi-natural Experimental Setting

In 2011, the IRS redesigned Form 3800.¹² As part of the form redesign, firms were newly required to disaggregate reported carry-forward general business credit to the same level of detail as current-year credits. For example, where a firm had reported \$100 in carry-forward general business credit prior to 2011, beginning in 2011, it had to report \$50 in carry-forward research and experimentation credit, \$25 in low-income housing credit, and \$25 in investment credit. Before 2011, it was practically impossible for the IRS to track and audit stocks of specific credits used and unused because of aggregate reporting and FIFO accounting. This newly disaggregated reporting provides greater transparency to the IRS in facilitating audits of tax returns.

The IRS released a draft of the redesigned 2011 Form 3800 in July 2011. Before release, it did not forewarn of an impending form redesign: the new form was not a legislative requirement, there were no new business tax credits introduced in the 2011 tax year that would have required a form redesign, and there were no public notifications of the upcoming change in typical federal reporting outlets.¹³ For this reason, the 2011 form redesign marked an exogenous regime switch in the reporting requirements for the carry-forward general business credit in 2011.

¹²The 2011 Form 3800 can be downloaded at <https://www.irs.gov/pub/irs-prior/f3800-2011.pdf>. The form change included minimal changes, and none of the other changes interact with the change we study (see <https://www.irs.gov/pub/irs-prior/i3800-2011.pdf>).

¹³For example, the IRS typically announces pending form changes through the Federal Registrar. On July 13th, 2010, the IRS notified the public that Form 3800 would be updated to account for newly available and expiring business tax credits. The next mention of modifications to IRS Form 3800 (OMB Number: 1545-0895) was not until November 22nd, 2013, and this modification accommodated changes due to the Small Business Jobs Act.

Equation (1) makes clear that a firm's 2011 carry-forward credit is determined by real behavior in 2010 and undisclosed adjustments made in 2011. Because the 2011 Form 3800 was released in mid-2011, after the close of the 2010 tax year, there was no scope for the newly disaggregated reporting requirement to have impacted lagged real behavior. This leads to a naive hypothesis that there will be no impact on 2011 carry-forward general business credits. On the other hand, an impact on 2011 carry-forward general business credits would be entirely driven by undisclosed adjustments in 2011. A decrease in carry-forward credits could reflect an intended consequence of the disaggregated disclosure environment; improved information flows to the tax authority reduces the propensity for firms to misreport. In contrast, an increase in 2011 carry-forwards could be driven by a one-time shock to salience in the mechanics of the general business credit and the tax authority's ability to audit it.

2.4. Corporate Tax Compliance: What Do We Know?

Tax authorities must measure the tax base accurately to administer tax systems effectively. It is well-known that third-party information is an essential mechanism for compliance with mandated tax disclosures. Supporting evidence abounds in the context of individual taxation (Kleven and Saez, 2011; Pomeranz, 2015) and the self-enforcing Value Added Tax (VAT) (Best et al., 2015; Waseem, 2019). However, the US business tax system does not include the same require third-party information for businesses. Indeed, theoretical and empirical evidence suggests that third-party reporting in the context of business taxation can reduce noncompliance (Kopczuk and Slemrod, 2006; Carrillo et al., 2017; Naritomi, 2019).

In the absence of truthful information revelation through third-party reporting and audit, taxpayers would minimize their tax burden through misreporting based on the perceived probability of audit and expectation of fines (Allingham and Sandmo, 1972; Becker, 1968).

Noncompliance by taxpayers increases the cost of raising revenues and shifts the tax burden to taxpayers with highly visible income, e.g., wage earners (Slemrod et al., 2017). With this in mind, the IRS mandates information disclosure across a myriad of forms and worksheets. The next two subsections provide a theoretical and empirical background on tax compliance.

2.4.1. Theoretical Predictions

We extend the Allingham and Sandmo (1972) model to investigate how changes in reporting alter firms' reporting incentives. The true tax base y is known to each firm but is not costlessly observable by the tax collection agency. This agency deters firms from reporting taxable income below its true value (either by under-reporting revenues or over-reporting deductions and credits) by subjecting firms to a penalty if found to be under-reporting their taxable income; this penalty is above and beyond the payment of the true tax liability.¹⁴

The tax authority detects under-reporting with probability $p(\phi; \theta_1)$, where ϕ is the amount of misreported income and θ_1 is a policy parameter determined by the tax authority.¹⁵ The probability of an audit increases in the amount of misreporting ($\partial p / \partial \phi \equiv p_\phi > 0$) and the policy parameter ($\partial p / \partial \theta_1 \equiv p_{\theta_1} > 0$). We assume that these two variables have complementary effects $\partial^2 p / \partial \phi \partial \theta_1 \equiv p_{\phi, \theta_1} > 0$.

We follow Slemrod et al. (2001) by allowing the income upon audit to be given by a general function $g(\phi; \theta_2)$, where θ_2 is a policy parameter determined by the tax authority. Income upon audit decreases with the amount of income misreported because the tax authority issues

¹⁴The penalty can be stated in terms of income, as in Allingham and Sandmo (1972), or in terms of the tax, as in Yitzhaki (1987). In many countries, the correct model is to write the penalty in terms of the tax. We follow Slemrod et al. (2001) in writing the penalty in terms of income because the choice in penalty is crucial for understanding changes in the tax rate but not for changes in the probability of audit, which is the focus of our paper. Slemrod and Yitzhaki (2002) provides an excellent summary of these models.

¹⁵The amount of income misreported is given by the difference between true taxable income y and the amount reported x : $\phi = y - x$.

a larger penalty: $(\partial g/\partial \phi \equiv g_\phi < 0)$. In addition, income upon audit decreases with the policy parameter θ_2 $(\partial g/\partial \theta_2 \equiv g_{\theta_2} < 0)$. Importantly, true tax liability may not be revealed even in the event of an audit. We allow the tax authority to change its ability to reveal true tax liability, and this affects the slope of income upon audit as a function of the amount of income misreported, $\partial^2 g/\partial \phi \partial \theta_2 \equiv g_{\phi, \theta_2} < 0$.

Firms choose the amount of income to report to maximize their expected value V , holding fixed all real decisions that determine y :

$$E[V] = (1 - p(\phi; \theta_1))(v + \tau \cdot \phi) + p(\phi; \theta_1) \cdot g(\phi; \theta_2), \quad (2)$$

where t is the proportional income tax and $v \equiv y(1 - \tau)$ is after-tax income. The firm's optimal misreporting ϕ^* is defined by the first-order condition

$$p(\phi)(g_\phi(\phi) - \tau) + p_\phi(\phi)(g(\phi) - v - \tau\phi) + \tau = 0. \quad (3)$$

The policy we explore increases mandatory disclosure. On the one hand, this unambiguously increases θ_1 in terms of the model because increased disclosure increases the probability of detection of misreporting. On the other hand, the policy may increase or decrease firms' beliefs of θ_2 in the year of the policy change. Firms' beliefs about the policy parameter θ_2 increase to the extent that increased disclosure allows the tax authority to better reveal true income in the case of an audit. Firms' beliefs about the policy parameter θ_2 decrease to the extent that firms interpret the policy change as an admission by the tax authority that it is unable to recover true income in the case of an audit. This admission may be especially true in the year of the policy change before the tax authority has a record from the firm of disaggregated disclosure for previous years.

To determine how firms change behavior in response to this policy, we totally differentiate the first-order condition

$$d\phi = -\Gamma [p_{\theta_1} (\tau - g_\phi) + p_{\phi, \theta_1} (v + \tau \cdot \phi - g)] d\theta_1 + \Gamma [(p \cdot g_{\phi, \theta_2} + p_\phi \cdot g_{\theta_2})] d\theta_2, \quad (4)$$

where

$$\frac{1}{\Gamma} = 2p_\phi(\tau - g_\phi) - p \cdot g_{\phi\phi} - p_{\phi\phi}(g - v - \tau\phi)$$

and $\Gamma > 0$ for reasonable values of $p_{\theta_1}, p_\phi, p_{\phi, \theta_1}, g_\phi, g_{\theta_2}$, and g_{ϕ, θ_2} .

To begin, we show that misreporting decreases as the policy parameter θ_1 increases. This is true as long as the term $p_{\theta_1} (\tau - g_\phi) + p_{\phi, \theta_1} (v + \tau \cdot \phi - g)$ is positive. This term is positive given our natural assumptions about the likelihood of audit and the detection technology ($p_\phi > 0$, $p_{\phi, \theta_1} > 0$, and $g_\phi < 0$). We also know that with positive misreporting the expected income for a firm without audit is greater than income under audit ($v + \tau \cdot \phi - g > 0$).

Next, we show that misreporting decreases as the policy parameter θ_2 increases. Increasing the policy parameter θ_2 can be thought of as increasing the penalty or increasing the detection of true income in the case of audit — both of which decrease income g . Therefore, it is natural to assume that $\partial^2 g / \partial \phi \partial \theta_2 \equiv g_{\phi, \theta_2} < 0$ and that $\partial g / \partial \theta_2 \equiv g_{\theta_2} < 0$. Under these assumptions, the second term is negative, and misreporting decreases as the policy parameter θ_2 increases. As previously noted, however, the policy we study may increase or decrease θ_2 *in the year of the policy change*.

Whether firms' beliefs about θ_2 increased or decreased is an empirical question — one with potentially different implications for optimal misreporting in light of the policy that we study. If the policy increased θ_2 , then misreporting should decrease after the policy change. However, if the policy decreased firms' beliefs of θ_2 , then it is possible that in response to

the policy change, firms will increase misreporting, at least in the year of the policy change. This case occurs if the second term in equation (4) is greater than the first term. In practice, we should expect some firms to increase their beliefs of θ_2 and others to decrease after 2010. The rest of the paper focuses on our empirical strategy to test whether misreporting increased or decreased in the year of the policy change and whether there is any heterogeneity in this response.

2.4.2. Empirical Evidence

A rich empirical literature examines the compliance behavior of taxpayers (for a review, see, e.g., [Slemrod, 2007](#); [Alm, 2012, 2019](#); [Slemrod, forthcoming](#)). To this end, researchers focus on evidence of tax aggressiveness on the part of the taxpayer. Although there is no universally accepted definition of tax aggressiveness, it is generally described as occupying one extreme of a continuum of tax-planning strategies, opposite responses like municipal bond investments ([Hanlon and Heitzman, 2010](#)). Moreover, this empirical literature must employ a variety of measures because tax aggressiveness is only a conceptual notion. Most common among these are measures based on effective tax rates or book-to-tax differences ([Plesko, 2000](#); [Manzon and Plesko, 2002](#); [Desai, 2002](#); [Yin, 2003](#); [Hanlon and Shevlin, 2005](#); [Hanlon et al., 2005](#); [Mills and Newberry, 2001](#); [Plesko, 2002, 2004](#); [Dyreng et al., 2008, 2010, 2018](#)). In addition, researchers have relied on evidence from audits ([Ayers et al., 2019](#); [DeBacker et al., 2015, 2018](#); [Hanlon et al., 2007](#)), randomized control trials ([Kleven and Saez, 2011](#)), and survey results ([Alm et al., 2019](#); [Graham et al., 2013](#)).

The overall evidence on the impact of increased tax disclosures on taxpayer compliance is mixed. Moreover, to the extent that this literature can speak to the impact on firms, the evidence is limited regarding the response of public firms to the introduction of FIN 48 ([Blouin et al., 2010](#); [Gleason et al., 2018](#); [Lisowsky et al., 2013](#); [Gupta et al., 2014](#); [Henry et al.,](#)

2016), Form M-3 (Donohoe and McGill, 2011; Hope et al., 2013), and Form UTP (Towery, 2017; Honaker and Sharma, 2017) and the results are mixed as to whether increased disclosure improves or dampens tax aggressiveness. To this end, we will use firm-level tax data to investigate whether and how the change in disclosure requirements impacts carry-forward general business credits in 2011.

3. Data

We use firm-level corporate tax data to analyze the impact of newly disaggregated reporting requirements on firm behavior. Specifically, we create a panel of firms from 2001 through 2016 based on the annual Statistics of Income (SOI) corporate sample, which is a stratified, random sample of all initial corporate tax returns.^{16,17} The richness of these data allow us to observe detailed information about tax liability, including all information disclosed on Form 3800. In addition, the panel nature of these data allow us to compute undisclosed adjustments to carry-forward credits as the difference between contemporaneous carry-forward credits and lagged real behavior, as in equation (1).

Table 1 provides firm-level summary statistics from 2001–2016. We exclude 2011 figures from these means because they were impacted by the new disclosure requirements.¹⁸ Panel A describes general firm characteristics, Panel B describes general business credit activity, and Panels C and D provide the distribution of firms by size and industry, respectively.

¹⁶We exclude sub-chapter S Corporations because general business credits are claimed on individual owner's tax returns, rather than at the entity level. The SOI sample is representative of the population of C corporation based on sample weights.

¹⁷Like other SOI products, the SOI Corporate Sample reflects the initial tax filing for corporations. It does not include adjustments made by amended returns or audit corrections.

¹⁸2011 Summary Statistics are reported in Table A.1.

Insert Table 1 about here.

In Column (1) of Table 1, we report summary statistics for the full population of C corporations. During this period, firms held, on average, \$1.6 million in assets, earned \$56,000 in taxable income, and paid \$17,000 in corporate income tax. Forty-six percent of firms were in loss, a statistic consistent with recent reporting by the General Accountability Office (GAO).¹⁹ Firms earned \$4,000 in general business credits, carried-forward a stock of \$7,000 in unused general business credits, and offset \$3,000 in tax liability with the general business credit.

Average general business credit activity, however, is somewhat misleading based on the full population of C-corporations because general business credit activity is highly concentrated among the largest firms. Roughly 6% of firms (23% of the SOI sample due to stratification) engage in activity that qualifies for a business tax credit, and these firms account for 80% of total income earned by C-corporations. Accordingly, we focus our analysis on the subsample of firms that claim a general business credit at least once between 2001 and 2016. This leads to our estimation sample: a panel of roughly 27,000 firms and 1,000,000 firm-years from 2001–2016 (200,000 weighted firms and 29,000,000 weighted firm-years).

Column (2) of Table 1 presents descriptive statistics for our estimation sample. These firms are, on average, six times larger when measured by average taxable income and tax liability, and about half as likely to be in loss. They earn \$57,000 in general business credits, carry forward \$67,000 in unused general business credits, and claim \$47,000 in general business credits. Firms in our sample are more heavily concentrated among the largest firms, reported in Panel C. Despite the upward tilt in the size distribution of our sample, it is distributed across industries in roughly the same proportion as the full population of firms, reported in Panel D.

¹⁹GAO-16-363 “Most Large Profitable U.S. Corporations Paid Tax but Effective Tax Rates Differed Significantly from the Statutory Rate”

Insert Figure 1 about here.

As previously described, the panel nature of our estimation sample allows us to identify undisclosed adjustments to carry-forward credits based on the difference between reported carry-forward credits and lagged real activity.²⁰ To this end, Figure 1 displays the distribution of undisclosed adjustments from 2001 through 2011 in Panel A and the distribution of positive adjustments in Panel B. Undisclosed adjustments can be negative or positive for varying reasons, and Panel A reflects as much. However, there is more mass to the right of zero, and, for this reason, Panel B focuses on positive adjustments.²¹ In addition, Panel A of Figure 2 reports the share of firm-years with positive undisclosed adjustments under the aggregate disclosure regime from 2001 through 2010. Specifically, we find positive undisclosed adjustments in 9 percent firm-years.

Insert Figure 2 about here.

Figure 2 also reveals the pervasiveness of undisclosed adjustments across a variety of subgroups. Subgroups of firms are defined based on the distribution of observable characteristics from 2001 to 2010. Specifically, firms are defined as large (small) if their total income ever (never) exceeds the median income during this time period. Firms are old (young) based on whether they are above (below) the mean age during this time period. Firms are defined as

²⁰Because the SOI data only reflect the initial tax filing, this calculation likely reflects adjustments that are part of a negotiation between the taxpayer and the IRS during the time of settlement. Negotiated adjustments to tax liability are consistent with the tax-aggressive strategy of high-income individual taxpayers found in Slemrod et al. (2001). At the same time, as long as negotiations are not both (1) differentially impacted in 2011 compared to other years and (2) heterogeneous across tax years, this type of behavior is not a threat to the differences-in-differences empirical strategy.

²¹In Figure A.2, we repeat this figure for 2001–2016. If anything, the importance of positive undisclosed adjustments becomes more pronounced by adding in these years.

public if they are ever publicly traded during this time period.²² Finally, we identify the subset of firms with positive undisclosed adjustments during this period, calling these firms ex-ante tax aggressive. We further divide these firms in half based on the share of firm-years with positive undisclosed adjustments.

The propensity to have positive undisclosed adjustments was 22% for the largest firms and 30% for public firms. Tax-aggressive firms had positive undisclosed adjustments for one-quarter of this decade, and the most aggressive firms had positive undisclosed adjustments for more than half of this decade. Taken together, our empirical sample reveals that firms frequently engaged in adjustments prior to the new reporting regime. Whether these adjustments were common due to the opacity of the aggregate reporting regime is outside the scope of this paper. However, they suggest a clear channel for improved compliance through increased information flows to the tax authorities.

4. Business Tax Years and Empirical Identification

The stock of carry-forward credits changes from year to year for several reasons. Separating the effect of the form change from the counterfactual series, therefore, requires variation beyond time variation. To do this, we leverage an institutional detail underlying the SOI corporate data. Specifically, firms are not subject to the same rigid definition of a tax year as individuals. Instead, firms can choose any consecutive twelve-month period to define a tax year.²³ Tax years are generally clustered on fiscal quarters and most often match the fiscal year defined by the firm for accounting purposes. We will exploit this variation to identify treated and control firms in 2011.

²²We rely on matched Compustat-SOI data utilized by [Feldman et al. \(2018\)](#) for the purposes of this definition

²³Firms make this decision within the first year of incorporation and thereafter can only adjust their tax year with the approval of the IRS.

4.1. Institutional Details: Heterogeneous Business Tax Years

Roughly 60% of firms report taxable income based on the calendar year. In light of the mismatch between tax year and calendar year, firms are grouped together so that the majority of the tax year is contained in the same calendar year. This ensures that annualized income shares a common calendar year. In fact, this is the organizational structure underlying the SOI corporate sample. For example, the SOI 2011 corporate file includes firms with tax years ending between July 31, 2011, and June 30, 2012. Figure 3 depicts the composition of annualized income in 2011 based on heterogeneous business tax years.

Insert Figure 3 about here.

Whereas the SOI year is defined based on the *end* of the tax year, relevant tax forms are based on the *beginning* of the tax year. Because of this distinction, there is a subset of firms included in annualized income in year y that fills out a tax form released for year $y - 1$. In the case of 2011, firms with tax years ending between July and November 2011 fill out the 2010 Form 3800 and are therefore subject to the aggregate disclosure requirements for carry-forward general business credits. At the same time, firms with tax years ending between December 2011 and June 2012 fill out the 2011 Form 3800 and are subject to the newly disaggregated disclosure requirements. Both groups of firms, however, share the same 2011 annualized income. This within-year variation in tax forms results in heterogeneous exposure to the redesigned Form 3800 in 2011. Specifically, control firms (tax years ending July–November) are subject to the old reporting regime on the 2010 Form 3800. In contrast, treated firms (tax years ending December–June) face the new disaggregated reporting regime on the 2011 Form 3800.

4.2. Empirical Specification

We exploit variation in tax years to identify the effect of newly disaggregated disclosure requirements based on a difference-in-differences empirical specification. We estimate the impact of the form redesign on carry-forward general business credits measured in two ways: (1) the log of carry-forward credits plus one and (2) carry-forward credits, measured in thousands and winsorized at the 1st and 99th percentile within year. Firms with tax years ending July–November serve as our control group, and firms with tax years ending December–June serve as our treatment group. The policy effect is given by the coefficient β_1 on the interaction of the indicator variables identifying treated firms and 2011. We use OLS to estimate the parameters in the equation

$$\begin{aligned} \log(Y_{i,t}) = & \beta_0 + \beta_1 \text{Treated Firm} \times \mathbb{1}(2011) \\ & + \beta_2 \text{Treated Firm} + \beta_3 \mathbb{1}(2011) \\ & + X_{i,t}\gamma + \lambda_i + \lambda_t + \eta_{\text{treated},t} + \varepsilon_{i,t}, \end{aligned} \tag{5}$$

where an observation is a firm-year for firm i in year t .

We run three specifications based on different dimensions of variation. First, we report the raw difference-in-differences specification. Second, we use within-firm variation by adding firm fixed effects λ_i and firm-level controls, including indicator variables for a series of use-frictions (whether a firm was taxable, whether a firm carried a stock of Net Operating Losses, whether a firm was limited by the Alternative Minimum Tax, and whether a firm used a Foreign Tax Credit), an indicator variable for whether a firm was ever publicly traded, and firm-size fixed effects. Finally, we use within-year variation by including year fixed effects λ_t and year-by-treated firm fixed effects $\eta_{\text{treated},t}$.

We estimate these three specifications based on two different sets of control years. The first set of years uses the ten years before 2011 as a control. The second set adds 2013–2016 as additional control years. Although the reporting regime during this latter time period was disaggregated, the reporting regime was symmetric for the treated and control firms.

In Panel C of Figure 1, we display the distribution of the log of carry-forward credits from 2001–2011. This figure demonstrates that the distribution of carry-forward credits is log-normal, which implies a skewed distribution of carry-forward credits. For this reason, our main specification relies on the log transformation. As we will show, however, all results are robust to level specifications.

In addition, these specifications help to alleviate concerns of omitted variable bias or confounded selection of being a treated firm. As usual, in these models, our estimates capture the causal effect in the absence of omitted variables that cause a differential effect between treated and control firms in 2011. Following [Bertrand et al. \(2004\)](#), we account for auto-correlated errors through a variety of techniques including clustering our standard errors at the firm-level, employing a fixed-effects panel methodology, and including year fixed effects.

4.3. Identification

Identification in the differences-in-differences model requires that longitudinal changes in the control group serve as an appropriate counterfactual for the treatment group absent the policy change. This is commonly referred to as a “parallel trends” assumption. Evidence of non-parallel dynamics or compositional differences across these two groups in the years before and after the form redesign would pose a threat to the validity of our empirical strategy. To investigate these potential threats to identification, we compare observable characteristics between the treatment and control firms in Table 1, as well as differences in outcome pretrends

in Figure 4. The similarity between these two groups of firms based on both observable characteristics and pretrends supports our differences-in-differences identification assumption.

Insert Figure 4 about here.

Table 1 provides descriptive statistics for treatment and control firms in the control years: column (3) for control firms with tax years ending July–November and filling out tax forms from SOI Year $t - 1$, and column (4) for treatment firms with tax years ending December–June and filling out tax forms from the current SOI Year. These descriptive statistics highlight the similarity between treated and control firms across the majority of observable characteristics, with the exception that treated firms are larger when measured by total assets. In addition, the mix of industries between these two groups is slightly different: treated firms are less likely to be in Wholesale, Retail, and Services, and more likely to be in Insurance.

We formally test the assumption of parallel trends between the treatment and control group in the control years by estimating the following specification via OLS

$$\log(CF)_{it} = \beta_0 + \beta_1 \text{Treated}_i + \sum_{t=2001}^{2011} \gamma_t \mathbb{1}(t) + \sum_{t=2001}^{2011} \theta_t \mathbb{1}(t) \times \text{Treated}_{it} + v_{it}, \quad (6)$$

where $\hat{\theta}_t$ identifies differences in trends between the treatment and the control group. In the case of log carry-forward credits, we fail to reject a null hypothesis that the trends are the same with a p-value of 0.304 for control years 2001–2010 and a p-value of 0.341 for control years 2001–2016, excluding 2011. This hypothesis test provides statistical support of the parallel trends assumption. Specifically, this test suggests that omitted variables are not differentially affecting treated and control firms (Kahn-Lang and Lang, 2018).

Figure 4 displays $\widehat{\theta}_t$ for carry-forward general business credits. Panel A plots the difference in trend for the log of carry-forward credits. Here, the difference in trend is near zero and never statistically significant across all control years.²⁴ Panel B plots the difference in trend for carry-forward credits, measured in \$1000s. In 2011, we observe a noticeable increase that is statistically significant at the 1 percent level. To formally investigate the response of firms to changes in disclosure, we examine the estimates of equation (5) in the following section.

5. Empirical Evidence

5.1. The Effect of Disclosure on Carry-Forward Credits

We reject the null hypothesis of no impact of the form redesign on carry-forward credits in 2011, as suggested by a naive model, at the 1% level. Instead, we find that firms reported *more* carry-forward credits due to the newly disaggregated disclosure requirements. These results are reported in Table 2.

Insert Table 2 about here.

We determine that firms reported 21%–26% *more* carry-forward credits in response to the required disaggregation on the new Form 3800 (shown in Panel A of Table 2). Column (1) illustrates that firms newly adopting the redesigned Form 3800 reported 23% more

²⁴In 2006, the coefficient is 0.19 with a t-statistic 1.92, statistically insignificant at conventional levels. However, given how close this coefficient comes to statistical significance, it warrants further discussion. In this case, that treated firms were carrying forward more general business credits in 2006 is consistent with the introduction of energy credits in 2005 that went largely unused (Carlson and Metcalf, 2008). Our identification strategy picks this up because treated firms carry-forward these credits in 2006 relative to control firms, which are still reporting on the 2005 Form 3800 and have not yet carried forward these credits.

carry-forward credits in 2011. This basic difference-in-differences specification uses variation across firms and uses 2001–2010 compared to 2011. The evidence from the raw difference-in-differences specification suggests a substantial unintended consequence from the Form 3800 redesign. Column (2) refines the evidence in column (1) by including controls and firm-fixed effects, revealing that firms reported 25% more carry-forward credits in 2011. The addition of control variables in this specification is particularly useful because a series of statutory rules determine frictions in carry-forward credit usage and therefore explain a carry-forward build up over time; we control for these. In addition, firm-fixed effects also allow us to investigate the effect of the 3800 Form redesign using within-firm variation, which controls for potential time-invariant confounding factors across firms.

Column (3) of Table 2 indicates that firms subject to the new Form 3800 reported 26% more carry-forward credits in 2011, using within-year variation by including year-fixed effects and year-by-treated firm-fixed effects. The advantage of the extensive fixed effects in this specification is that they control flexibly for a wide array of potential confounding factors. The disadvantage of this specification is that it relies on substantially less variation in the data. This disadvantage is limited in practice, however, as the estimates are similar to the estimates in columns (1) and (2) and remain statistically significant at the 1% level.

The estimates are also similar when we expand the control years in our sample to include 2013–2016. Columns (4)–(6) replicate the specifications in columns (1)–(3) by including these additional four years. Our empirical design exploits differences in reporting requirements on Form 3800 that arise between the 2010 and the 2011 form. After 2012, variation in reporting requirements across treated and control firms disappears. Including these years, therefore, controls for potential time-varying confounding factors that occur after 2012.²⁵ The estimates

²⁵We exclude the 2012 SOI sample because it is contaminated. In particular, this sample includes firms that face Form 2011 and firms that face Form 2012. However, the timing of the form change suggests that those

in columns (4)–(6) suggest that firms required to report disaggregated information reported 21%–26% more carry-forward credits.

Panel B of Table 2 replicates the specifications in Panel A using the level of carry-forward credits in thousands as the dependent variable. These specifications demonstrate that requiring firms to report disaggregated information leads to an increase in reported carry-forward credit of \$6,000 to \$15,000 per firm in the first year of adoption. These estimates are similar to those in Panel A, despite the skewed distribution of carry-forward credits.

5.2. Heterogeneous Effects of Disclosure on Carry-Forward Credits

Table 3 reports our difference-in-differences estimates across several dimensions of heterogeneity. These estimates provide insights into which firms are responding to the required reporting of disaggregated information and into what drives the increase in observed carry-forward credits.

Insert Table 3 about here.

One explanation for the growth in carry-forward credits could be that the new policy increased the quality of reporting by making the carry-forward credit more salient. This intended consequence could cause some firms to report more credits if lower quality reporting led to under-reporting of carry-forward credits. If this were the case, we might expect larger and older firms to have a stronger response because these kinds of firms are more likely to have larger and more diverse portfolios of general business credits. In contrast, we might expect firms facing the redesigned Form 3800 for the first time in 2012 had time to adjust 2010 behavior strategically. Regardless, our results are robust to the inclusion of 2012 in the control years.

that public firms would respond tepidly because they have more reporting requirements to shareholders, are generally believed to be better monitored, and are likely subject to a regular audit by the IRS. We also would expect salience to be less important for public firms because they can report carry-forward credits on their financial statements as tax assets. Finally, we anticipate a smaller scope of improved salience among the subset of firms that previously engaged in positive undisclosed adjustments (tax-aggressive firms) compared to those that did not engage in positive undisclosed adjustments (compliant firms). Another possible explanation for the growth in carry-forward credits is a compliance channel, which we explored in section 2 and revisit in section 5.3.

Table 3 reports our baseline specification (column 2 from Table 2) for big and small, young and old, private and public, and compliant and aggressive firms. We define these categories using pre-2011 data, which reduces our observations from 168,437 to 167,739.²⁶ Columns (1) and (2) demonstrate that this change does not alter the estimates.²⁷ Our results are also robust to the alternative specifications reported in columns (1) and (3) of Table 2, reported in Tables A.2 and A.3, respectively.

The estimated impact of the new disclosure regime on carry-forward credits is similar for small, big, young, and old firms, reported in columns (3)–(6) of Table 3. Small and big firms reported 24% and 29% more carry-forward credits in 2011. Similarly, young and old firms reported 21% and 26% more carry-forward credits. The similarity of this response across these dimensions is inconsistent with a salience mechanism. Instead, these estimates suggest that mechanisms beyond salience may help explain the response that we find.

²⁶Specifically, the SOI corporate sample of firms engaging in general business credits includes a small number of firms observed in 2011 for the first time. These firms are not included in the heterogeneity analysis.

²⁷The coefficients in Columns (1) and (2) are identical by construction. The coefficient of interest cannot be estimated for firms that appear for the first time in 2011 because there is no time variance for these firms.

In contrast, Columns (7)–(10) of Table 3 reveal substantial heterogeneity in estimates across private and public firms and compliant and tax-aggressive firms. Public firms increased carry-forward credits substantially more than private firms: 53% and 24%, respectively. Similarly, tax-aggressive firms increased carry-forward credits twice as much as compliant firms: 43% and 20%, respectively. The heterogeneity in response along these dimensions, coupled with the similarity in response by size and age, is less consistent with a salience channel and more consistent with other potential mechanisms. The next section provides additional suggestive tests to investigate alternative reasons why firms reported more carry-forward credits in 2011.

5.3. Mechanisms For Firm Responses

The large increase in reported carry-forward credits found in the previous sections motivates an investigation into the mechanism driving this behavior. Although our empirical specification is unable to provide causal evidence on the different channels, we provide several additional suggestive tests to investigate the increase in credits. In particular, we investigate two potential channels — salience and compliance — by focusing directly on positive undisclosed adjustments. The salience hypothesis posits that the form redesign caused firms to become more cognizant of the carry-forward credits, which in turn led firms to report more carry-forward credits that they had previously earned but did not document on Form 3800 in 2011. The compliance channel posits that firms interpreted the form change as an admission of weak audit technology in the pre-period. Under this hypothesis, it would have been difficult to audit carry-forwards before 2011, and, in this way, 2011 would set the baseline for the stock of carry-forwards that could be audited going forward. Table 4 looks to disentangle these two responses by examining changes in positive undisclosed adjustments at the intensive and extensive margin for two distinct groups of firms. The first group includes those firms

that had engaged in positive undisclosed adjustments prior to the change in disclosure requirements; we describe these firms as ex-ante tax-aggressive. The second group of firms are those that had never engaged in positive undisclosed adjustments prior to the change in disclosure requirements—we describe these firms as ex-ante compliant.

Insert Table 4 about here.

Our first test investigates whether firms were *more likely to report* undisclosed credits in 2011 based on whether they had previously reported undisclosed credits. Put differently, we test for a heterogeneous response by compliant and tax-aggressive firms on the extensive margin. If the response channel were mostly due to improved salience, then we would expect compliant firms to have a larger extensive margin response than tax-aggressive firms. If instead, the response is mostly due to the compliance channel, then we would expect no difference in extensive margin responses.

Panel A of Table 4 reports that compliant and tax-aggressive firms have similar extensive margin responses. The estimates for compliant firms (column 1) come from a cross-sectional specification using data only from 2011; before 2011, by construction, both treated and control firms defined as compliant did not have undisclosed adjustments. For this subgroup, we can compare differences in behavior in 2011 directly. The estimates for tax-aggressive firms (column 2) use the same difference-in-differences specification as in Table 3 to control for any potential differences over time and across groups. These columns report that the probability that compliant and aggressive firms reported positive undisclosed credits in 2011 is 2.9% and 2.7%, respectively. The similarity in the extensive margin responses is more consistent with the compliance channel than the salience channel because we would expect that firms that had

previously made undisclosed credits would already be aware of these credits. In this case, there would be less potential for salience to have an impact.

Our second test investigates whether firms *reported more* credits based on whether they reported undisclosed credits in the pre-period. In other words, we test for a heterogeneous response by compliant and tax-aggressive firms on the intensive margin of undisclosed adjustments. If the response channel were mostly due to salience, then we would expect compliant firms to have a similar or larger intensive margin response than tax-aggressive firms. In particular, the salience channel posits that previously compliant firms that are newly made aware of these carry-forward credits because of the form redesign should have more undisclosed credits in 2011. If instead, the response is mostly due to the compliance channel, then we would expect tax-aggressive firms to have a larger intensive margin response. In particular, the compliance channel suggests previously tax-aggressive firms are more likely to be aggressive in 2011 and report more undisclosed credits than previously compliant firms.

Panel B of Table 4 reports that tax-aggressive firms report substantially more undisclosed credits in 2011 than compliant firms. Specifically, treated tax-aggressive firms reported \$7,920 more undisclosed credits in 2011 than untreated tax-aggressive firms. By comparison, compliant firms reported \$2,870 *fewer* undisclosed credits in 2011 than untreated compliant firms. The stark difference both in magnitude and sign suggests that tax-aggressive firms had substantially larger intensive margin responses than compliant firms. This evidence suggests that previously tax-aggressive firms were more tax aggressive in 2011, which is more consistent with the compliance channel than the salience channel.

Columns (3) and (4) of Table 4 provide additional context by separately estimating the extensive and intensive margin responses for firms that reported above and below median levels of undisclosed credits before 2010. Columns (3) and (4) in Panel A indicate that the most aggressive firms before 2011 are more likely to report positive undisclosed credits in

2011 than the least aggressive firms. This evidence provides additional evidence that the response in 2011 is due to the compliance channel. In particular, the compliance channel would suggest that previously aggressive firms would be the most likely to report undisclosed credits in 2011, while the salience channel would suggest the reverse. Columns (3) and (4) in Panel B show that less aggressive firms had larger intensive margin responses than more aggressive firms. This evidence could be due to a ceiling effect — that the most aggressive firms are unable to greatly increase their aggressiveness. This evidence is also consistent with an intended consequence of the form change: to limit tax-aggressive behavior. Specifically, if undisclosed adjustments are related to tax-aggressive behavior, then this estimate suggests that the form change decreased tax-aggressive behavior for the most tax-aggressive firms.

These extensive and intensive margin tests are consistent with several descriptive statistics about positive adjustments to carry-forward credits. In particular, the salience channel predicts an adjustment to carry-forward credits in 2011, but adjustments should otherwise be rare before and after 2011. Panel A of Figure 2 demonstrates, however, that undisclosed adjustments are pervasive before 2011 across a wide array of subgroups, as discussed in section 3. Panel B of Figure 2 reports the share of firm-years with positive adjustments after 2011 and includes positive adjustments before 2011 in gray for comparison. For most groups, the share of firm-years with positive adjustments to carry-forward credits is *even larger* after 2011. For example, the share of firm-years with positive adjustments for small, young, old, and private firms doubled from roughly 8% before 2011 to roughly 16% after 2011. The pervasiveness of positive adjustments before and after 2011 is more consistent with the compliance channel than the salience channel. Moreover, the increase in positive adjustments after 2011 suggests that some firms' beliefs about the audit technology, θ_2 , decreased.

We also consider reports from the Treasury Inspector General for Tax Administration (TIGTA) to determine if our results are externally consistent. TIGTA provides independent

oversight of IRS activities with an emphasis on detecting fraud and waste. In 2015, TIGTA completed an investigation of business credits reported in 2013. This report identified \$2.9 billion in potentially erroneous general business credit carry-forward claims among 3,285 corporate tax returns (Treasury Inspector General for Tax Administration, 2015). This magnitude is consistent with our estimated impact of the rise in carry-forward claims due to the change in disclosure requirements. In a follow-up 2019 report, TIGTA determined that the IRS had not followed the recommended remedies suggested in the 2015 report. In response, the IRS stated that it “lacks the needed information technology resources and there were other competing priorities” (Treasury Inspector General for Tax Administration, 2019). This response from the IRS is consistent with the model where firms’ beliefs about audit technology decreased. Furthermore, the 2019 TIGTA report identified an additional \$5 billion in potentially erroneous carry-forward claims and deductions stemming from the 2015 tax year.²⁸ These reports provide external validity to our estimates and mechanism and are consistent with tax-aggressive behavior on the part of businesses in the context of the general business credit.

Importantly, we also see some evidence of the intended consequences of the IRS form change. Specifically, the share of firm-years with positive adjustments decreased for the firms that were the most tax aggressive before 2011. The share of firm-years with positive adjustments dropped from roughly 25% to 18% for all tax-aggressive firms, from 18% to 16% for low aggressive firms, and from 52% to 20% for high aggressive firms. This descriptive evidence is consistent with the evidence in Table 4 and suggests that the change was successful in decreasing tax-aggressive behavior for the most tax-aggressive firms after 2011.

Our finding that firms increase tax aggressiveness in response to the redesigned Form 3800 complements the literature on unintended consequences of an audit. For example, Slemrod et al. (2001) finds that wealthy taxpayers *decreased* their reported taxable income in response

²⁸This figure is not limited to general business credits, but includes a larger set of carry-forward credits and deductions.

to the threat of an audit. Similarly, firms have an incentive to undertake a tax-aggressive position in response to increased scrutiny from the tax authority as part of an optimal negotiation strategy (Hoopes et al., 2012). These findings are consistent with a statement by IRS Commissioner Mark Everson (2005). Testifying to the President’s Advisory Panel on Tax Reform, Everson said that it is “always in the interest of the non-compliant taxpayer to take an aggressive position with the Service” (Slemrod, 2007, (pg 32)). Amid this background, the evidence we find is consistent with the hypothesis that (1) tax-aggressive firms (1) interpreted the form redesign as a signal of increased scrutiny of carry-forward general business credits, (2) carry-forward general business credits were practically impossible to audit prior to the stock reported on the 2011 Form 3800, and therefore, (3) the stock reported on the 2011 Form 3800 would set the benchmark for future tax positions.

5.4. Additional Discussion: IRS Audits and Tax Aggressiveness

In principle, increased disclosure of general business credits should increase the ability of the IRS to detect tax-aggressive behavior and to determine true taxable income in the event of an audit. Yet our analysis shows that this change influenced firm behavior in a way consistent with an increase in tax aggressiveness. Moreover, we have shown that it was not uncommon for firms to have positive undisclosed adjustments to general business credits that could be subsequently reduced or denied upon audit. In this context, tax aggressiveness is consistent with at least two possible behaviors: as amended or corrected returns and in financial reserves held in response to uncertain tax positions. Our results, therefore, complement existing studies considering these intended and unintended consequences of disclosure.

Further, our results documenting positive undisclosed adjustments complement work on IRS audits (DeBacker et al., 2015, 2018). This literature primarily relies upon data from the

IRS National Research Program (NRP), which is a random audit program to measure misreported taxable income in the US. Future research could build upon our results and those of the broader literature to ask the next question about the effectiveness of disclosure in tamping down tax-aggressive behavior.

Our results also connect to research on recently introduced disclosures to increase the transparency of tax-aggressive behavior. Specifically, the Financial Accounting Standards Board (FASB) introduced ASC 740-10 in 2007 to standardize the disclosure method used to account for financial reserves made against uncertain tax positions, or those tax positions likely to be challenged by the IRS. This provision is known colloquially as “Fin 48.” In 2010, the IRS harmonized these disclosures by requiring large firms to identify and rank order their uncertain tax positions on Form UTP. Our results complement this literature because the firms required to report form UTP are a subset of the firms in our data.²⁹ [Henry et al. \(2016\)](#) and [Towery \(2017\)](#) provide excellent background and analysis of the intended and unintended consequences of these changes. Future changes to Form UTP and FIN 48 could have interesting effects on how firms report general business credits, especially if these changes require more firms to make these disclosures.

6. Conclusion

Information disclosure must strike a balance between the benefit of increasing oversight to an authority and the cost of increasing reporting borne by firms. Further, policymakers choosing to change the level of information disclosure must be mindful that the benefits of the intended consequences could be at the cost of unintended consequences due to signaling or changes in

²⁹Disclosure on Form UTP is limited to the largest reserves; unless tax aggressiveness related to general business credits ranks amongst the largest UTBs and only if firms have reserved against these tax positions would we expect to this reflected on Form UTP.

firm behavior. The 2011 redesign of the IRS form 3800 increased the information that firms provide to the IRS about their stock of carry-forward general business credits by requiring disaggregated information. As a result of the newly disaggregated information, the IRS gained access to detailed information about specific general business credit usage that was previously only known by firms themselves. Our findings here suggest that while this new information reduced what appears to be the most aggressive form of taxpayer behavior in reporting credits, it came at the cost of a higher stock of general business credit carry-forwards being reported by firms overall.

In addition to legitimate causes of undisclosed adjustments, firms may engage in tax aggressiveness. This behavior was easier to conceal from the IRS before the increase in disclosure requirements. Our results suggest that highly-aggressive firms engaged in undisclosed adjustments at a very similar rate to other firms after the form change. This is notable because we provide direct evidence of increased compliance due to tax disclosure, which is unique in a literature that largely relies on proxies.

Importantly, we also find that the change in disclosure regime induced a 20-25% *increase* in reported carry-forward credits. This result is pervasive across several groups: young and old firms, large and small firms, and public and private firms. The evidence shown here is consistent with the notion that firms interpreted the form redesign simultaneously as a signal of increased scrutiny in the future and as an acknowledgment that carry-forward general business credits were practically impossible to audit before the change. Firms appeared to use the first filing under the new regime to set a benchmark for future tax positions. This unintended consequence could potentially have a large, negative impact on future tax revenues. With roughly 100,000 firms engaging in carry-forward credits during this period, each reporting \$11,700-\$15,000 more credits, the cost equates to roughly \$1.3 billion in corporate income tax receipts.

Several tests and descriptive statistics suggest that this costly increase in reported carry-forward credits is due to the compliance channel rather than a salience channel. Specially, these tests and descriptive statistics suggest that (1) firms were previously aware of the reporting requirements, (2) the form change did not induce those firms that were potentially unaware of being more likely to engage in undisclosed adjustments, (3) firms that previously engaged in undisclosed adjustments are the firms with the largest increase in undisclosed adjustments in 2011, and (4) the share of firm-years that had undisclosed adjustments increased after 2011 in the full sample and across most subgroups.

Ultimately, optimal tax disclosure is a critical feature of tax administration. Empirical evidence on the response of businesses to tax disclosures is sparse. Our findings suggest that firms are sensitive to the tax disclosure environment, and changes can have intended and unintended consequences. In light of the fact that the IRS continually updates tax disclosure requirements, our findings motivate additional research on best practices for tax disclosure.

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Figure 1. Distribution of Key Variables, 2001–2011

Notes: This figure uses data from the annual IRS Statistics of Income corporate sample from 2001 to 2011 (see section 3). Panel A reports undisclosed adjustments which come from the authors calculations from

$$\text{Carry-Forward}_t = \text{Carry-Forward}_{t-1} + \text{Earned}_{t-1} - \text{Claimed}_{t-1} + \text{Undisclosed Adjustment}_t$$

(equation (1) in the text). Panel B restricts undisclosed adjustments to only positive adjustments. Panel C reports the log of carry-forward credits, measured in thousands of dollars.

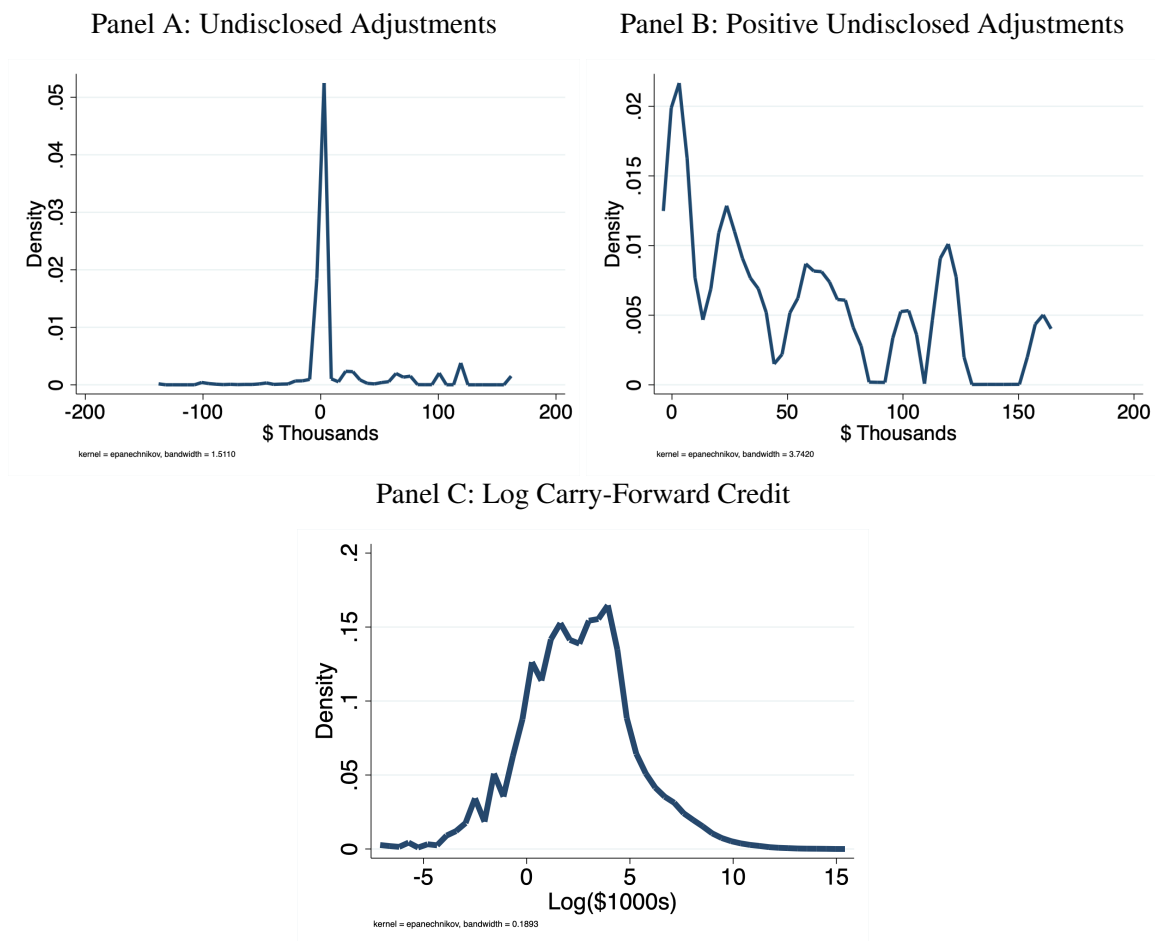
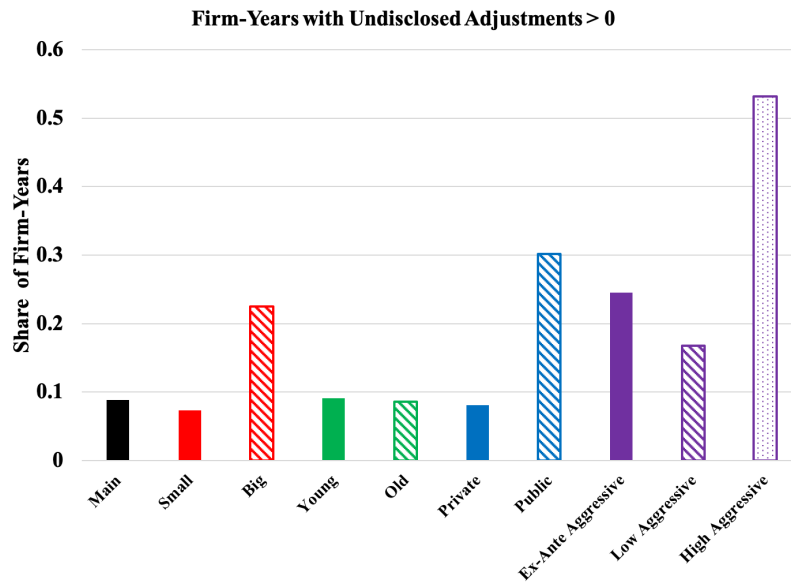


Figure 2. Undisclosed Adjustments to Carry-Forward General Business Credits

Notes: This figure uses data from the annual IRS Statistics of Income (SOI) corporate sample from 2001 to 2011, see section 3). Panel A provides the share of firm-years with positive undisclosed adjustments (see definition of undisclosed adjustments in equation (1) in the text), grouped according to firm characteristics, for the years 2001 to 2010. Colors and shading depict the following subgroups of firms: main (full sample), small, big, young, old, private, public, ex-ante aggressive, low aggressive, and high aggressive. Aggressive is defined as having at least one year with a positive undisclosed adjustment from 2001 to 2010. Panel B replicates the means in Panel A in gray, and provides means for the same subsamples for the years 2012 to 2016 in color.

Panel A : 2001–2010



Panel B: 2001–2010 vs 2012–2016

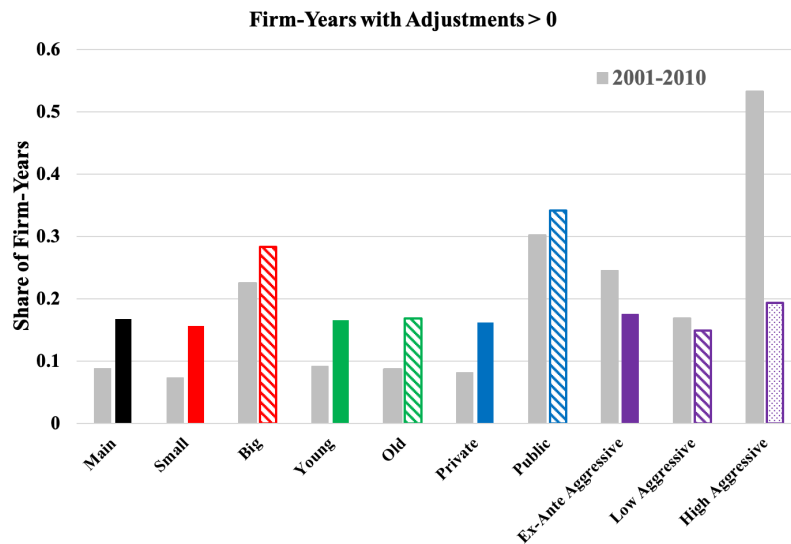


Figure 3. Identification Strategy Based on Heterogeneous Tax Years

This figure depicts the characterization of treatment and control firms by tax year. Firms, unlike individuals, are able to choose their tax year. Firms with tax years that start in December are subject to the new tax form a year later than firms with tax years that begin in January, despite almost perfect overlap in economic activity. See section 4.1 for more details.



Figure 4. Differences-in-Differences: Identification Assumptions, 2001–2011

Notes: This figure depicts the difference-in-difference coefficients by year from 2001 to 2011 with 95% confidence intervals, estimated according to equation (6). Panel A depicts the coefficients from the specification with the log of carry-forward general business credits in thousands as the dependent variable. Panel B depicts the coefficients from the specification with carry-forward general business credits in \$1000s (in levels) as the dependent variable.

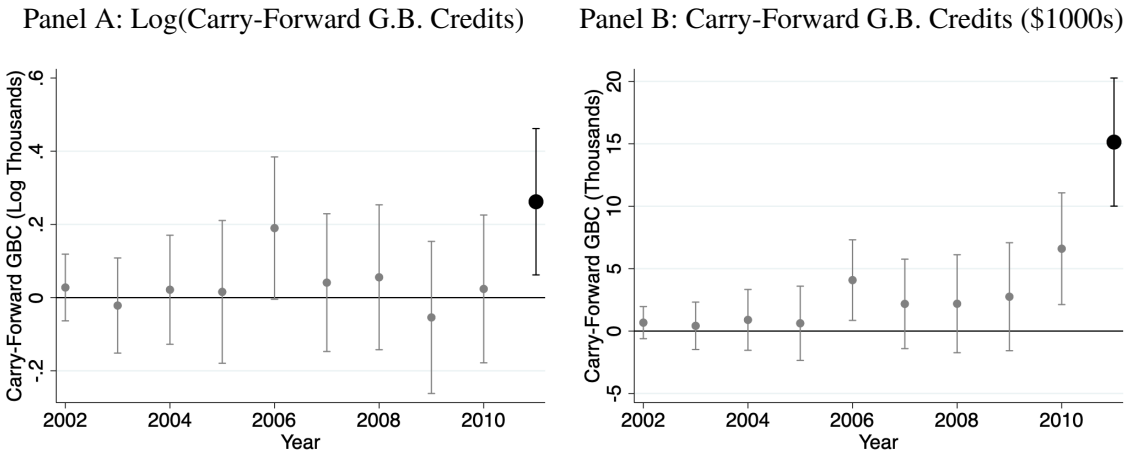


Table 1
Summary Statistics: IRS Corporate Statistics of Income (SOI): Control Years

Table details mean values based on Form 1120 and Form 3800 for SOI Years 2001-2016. We detail relevant forms for Tax Year 2015. Taxable Income: Form 1120 Line 30. Total Assets: Form 1120 Schedule L 19d. Total Taxes Paid: Form 1120 Line 31. General Business Credits (GBCs) Claimed: Form 1120 Schedule J Line 5c. GBCs Earned: Form 3800 Part III Line 6, Box A and B. GBCs Carried Forward: Form 3800 Part III Line 6, Box C and F. Control firms in 2011 are those with a Tax Year ending July 1 2011 - Nov 30 2011. Treated firms in 2011 are those with a Tax Year ending Dec 1 2011 - June 31 2012. Both treatment and control firms are included in the 2011 SOI file. \$-Weighted Distribution is weighted by Gross Receipts.

	Full Population (1)	GBC Subsample		
		Full Sample (2)	Control Tax Year End July–Nov (3)	Treatment Tax Year End Dec–June (4)
<i>Panel A: Firm Characteristics (\$ Thousands or Percents)</i>				
Gross Receipts	1,711	7,343	7,346	7,343
Taxable Income	56	410	331	424
Taxes Paid	17	128	101	133
Total Assets	1,625	8,707	6,497	9,094
In Loss (%)	46	25	22	26
Public(%)	0.4	3	2	3
<i>Panel B: GBC Activity (\$ Thousands or Percents)</i>				
Claimed	3	47	34	49
Earned	4	57	40	59
Carry-Forward	7	67	43	71
<i>Panel C: \$-Weighted Distribution of Firms by Total Income</i>				
< \$1 million	0.04	0.01	0.01	0.01
\$1 million–\$10 million	0.08	0.02	0.04	0.02
\$10 million–\$25 million	0.03	0.01	0.02	0.01
\$25 million–\$100 million	0.06	0.03	0.05	0.03
\$100 million–\$1 billion	0.17	0.16	0.22	0.16
> \$100 billion	0.61	0.77	0.66	0.78
<i>Panel D: \$-Weighted Distribution of Firms by Industry</i>				
Construction	0.03	0.01	0.03	0.01
Manufacturing	0.34	0.40	0.39	0.40
Wholesale/Retail	0.28	0.26	0.36	0.25
Transportation	0.03	0.02	0.00	0.03
Information	0.05	0.05	0.05	0.05
Finance	0.03	0.03	0.03	0.03
Insurance	0.09	0.10	0.00	0.11
Services	0.06	0.06	0.04	0.06
Other	0.09	0.07	0.09	0.06
N	1,385,780	222,995	28,618	194,377
Weighted N	27,187,024	1,539,536	229,043	1,310,492

Table 2
Impact of Newly Disaggregated Disclosure Requirements: 2011 Carry-Forward
General Business Credits

This table reports the difference-in-differences specification of the form:

$$\log(Y_{i,t}) = \beta_0 + \beta_1 \text{Treated Firm} \times \mathbb{1}(2011) + \beta_2 \text{Treated Firm} + \beta_3 \mathbb{1}(2011) + \gamma X_{i,t} + \lambda_i + \lambda_t + \eta_{i,t} + \varepsilon_{i,t}$$

for firm i in year t . We report the coefficient of interest: β_1 . Panel A and B evaluate different dependent variables. Controls include indicator variables for whether a firm carried a stock of Net Operating Losses, whether a firm was limited by the Alternative Minimum Tax, and whether a firm used a Foreign Tax Credit), whether a firm was taxable, and whether a firm was ever publicly traded. Controls also include firm size and industry fixed effects. Standard errors in Columns 1,3,4, and 6 are clustered at the firm level to account for auto-correlated errors within firm over time. Standard errors in Columns 2 and 5 account for auto-correlated errors.

	Control Years: 2001 - 2010			Control Years: 2001 - 2016		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Log Carry-Forward General Business Credits</i>						
2011 × Treated	0.231 (0.0814)	0.255 (0.0475)	0.262 (0.102)	0.209 (0.0769)	0.229 (0.0489)	0.262 (0.102)
N	168,437	168,437	168,437	222,812	222,812	222,812
<i>Panel B: Carry-Forward General Business Credits (\$ Thousands)</i>						
2011 × Treated	13.0 (2.11)	11.7 (1.76)	15.1 (2.63)	7.81 (1.85)	6.52 (1.63)	15.1 (2.62)
N	168,437	168,437	168,437	222,812	222,812	222,812
Controls		✓			✓	
Firm FE		✓			✓	
Year FE			✓			✓
Year FE × Treated Firm FE			✓			✓

Table 3
Heterogeneous Impact of Newly Disaggregated Disclosure Requirements: 2011 Carry-Forward General Business Credits

This table reports the difference-in-differences specification of the form:

$$\log(Y_{i,t}) = \beta_0 + \beta_1 \text{Treated Firm} \times \mathbb{1}(2011) + \beta_2 \text{Treated Firm} + \beta_3 \mathbb{1}(2011) + \gamma X_{i,t} + \lambda_i + \varepsilon_{i,t}$$

for firm i in year t . We report the coefficient of interest: β_1 . Panel A and B evaluate different dependent variables. Controls include indicator variables for whether a firm carried a stock of Net Operating Losses, whether a firm was limited by the Alternative Minimum Tax, and whether a firm used a Foreign Tax Credit), whether a firm was taxable, and whether a firm was ever publicly traded. Controls also include firm size and industry fixed effects. Standard errors account for auto-correlated errors based on the within-firm transformation.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Main	Pre-2011	Small	Big	Young	Old	Private	Public	Compliant	Aggressive
<i>Panel A: Log Carry-Forward General Business Credits</i>										
2011 × Treated	0.255 (0.0475)	0.255 (0.0475)	0.242 (0.0514)	0.294 (0.0922)	0.214 (0.0628)	0.261 (0.0608)	0.243 (0.0485)	0.530 (0.175)	0.204 (0.0410)	0.431 (0.122)
N	168,437	167,739	70,488	97,251	65,973	101,766	133,695	34,044	83,023	84,716
<i>Panel B: Carry-Forward General Business Credits (\$ Thousands)</i>										
2011 × Treated	11.7 (1.76)	11.7 (1.76)	3.44 (1.25)	62.4 (13.4)	10.9 (3.06)	10.3 (2.14)	7.36 (1.50)	112 (33.7)	2.94 (1.26)	39.6 (5.94)
N	168,437	167,739	70,488	97,251	65,973	101,766	133,695	34,044	83,023	84,716
Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 4
2011 Impact on Extensive Margin of Undisclosed Adjustments: Salience or Non-Compliance?

Column (1) uses cross-sectional variation in 2011 to estimate the extensive and intensive margins of undisclosed adjustments for the subset of firms that before 2011 did not have any undisclosed adjustments (compliant firms). The estimates in column (1) come from the specification,

$$Y_i = \beta_0 + \beta_1 \text{Treated Firm}_i + \gamma X_i + \varepsilon_i.$$

Columns (2)–(4) use variation across years and firms in a difference-in-differences specification. Column (2) reports estimates for firms that had undisclosed adjustments between 2001 and 2010 (tax aggressive firms). Columns (3) and (4) further refine this subset to firms in either above or below the median amount of undisclosed adjustments between 2001 and 2010. The estimates in these columns come from the specification,

$$Y_i = \beta_0 + \beta_1 \text{Treated Firm}_i \times \mathbb{1}(2011) + \beta_2 \mathbb{1}(2011_t) + \gamma X_i + \lambda_i + \varepsilon_i.$$

Controls include indicator variables for whether a firm carried a stock of Net Operating Losses, whether a firm was limited by the Alternative Minimum Tax, and whether a firm used a Foreign Tax Credit), whether a firm was taxable, and whether a firm was ever publicly traded. Controls also include firm size and industry fixed effects. Standard errors in columns (2) - (4) account for auto-correlated errors.

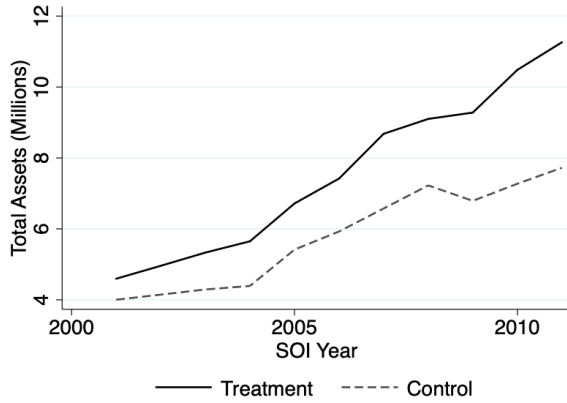
	(1)	(2)	(3)	(4)
	Compliant	Aggressive	Bottom	Top
<i>Panel A: Extensive Margin, $\mathbb{1}(\text{Undisclosed Adjustments} > 0)$</i>				
Treat \times 2011	0.0293 (0.0104)	0.0269 (0.0352)	0.0185 (0.0363)	0.0405 (0.0749)
Firm-Years	7,524	84,716	40,439	36,348
<i>Panel B: Intensive Margin, Undisclosed Adjustments (\$ Thousands)</i>				
Treat \times 2011	-2.87 (3.59)	7.92 (4.60)	13.5 (5.99)	-8.33 (4.69)
Firm-Year	7,524	84,716	40,439	36,348
Cross-Sectional	✓			
Longitudinal		✓	✓	✓
Controls	✓	✓	✓	✓
Firm FE		✓	✓	✓

A. For Online Publication, Appendix: Tables and Figures

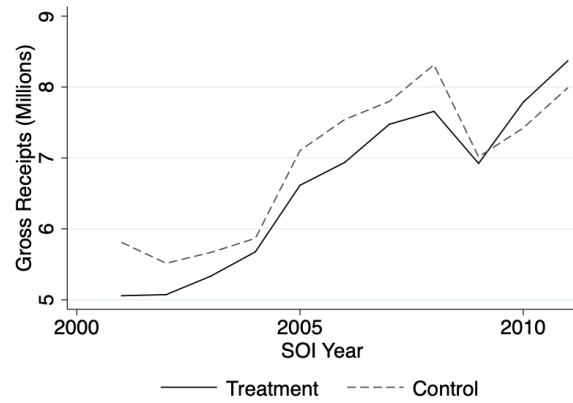
Figure A.1. Differences-in-Differences: Parallel Trends

Notes: This figure uses data from the annual Statistics of Income (SOI) corporate sample from 2001 to 2016 (see section 3). Panel A provides the trends in total assets for the treatment (solid line) and control (dashed line) groups—those subject to the new tax form in 2011 and in 2012. These are firms with different tax years (see section 4.1). Similarly, Panels B, C, and D provide trends in gross receipts, taxable income, and taxes paid.

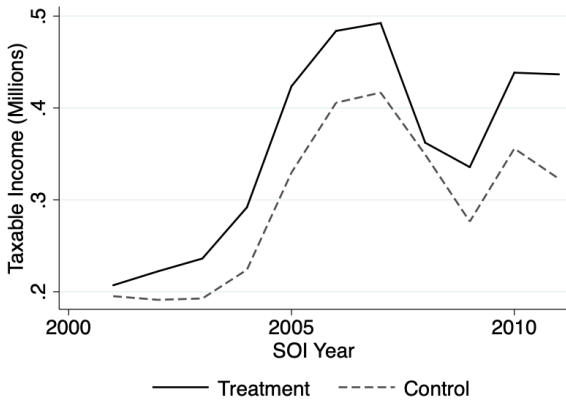
(a) Total Assets



(b) Gross Receipts



(c) Taxable Income



(d) Taxes Paid

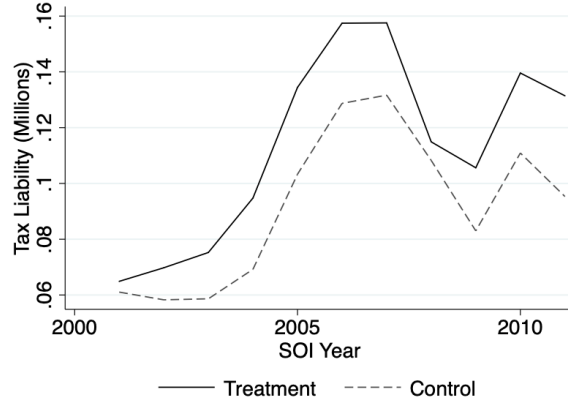


Figure A.2. Distribution of Key Variables, 2001–2016

Notes: This figure uses data from the annual Statistics of Income (SOI) corporate sample from 2001 to 2016 (see section 3). Panel A reports undisclosed adjustments which come from the authors calculations from

$$\text{Carry-Forward}_t = \text{Carry-Forward}_{t-1} + \text{Earned}_{t-1} - \text{Claimed}_{t-1} + \text{Undisclosed Adjustment}_t$$

(equation (1) in the text). Panel B restricts undisclosed adjustments to only positive adjustments. Panel C reports the log of carry-forward credits, measured in thousands of dollars.

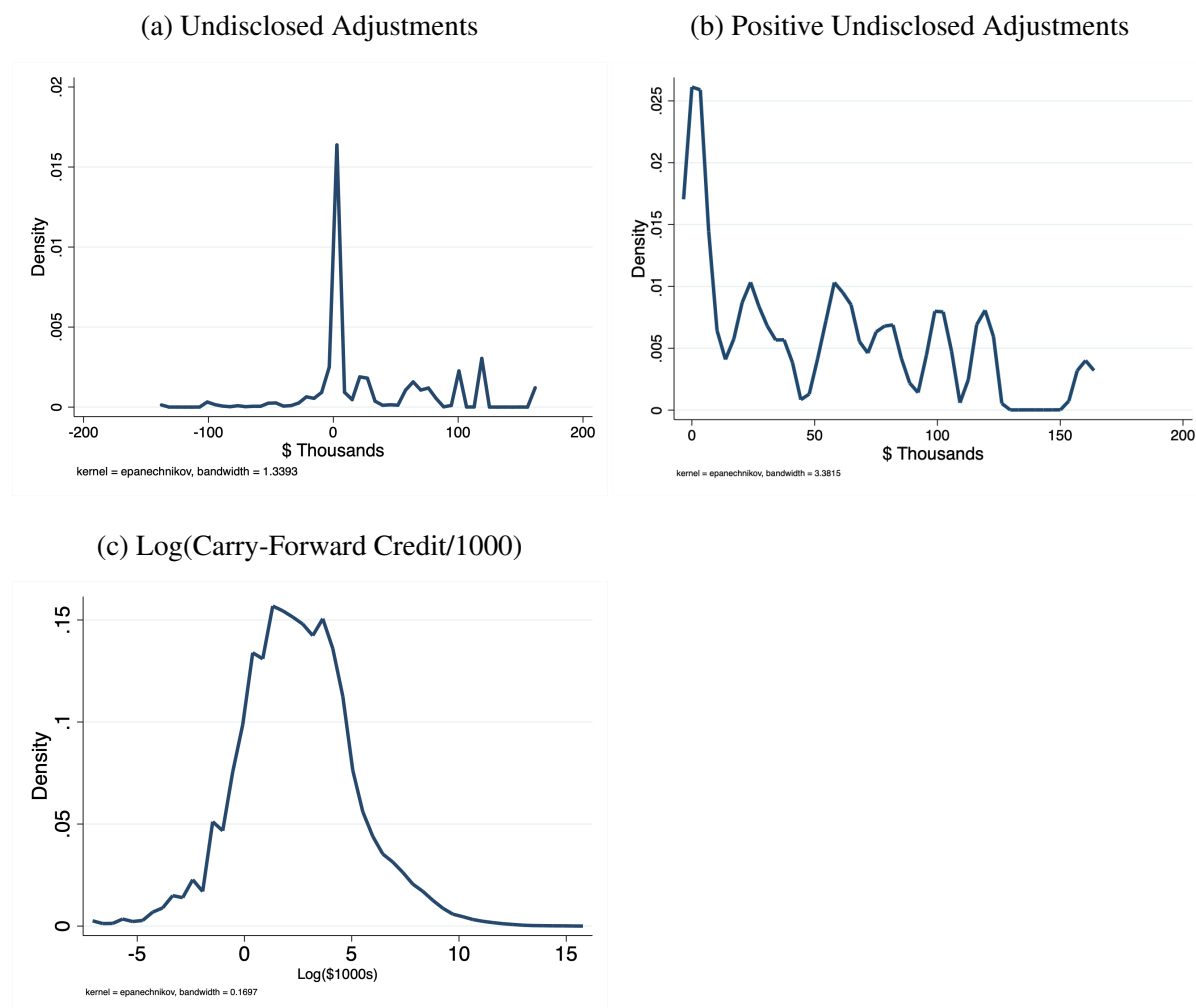


Table A.1
Summary Statistics: IRS Corporate Statistics of Income (SOI): Treatment Year

Table details mean values based on Form 1120 and Form 3800 for SOI Years 2000-2016. We detail relevant forms for Tax Year 2015. Taxable Income: Form 1120 Line 30. Total Assets: Form 1120 Schedule L 19d. Total Taxes Paid: Form 1120 Line 31. General Business Credits (GBCs) Claimed: Form 1120 Schedule J Line 5c. GBCs Earned: Form 3800 Part III Line 6, Box A and B. GBCs Carried Forward: Form 3800 Part III Line 6, Box C and F. Control firms in 2011 are those with a Tax Year ending July 1 2011 - Nov 30 2011. Treated firms in 2011 are those with a Tax Year ending Dec 1 2011 - June 31 2012. Both treatment and control firms are included in the 2011 SOI file. \$-Weighted Distribution is weighted by Gross Receipts.

	GBC Subsample			
	Full Population (1)	Full Sample (2)	Control	Treatment
			Tax Year End July–Nov (3)	Tax Year End Dec–June (4)
<i>Panel A: Firm Characteristics (\$ Thousands or Percents)</i>				
Gross Receipts	1,843	8,316	7,991	8,370
Taxable Income	57	420	323	437
Taxes Paid	17	126	95	131
Total Assets	1,962	10,758	7,724	11,262
Loss Share	46	28	23	29
Public	0.0	3	2	3
<i>Panel B: GBC Activity (\$ Thousands or Percents)</i>				
Claimed	3	40	31	41
Earned	4	51	44	52
Carry-Forward	9	90	45	97
N	1,385,780	222,995	28,618	194,377
Weighted N	27,187,024	1,539,536	229,043	1,310,492

Table A.2
Heterogeneous Impact of Newly Disaggregated Disclosure Requirements: 2011 Carry-Forward General Business Credits

This table reports the difference-in-differences specification of the form:

$$\log(Y_{i,t}) = \beta_0 + \beta_1 \text{Treated Firm} \times \mathbb{1}(2011) + \beta_2 \text{Treated Firm} + \beta_3 \mathbb{1}(2011) + \varepsilon_{i,t}$$

for firm i in year t across several subgroups. We report the coefficient of interest: β_1 . Panel A and B evaluate different dependent variables. Standard errors are clustered at the firm level to account for auto-correlated errors within firm over time.

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(10)
	Main	Pre-2011	Small	Big	Young	Old	Private	Public	Compliant	Aggressive
<i>Panel A: Log Carry-Forward General Business Credits</i>										
2011 × Treated	0.231 (0.0814)	0.241 (0.0827)	0.208 (0.0893)	0.393 (0.0904)	0.233 (0.115)	0.221 (0.102)	0.221 (0.0844)	0.705 (0.188)	0.156 (0.0553)	0.305 (0.261)
N	168,437	167,739	70,488	97,251	65,973	101,766	133,695	34,044	83,023	84,716
<i>Panel B: Carry-Forward General Business Credits (\$ Thousands)</i>										
2011 × Treated	13.0 (2.11)	13.5 (2.16)	3.48 (1.62)	63.2 (13.9)	14.5 (4.57)	11.1 (2.37)	8.14 (1.86)	114 (32.2)	3.83 (1.28)	34.7 (9.26)
N	168,437	167,739	70,488	97,251	65,973	101,766	133,695	34,044	83,023	84,716

Table A.3
Heterogeneous Impact of Newly Disaggregated Disclosure Requirements: 2011 Carry-Forward General Business Credits

This table reports the difference-in-differences specification of the form:

$$\log(Y_{i,t}) = \beta_0 + \beta_1 \text{Treated Firm} \times \mathbb{1}(2011) + \beta_2 \text{Treated Firm} + \beta_3 \mathbb{1}(2011) + \eta_t + \varepsilon_{i,t}$$

for firm i in year t across several subgroups. We report the coefficient of interest: β_1 . Panel A and B evaluate different dependent variables. Standard errors are clustered at the firm level to account for auto-correlated errors within firm over time.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(8)	(10)
	Main	Pre-2011	Small	Big	Young	Old	Private	Public	Compliant	Aggressive
<i>Panel A: Log Carry-Forward General Business Credits</i>										
2011 × Treated	0.262 (0.102)	0.272 (0.103)	0.224 (0.112)	0.496 (0.129)	0.473 (0.167)	0.193 (0.129)	0.245 (0.106)	0.772 (0.274)	0.161 (0.0802)	0.288 (0.290)
N	168,437	167,739	70,488	97,251	65,973	101,766	133,695	34,044	83,023	84,716
<i>Panel B: Carry-Forward General Business Credits (\$ Thousands)</i>										
2011 × Treated	15.1 (2.62)	15.7 (2.68)	3.09 (2.07)	77.8 (16.2)	18.2 (5.74)	12.4 (2.99)	9.04 (2.33)	127 (37.3)	4.32 (1.77)	41.9 (10.8)
N	168,437	167,739	70,488	97,251	65,973	101,766	133,695	34,044	83,023	84,716
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year × Treated Firm FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table A.4
2011 Impact on Extensive Margin of Undisclosed Adjustments: Saliency or Non-Compliance?

Column (1) uses cross-sectional variation in 2011 to estimate the extensive and intensive margins of undisclosed adjustments for the subset of firms that before 2011 did not have any undisclosed adjustments (compliant firms). The estimates in column (1) come from the specification,

$$Y_i = \beta_0 + \beta_1 \text{Treated Firm}_i + \gamma X_i + \varepsilon_i.$$

Columns (2)–(4) use variation across years and firms in a difference-in-differences specification. Column (2) reports estimates for firms that had undisclosed adjustments between 2001 and 2010 (tax aggressive firms). Columns (3) and (4) further refine this subset to firms in either above or below the median amount of undisclosed adjustments between 2001 and 2010. The estimates in these columns come from the specification,

$$Y_i = \beta_0 + \beta_1 \text{Treated Firm}_i \times \mathbb{1}(\text{Undisclosed Adjustments}(2011) > 0) + \beta_2 2011_t + \varepsilon_i.$$

Standard errors account for auto-correlated errors based on the within-firm transformation.

	(1)	(2)	(3)	(4)
	Compliant	Aggressive	Bottom	Top
<i>Panel A: Extensive Margin, $\mathbb{1}(\text{Undisclosed Adjustments} > 0)$</i>				
Treat × 2011	0.0275 (0.0108)	0.0114 (0.0303)	0.0123 (0.0248)	0.0124 (0.0678)
Firm Years	7,524	84,716	40,439	36,348
<i>Panel B: Intensive Margin, Undisclosed Adjustments (\$ Thousands)</i>				
Treat × 2011	-2.55 (3.42)	11.4 (6.23)	17.8 (8.30)	-4.53 (4.90)
Firm-Years	7,524	84,716	40,439	36,348
Cross-Sectional	✓			
Longitudinal		✓	✓	✓

Table A.5
2011 Impact on Extensive Margin of Undisclosed Adjustments: Saliency or Non-Compliance?

Column (1) uses cross-sectional variation in 2011 to estimate the extensive and intensive margins of undisclosed adjustments for the subset of firms that before 2011 did not have any undisclosed adjustments (compliant firms). The estimates in column (1) come from the specification,

$$Y_i = \beta_0 + \beta_1 \text{Treated Firm}_i + \gamma X_i + \varepsilon_i.$$

Columns (2) and (3) use variation across years and firms in a difference-in-differences specification. Columns (2) and (3) report estimates in subsets of firms in either above or below the median amount of undisclosed adjustments between 2001 and 2010. The estimates in these columns come from the specification,

$$Y_i = \beta_0 + \beta_1 \text{Treated Firm}_i \times \mathbb{1}(2011) + \beta_2 2011_t + \lambda_t + \varepsilon_i.$$

Standard errors account for auto-correlated errors based on the within-firm transformation.

	(1)	(2)	(3)
	Aggressive	Bottom	Top
<i>Panel A: Extensive Margin, $\mathbb{1}(\text{Undisclosed Adjustments} > 0)$</i>			
Treat \times 2011	0.0355 (0.0544)	-0.00705 (0.0368)	0.113 (0.140)
Firm-Years	84,716	40,439	36,348
<i>Panel B: Intensive Margin, Undisclosed Adjustments (\$ Thousands)</i>			
Treat \times 2011	13.9 (6.82)	18.0 (8.85)	6.25 (5.03)
Firm-Years	84,716	40,439	36,348
Longitudinal	✓	✓	✓
Year FE	✓	✓	✓
Firm \times Treated Year FE	✓	✓	✓