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2023

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Essays on the Responses to Taxation by US Firms

by

Michael Love

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Economics

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Alan Auerbach, Chair

Professor Aaron Edlin

Professor Emmanuel Saez

Spring 2023

Essays on the Responses to Taxation by US Firms

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Michael Love

Abstract

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Professor Alan Auerbach, Chair

Business taxation, by affecting the costs of certain behaviors of firms, owners, or their counterparties, can trigger potentially substantial changes in real activity, such as changes in inputs or production processes. But it can also prompt avoidance responses—such as legal restructuring or changes in tax reporting—that may have important effects on efficiency and distribution. Understanding such responses is thus critical for enacting efficient and well-informed tax policy.

In this dissertation I investigate the real and avoidance responses at the intersection of several important topics in businesses taxation, namely capital taxation, taxation of passthrough entities, international taxation, and corporate taxation. My research sheds new light on our understanding of US business taxation by employing a variety of empirical methods to (1) develop new explanations for persistent puzzles in the literature, (2) fill knowledge gaps in the current body of business tax research, and (3) draw attention to new issues that have so far received little attention by public finance economists.

In Chapter 1, I investigate financing and investment responses by corporations to a change in capital taxation, presenting results that help resolve an existing conflict among empirical findings in the public finance literature. I estimate that dividend taxes, by impacting the cost of equity financing, have large effects on the financing, investment, and real outcomes of many US public firms. But—in contrast with economists’ longstanding focus on capital investment outcomes—I find these responses are mostly from smaller, cash-constrained firms through “non-capital” investment channels: R&D and operating expenditures. Exploiting a quasi-experiment that tracks financing and expenditure responses to the 2003 dividend tax cut, I estimate a large, immediate, and sustained increase in average equity financing (+86% ± 11%) by these firms, reflecting a high elasticity to the cost of capital. Responsive firms put the cash substantially toward operating expenditures and R&D, rather than tangible investment. I also find higher job growth and long-run sales among the responsive firms. These results make sense, reconciling mixed evidence in recent research: because dividend

taxes affect the cost of equity financing, the firms impacted most are those that actually rely on equity financing—smaller, often unprofitable, less capital-intensive firms who invest heavily in “non-capital” pathways.

In Chapter 2, I describe and estimate tax avoidance behavior that uses complex entity structures involving partnerships and tax havens to exploit discrepancies in tax treatment of capital income across jurisdictions. I also address a significant missing piece of knowledge in the public finance literature: where partnership income goes. Partnerships are the fastest growing class of business entity in the United States and represent over one third of reported business income, but due to their legal complexity, data quality, and opaque nature economists have not yet been able to identify where a sizeable portion of this income goes. In this paper, I use US federal tax records from 2005-2019 to compile a comprehensive analysis covering 99% of the income flowing to the owners of partnerships. I find that a much larger portion goes to foreign owners than previously thought, and that most of this amount goes to tax havens—over \$1 trillion since 2011. The majority of these flows likely face zero tax in either the US or in the tax haven. The evidence I present suggests a prevalent use of entity arrangements by investment firms that shield investors from tax and reporting through “blocker structures,” predominantly in the Cayman Islands. Evidence also suggests a substantial increase in income reported after the enactment of Foreign Account Tax Compliance Act (FATCA).

In Chapter 3, I investigate the degree to which corporations can manipulate their accounting of expenses to avoid taxes, and what effects this has on the corporate tax base. The investigation exploits a unique corporate tax reform in Texas that replaced a 4.5% profits tax with a broader 1% gross revenue tax and that eliminated almost all deductions, but still permitted corporations to deduct one of two categories of expenses: cost of goods sold (COGS) or total worker compensation. Data from federal corporate income tax returns makes it possible to estimate the effects of the reform, as data are consistent across years and harmonized across states. Strong evidence reveals a very large avoidance response for COGS but not for compensation: corporations reduced the tax base roughly 4% by reclassifying non-deductible expenses into COGS (with a large elasticity of roughly -5 ± 1), but there is little reclassification into compensation. These findings reveal the potentially very large but also highly context-specific nature of accounting reclassification responses. Given that numerous states have some form of gross receipts tax and that there is currently wide discussion of measures to broaden corporate tax bases by incorporating accounting measures, these findings offer important considerations for policymakers and tax authorities when designing, scoring, and enforcing corporate tax changes.

To my Classmates,
for teaching me,
challenging me,
and bringing out the best in me.

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Acknowledgments

Pursuing a Ph.D. at UC Berkeley has been an amazingly positive and fulfilling experience for me. But such a fortunate result was only possible due to the care, dedication, and support of my mentors, colleagues, friends and family.

First and foremost, thank you to Alan Auerbach, my advisor. No words adequately capture the measure of my gratitude for his generosity, wisdom, trust, and advocacy throughout the past four years. I cannot thank him enough for his time and attention that he offered so unconditionally, listening to and thoughtfully commenting on my ideas, or providing guidance in a pinch on short notice. Just as importantly, I thank him for his trust and support, which were instrumental in more ways than I can count in making my current career possible. And I will always appreciate his wisdom and perspective, providing guidance to navigate challenging situations and make the most of my short time in the program.

I also cannot thank enough Aaron Edlin, who is responsible more than anyone else for making possible my dual track as a scholar of both law and economics. His kindness and generosity are reflected not only in his willingness to supervise my independent studies, but also in his eagerness to work alongside me as a coauthor. I have learned more than I can articulate from our time together, from the technical (working through models), to the managerial (working with research assistants), to the practical (navigating my career), to the artistic (appreciating better writing). Aaron has been my fiercest advocate, and I am forever indebted to him for his support. I also have sincerely enjoyed our conversations, and will look back fondly on our brainstorming sessions.

I am as well indebted and grateful to Emmanuel Saez. Emmanuel's devotion to his mentees is unparalleled, and I have learned more about public economics from him than anyone. Our weekly sessions for third-year public finance students, which Emmanuel led voluntarily, were the single most instructive activity in my economics career. His advice is sharp and to-the-point, and my research is immeasurably better after learning from him. I only hope I can offer as helpful feedback to others going forward.

But perhaps the folks most instrumental in making my experience at Berkeley so positive were my classmates. I am blessed to say that my classmates are the embodiment of sincerity, kindness, and compassion. They are also brilliant. I am lucky to call them friends, and I look forward to working alongside them as we progress through our careers.

Although I am grateful to all of my classmates, several stand out in helping this dissertation come to fruition. I thank Jacob Weber, Vitaliia Yaremko, Joan Martinez, and Jianlin Wang for being the best study group one could hope for. I thank Cristobal Otero for his encouragement early on in what ultimately became my job market paper. I thank Damian Vergara for being the most generous classmate one could ask for. I thank Maximiliano Lauletta, Sreeraahul Kancherla, Patrick Kennedy, Jakob Brounstein, Monica Saucedo Hernandez, Niklas Flamang, and Billy Morrison for their invaluable feedback. I also thank Hadar Avivi for being the best officemate one could hope for, helping me stay motivated to work hard late into the evening after everyone else had left at a sane time.

I am also grateful to the Joint Committee on Taxation and my colleagues there. It has been the honor of a lifetime to serve Americans by conducting data work to provide new insights on such important topics. I am grateful for Tom Barthold and Rob Harvey for their trust and support to carry out the task. As well, the teamwork with my colleagues has been deeply rewarding, and the research would not have been possible without the combined efforts of many. I am especially thankful to Jacob Mortenson, who has been a phenomenal mentor, ally, and coauthor. I am also grateful to have worked alongside Eric Heiser, whose skill with data is simply incredible. I am likewise especially thankful for support, mentorship, and guidance from Nick Bull, Tim Dowd, Carol Wang, Jeff Arbeit, and Cecily Rock.

Numerous others at Berkeley were instrumental in my progress to this point. I thank Danny Yagan for his unyielding support and incisive feedback. The dissertation would not have been possible without his thoughtful commentary. Likewise, I thank David Sraer for pushing me to simplify and hone my approach, advice that proved critical in producing the final product. I am likewise grateful the time and advice of Ulrike Malmendier, whose feedback helped me refine and focus my efforts.

I am also especially grateful for the devotion and support of Christina and David Romer. Their encouragement and advice early in my time at Berkeley laid the foundation for many projects to come, helping me find the direction that ultimately became my research portfolio.

I thank as well Mark Gergen, whose knowledge of partnerships is inspiring, for his encouragement to pursue research in the area. I also thank Bobby Bartlett, Adam Badawi, Jonah Gelbach, and Robert Cooter for their advice and support.

There are also several mentors who were instrumental in my development before arriving at Berkeley. First and foremost, I will forever be indebted to Larry Katz and Claudia Goldin, who have supported me at every step of my career. I have learned so much from them, and though I can never hope to pay them back, I aim to honor their generosity, devotion, and faith in me by being the best teacher, mentor and scholar I can be going forward. I am also immeasurably grateful to Ian Ayres, not only for his consistent support as I progressed through law school, but also for his wisdom and guidance on entering academia. Finally, I am humbly grateful to Scott Adams, my mentor at the Council of Economic Advisors, who has been a champion for me ever since.

I am grateful as well to the Burch Center and the Center for Law Economics and Politics at Berkeley. They provided generous financial support that allowed me to become a more productive scholar.

Finally, I thank my family and friends. You were there for me throughout the ups and downs—and through the lockdowns—and I could not have made it without the stability, care and companionship you offered so unconditionally.

In the end, this dissertation is far from a solo endeavor. It is the product of dedication from a large team. For that I am forever grateful. Thank you all.

Chapter 1

Equity Financing, Dividend Taxes and Investment

1.1 Introduction

Do dividend taxes, by reducing the after-tax returns to owners and investors, discourage businesses from undertaking new investments? For more than half a century, economists investigating this question have focused almost exclusively on capital investment responses, offering conflicting predictions, results, and conclusions (Modigliani and Miller, 1958; King, 1974; Poterba and Summers, 1983; Fazzari et al., 1987; Sinn, 1991; Devereux et al., 1994; Auerbach and Hassett, 2003, 2006, 2007; Korinek and Stiglitz, 2009; Chetty and Saez, 2010; Becker et al., 2013; Yagan, 2015; Alstadsæter et al., 2017; Moon, 2019; Boissel and Matray, 2019).

In this paper, I show that this longstanding focus on capital investment misses what are likely the most important real effects of dividend taxes. I present evidence of large, sharp, and sustained financing and investment responses to the 2003 dividend tax cut by many US public firms, but through “non-capital” investment pathways: R&D and operating expenditures. Not only do these findings uncover what appear to be broad and powerful effects, but more importantly they (a) intuitively track the mechanisms through which dividend taxes affect real firm outcomes, (b) offer insights about how firms respond to shocks affecting the cost of equity financing, and (c) provide a coherent resolution to ongoing debates in the literature.

What is the intuition for looking beyond capital investment? Two reasons. First, rather than affecting the cost of any particular investment, dividend taxes primarily affect the financing opportunities of firms that actually use equity financing. Dividend taxes create a “wedge” that reduces returns to equity, forcing shareholders to demand higher pre-tax returns. This raises the cost of equity financing relative to other sources, as potential investors now require larger stakes in the company to achieve the same expected return. At some point this extra dilution precludes financing and investment that would otherwise occur under a lower tax.

Second, equity financing (as opposed to debt financing) tends to be especially well-suited for firms that are less capital-intensive and more engaged in intangible investment, given their lack of available tangible assets for debt collateral, their uncertain cash flow, and the more speculative nature of their long-run prospects (Hall and Lerner, 2010; Brown et al., 2012; Hsu et al., 2014; Hall, 2002). Likewise, ample evidence suggests that R&D and intangible investment are sensitive to the availability of equity financing (Brown, Fazzari, and Petersen, 2009; Czarnitzki and Hottenrott, 2011; Hoberg and Maksimovic, 2015; Amore, Schneider, and Žaldokas, 2013).

In light of these two observations, I take a different approach than prior empirical investigations of payout taxes. Viewing the 2003 dividend tax cut as a shock to the cost and availability of equity financing—rather than to the incentives for capital investment directly—two clear hypotheses emerge. First, firms who use (or might use) equity financing should issue more stock after the tax cut. Second, a lot of this extra cash should be put toward productive uses other than tangible capital investments.

To test these hypotheses I use Compustat quarterly data on US public firms across a 26 year period from 1991 through 2017. Compustat is the best dataset for several reasons. First, the data can be linked to quarterly filings, which provide rich qualitative discussion about firm financing and expenditure decisions. As well, the quarterly frequency is essential to observe firm financing decisions in response to particular financial states—annual administrative data is too infrequent. Finally, the Compustat data include detailed balance sheet and cash flow statement information, which is critical for tracking where cash is spent.

To identify the effect of the 2003 tax cut on equity financing, I exploit a natural experiment inherent in the policy change. I utilize the fact that most US public firms (79%) issue stock every year for a variety of purposes, some of which are incentivized by the tax cut but others are not. For example, public offerings, private placements and other stock-for-cash sales are incentivized by a dividend tax cut for the reasons discussed above: the smaller tax “wedge” allows investors to enjoy higher after-tax returns and allows companies to raise more cash with less share dilution. On the other hand, equity issuance for mergers and acquisitions (M&A) is *not* incentivized by the tax cut.

The logic, as modeled formally in Section 1.3, can be summarized here succinctly. In a stock-for-stock M&A transaction, one company (the acquiror) acquires another company (the target) by issuing new stock to the target shareholders. In essence the acquiror is “buying” the target company not with cash, but with its stock. But in this case, the asset the acquiror is buying is *also* affected by the dividend tax cut. Thus, the incentive created by a dividend tax cut for the acquiror to issue more equity is offset by the increased after-tax value of the equity of the target, counteracting the incentive of potential acquirors to issue more equity.

With these incentive effects in mind, I isolate two sets of firms to serve as comparison groups for this investigation. The first group is comprised of firms that are in a state where they enjoy high marginal value from extra cash raised from stock issuance (i.e., firms who use or might use equity financing), and thus should be sensitive to the cost of equity financing. I refer to these firms as the “Cash Short” firms, as they have productive investment

opportunities but need cash. The second group is comprised of firms in a state where they are likely to issue equity for M&A, and so I likewise refer to these as the “High M&A Issuer” firms. I empirically separate these two groups by drawing on indicators from the finance literature and prediction models, using a battery of alternative specifications to ensure robustness. In general, the Cash Short firms tend to be smaller (median \$12m total assets) and unprofitable, with low and precarious cash flow. They tend to be more heavily engaged in R&D and less capital intensive, and they constitute about 36% of observations over the sample period. By contrast, the High M&A Issuer firms are much larger (median \$750m total assets), very profitable, and more capital-intensive. They constitute about 18% of observations.

Both the Cash Short and the High M&A Issuer firms issue a great deal of equity pro-cyclically, but while the former should be encouraged to issue extra equity by the dividend tax cut, the latter should be largely unaffected. Thus, the identifying assumption is that the two groups would have experienced parallel trends were it not for the dividend tax cut. As seen in Figure 1.1, there are remarkably stable pre-trends in equity issuance throughout the 12 years preceding the dividend tax cut, followed by a break immediately after the tax cut, with a sustained separation throughout the 14 years thereafter.

I estimate that the Cash Short firms exhibited a sharp 86% ($\pm 11\%$) increase in equity financing on average after the 2003 dividend tax cut, raising approximately \$132bn ($\pm \64 bn) in extra cash through 2017.¹ I also estimate a large elasticity of equity financing to the cost of capital of -3.7 (± 1.8), the first estimate of this parameter to my knowledge.² I find that these responses are extremely robust: although magnitudes vary, the overall results are remarkably resilient to changes in the definitions of the comparison groups, the addition of controls, and changes to the regression specification. Overall, I find the strongest financing responses are among firms that are smaller, unprofitable, rely more on equity financing, and exhibit low capital intensity. The most responsive firms tend to be concentrated in a combination of “high-tech” industries (chemicals, computers, telecom, electrical components), health tech (pharmaceuticals, medical equipment), low-tangible asset industries (business and personal services), and industries with speculative outcomes (oil & gas).

How do these Cash Short companies appear to spend this extra cash? After accounting for firm size, I find that responsive firms appear to have put substantial portions of the extra capital they raised toward R&D (40%) and operating expenditures (54%), rather than tangible investment (approximately 1%).³ If one treats a portion of firms’ Selling, General, and Administrative (SG&A) expenses as intangible investment (as in Peters and Taylor, 2017, who use a 30% allocation), then the share attributable to intangibles increases to 46%.

¹Note that the estimate for aggregate effect is noisier because it is sales-weighted. The point estimate for the percentage increase reflects a response by the average Cash Short firm.

²Note that this is an estimate for an aggregate financing response. The average response across firms is larger, as discussed in Section 1.6, reflecting how smaller, more cash-constrained firms exhibit a larger response.

³Note that this is not a reflection of aggregate dollar amounts across all Cash Short firms, but rather a measure of how the responsive firms were, on average, allocating the extra capital.

These investments appear to be productive, as I also find sharp increases in both average employment growth ($+10\text{pp} \pm 2\text{pp}$) and average longer-run sales ($+26\text{pp} \pm 10\text{pp}$) among Cash Short firms beginning immediately after the dividend tax cut, again sustained over the post-reform period. This result is consistent with previous findings that early access to funding for intangible investment can have strong positive longer-run effects (Howell, 2017).

These findings have important implications both economically and for policy design, by revealing how firms respond to a tax shock that affects the cost and availability of equity financing. In short, I find that firms with investment opportunities that would benefit from extra equity financing, but that are constrained from raising capital due to financing frictions and taxes, respond strongly to the reduced cost of equity capital. But this only describes a subset of firms, and these do not include the giants that constitute the bulk of corporate economic activity like Exxon, AT&T, Walmart, or General Motors.⁴ Rather, because of the nature of equity financing and the types of firms that find it worthwhile, a shock to the cost of equity capital will affect firms such as small medical device manufacturers, pharmaceutical companies, software developers, clean tech firms, and business service firms. Thus, payout tax cuts—which may indeed have merit for other policy goals, such as reducing distortions to improve efficiency in financing and investment decisions overall—are not a well-targeted tool for stimulating new investment, particularly capital investment. As well, because this evidence highlights the existence of a market failure that undercuts investments by cash-constrained firms, there are likely better-targeted tax policies to address these concerns, such as a refundable qualified investment tax credit.

My findings contribute to several important areas of ongoing research. The most straightforward of these contributions is to the literature investigating the effects of shareholder taxation on firms, by revealing sizeable financing and real responses to the 2003 dividend tax cut. This paper thus addresses an unsettled debate among public economists about how the “Traditional View” and “New View” models of dividend taxation apply in practice, where the former predicts that dividend taxes discourage investment by making equity financing more costly (Harberger, 1962; Feldstein, 1970; Poterba and Summers, 1984), while the latter predicts that firms will largely be unaffected (King, 1977; Auerbach, 1979; Bradford, 1981). Recent empirical research has yielded mixed results: while a lack of capital investment response to the 2003 dividend tax cut appeared to support the New View (Yagan, 2015), research in international settings suggests sizable real responses to shareholder tax changes, in line with the Traditional View (Becker et al., 2013; Alstadsæter et al., 2017; Moon, 2019). My investigation helps coherently reconcile this apparent conflict. In line with the predictions of Auerbach and Hassett (2003), I clearly find that firms respond disparately depending on their marginal source of funding. Also, the magnitudes and the types of firms responding align closely with recent evidence supporting the Traditional View.⁵ Hence, my

⁴Although fewer than 1 percent of US corporations have more than \$100 million of annual gross receipts, these companies pay roughly two-thirds of corporate salaries, collect three-quarters of corporate receipts, and own over 90% of corporate depreciable assets. IRS Statistics of Income: Corporation Income Tax Returns Complete Report, 2018 Tables 2.1 and 3.1.

⁵Moon (2019) confirms a much stronger response by cash-constrained firms.

results highlight the importance of identifying the mechanisms through which the dividend taxes affect firm outcomes, and using this intuition to identify the firms likely to respond.

My results also speak to literature on equity financing and capital structure, specifically to questions regarding which firms issue stock and why (Fama and French, 2005; DeAngelo et al., 2010; Huang and Ritter, 2021) how policies impact issuance decisions (Gustafson and Iliev, 2017), and how costs of financing impact capital structure (Myers and Majluf, 1984; Myers, 2001; Frank and Goyal, 2003; Baker and Wurgler, 2002; Frank and Goyal, 2008; Graham and Leary, 2011), especially through the effects of tax policy (Doidge and Dyck, 2015; Heider and Ljungqvist, 2015; Graham, 2000; Lin and Flannery, 2013). The paper also speaks to literature on financing constraints (Fazzari et al., 1987; Kaplan and Zingales, 1997; Whited and Wu, 2006; Hadlock and Pierce, 2010; Farre-Mensa and Ljungqvist, 2016) by investigating specifically how cash-constrained firms respond to a shock affecting the cost and availability of equity financing. In particular, this paper makes a contribution to this literature by estimating an elasticity of equity financing to the cost of capital for Cash Short firms.

Finally, this paper contributes to a rapidly growing literature on the importance of intangible investment, and how that investment is affected by the availability of financing. Intangible investment is growing in importance in the economy, becoming an increasingly large part of overall corporate investment (Corrado and Hulten, 2010; Corrado et al., 2012; Haskel and Westlake, 2017; Falato et al., 2020). Unlike tangible capital, which is well suited for debt financing, R&D and other intangible investment is often financed with equity because it has uncertain prospects and offers little collateral value, but yet has a potentially lucrative payout (Hall and Lerner, 2010; Hsu et al., 2014). This project thus builds on empirical research on R&D and intangible investments by firms, particularly how taxes impact these activities (Gale and Brown, 2013; Rao, 2016; Mukherjee et al., 2017; Brown et al., 2017; Guceri and Liu, 2019; Agrawal et al., 2020; Akcigit et al., 2022). It also contributes to literature highlighting the importance of the availability of equity finance for the funding of intangible investment (Brown et al., 2009, 2012; Acharya and Xu, 2017; Hottenrott and Peters, 2012), in particular by offering new evidence regarding the impact of a broad financing shock on intangible investment outcomes.

1.2 Background on the Tax Cut

The Jobs and Growth Tax Relief and Reconciliation Act (“JGTRRA”) was enacted on May 23, 2003. The concept was first introduced by President Bush on January 7, when he proposed a complete elimination of the double-taxation of distributed corporate profits (at which point he contended that the tax cut would “provide capital” for businesses “to build factories” and “to buy equipment,” following the predictions of traditional models for capital investment).⁶ The proposal was unanticipated, and the ultimate passage of the law was far

⁶President Bush’s Remarks to the Economic Club of Chicago in Chicago, Illinois. January 7, 2003. *Public Papers of the Presidents of the United States*.

from certain even in its modified compromise form, justifying the use of the tax cut as an instrument for the effect of dividend tax cuts in many studies since then.⁷

Prior to JGTRRA, dividends were taxed as ordinary income. JGTRRA changed this by taxing dividends instead at the long-term capital gains rate, which was also reduced by the new law (from a top rate of 20% to 15%).⁸ The change was retroactive to January 1, 2003. The exact rate reduction was determined by the type of recipient: for tax-exempt investors, foreign investors, and corporations there was no effect, but for US individuals the rate reduction depended on their taxable income. For all computations of elasticities, I follow Yagan (2015) in using the rate change estimated by the OECD: a reduction from a top combined rate of 44.7% to 20.8%, after factoring state and local taxes as well.⁹

The shareholder tax rates established in JGTRRA were originally set to expire on January 1, 2008, but they were subsequently extended in 2005 and 2010, and made permanent in 2012.¹⁰ And while JGTRRA represents the most substantial shareholder-level tax reform in decades, it is not the only one. Several other federal tax laws affecting dividend and capital gains rates were enacted during my 26-year investigation period, but all of these were much smaller in magnitude, were generally more anticipated, and received much less public attention than the dividend tax cut in JGTRRA.¹¹

Other important law changes occurred contemporaneously in 2003. First, JGTRRA also included investment tax incentives targeting small businesses (increasing bonus depreciation and expensing caps), which I consider as a confounding factor that could cause an upward bias in my (already quite low) estimates of effects on capital expenditure during the 2003-2008 period.¹² Another important contemporaneous law was the Medicare Prescription Drug, Improvement, and Modernization Act of 2003, enacted in December of that year: it subsidized the pharmaceutical industry with new regulations and through the establishment

⁷See Auerbach and Hassett (2007) for the discussion of the timing and unanticipated nature of the tax cut.

⁸Note that to be taxed at the lower rate, the dividend must be “qualified” dividends. Generally this requires the dividends be paid by US corporations or corporations traded on a US stock market, and that the shareholder meets a 60-day holding period requirement.

⁹See OECD Tax Database Table II.4 (<http://www.oecd.org/tax/tax-policy/tax-database.htm>).

¹⁰The rates were extended until January 1, 2011 by the Tax Increase Prevention and Reconciliation Act of 2005, until January 1, 2013 by the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010, and made permanent by the Middle Class Tax Relief and Job Creation Act of 2012.

¹¹The Taxpayer Relief Act, enacted August 5, 1997, reduced the top marginal capital gain rate from 28% to 20%. The Patient Protection and Affordable Care Act, enacted March 23 2010, added a 3.8% surtax to the net investment income of high-income individuals, applying to dividend and capital gain income beginning on January 1, 2013. The American Taxpayer Relief Act of 2012, which primarily raised the ordinary income tax rates on high earners (which received most of the attention leading up to its enactment) raised the long-term capital gain and dividend tax rate on the highest bracket from 15% to 20%.

¹²The bonus depreciation provisions permitted an additional first-year depreciation deduction equal to 50% of the adjusted basis for certain qualified property, generally tangible property and improvements. The business expensing provisions raised the expensing cap from \$25,000 to \$100,000 for qualifying property (generally tangible property used in the ordinary course of business, as well as computer software). See Joint Committee on Taxation, 2005. *General Explanation Of Tax Legislation Enacted In The 108th Congress*.

of Medicare Part D. I perform robustness tests excluding pharmaceutical companies to ensure that my results are robust to any contamination from this policy change.

1.3 Theoretical Framework

Dividend taxes are predicted to affect investment outcomes by reducing returns to shareholders, in particular by distorting the cost and availability of equity financing. But the presence or absence of these distortions depends on the firm’s marginal source of financing—or, more precisely, whether the firm has a high marginal value of extra cash from equity financing.

On the one hand, “Cash Short” firms may experience quite large incentive effects for additional equity financing and investment after a dividend tax cut. These are firms who have productive investment opportunities and have a high marginal value of extra cash from equity financing, but are constrained in part by a high dividend tax. This outcome is predicted by the Traditional View. On the other hand, there should be no effects if a firm has low marginal value from extra equity financing, and instead relies on retained earnings to finance its investments. This outcome is predicted by the New View.

This framework, although appealing in its simplicity, poses a significant empirical challenge: if New View firms aren’t engaging in equity financing in the first place, how can they serve as a comparison group to identify and estimate the effects of a dividend tax cut on Cash Short firms, whose issuance patterns are highly procyclical? I overcome this challenge by extending the theoretical framework to “High M&A Issuers:” firms with low marginal value for equity financing (like New View firms) but who still tend to engage in stock-for-stock M&A, and thus issue a great deal of equity procyclically. The circumstances of M&A create incentives similar to New View firms, so that these firms should not experience incentive effects from a dividend tax cut, thus providing a valid comparison group for analysis.

In this section I formalize these predictions in a simple single-stage model, based on Becker et al. (2013) and Alstadsæter et al. (2017).

Model: Two Classic Views of Dividend Taxation

Consider a firm that faces an investment opportunity, and the owner must decide now (in t_1) whether to pursue the opportunity, and if so, how to finance it. The investment requires some amount of cash I , and will generate (in expectation) an amount $I + \pi(I)$ in period t_2 , where the amount $\pi(I)$ is the discounted profit after corporate income tax.¹³ Assume that the firm will pay out all profits to its shareholders as dividends in t_2 , where dividend income is taxed at the rate τ_d . Note that only the profit $\pi(I)$ is taxed, and not the return of capital I .¹⁴ Assume further that if the firm owner chooses to pursue the investment opportunity,

¹³Note this framework is intentionally flexible to accommodate both continuous and discrete investment opportunities.

¹⁴As defined in IRC §316, only distributions from a firm’s current or accumulated earnings and profits constitute taxable dividends.

the owner may finance the chosen amount I either with retained earnings R or with equity financing E . Finally, assume that investors have an opportunity cost of capital ρ , equal to the generic after-tax return achieved by investing in competitive capital markets. Will the owner pursue the opportunity, and if so, how will it be financed?

Consider two cases, where the firm relies on different sources of funding. In the first case, assume that the firm has a high marginal value of the extra cash raised from equity financing—in other words, that the firm’s marginal source of funding is equity financing, thus corresponding to the Traditional View. For this firm, the return on the investment will be subject to the dividend tax upon the payout in t_2 , and so the after-tax dividend to shareholders will be $(1 - \tau_d)\pi(E)$. As a result, the investment will only be undertaken so long as:

$$(1 - \tau_d) \frac{\partial \pi(E)}{\partial E} > \rho \tag{1.1}$$

If the dividend tax is cut to $\tau'_d < \tau_d$, the pre-tax return required to satisfy this first order condition is thus lower. Hence, for these firms whose marginal source of funding is equity financing, a dividend tax cut is predicted to prompt additional equity issuance to finance extra investment.

How much extra equity issuance? The answer depends on the profit function $\pi(I)$, which in turn is dictated by the nature of the investment opportunity and the firm’s circumstances. In Appendix A.1 I generate a simple numerical example demonstrating that even with a simple profit function the increase in equity issuance from a dividend tax cut could be very large, easily more than doubling the equity issuance by the firm.

Note that any firm with sufficiently high $\frac{\partial \pi(E)}{\partial E}$ will find it profitable to take advantage equity financing. But if $\frac{\partial \pi(E)}{\partial E}$ is low, the firm will not. This could be because the firm lacks investment opportunities or because the firm has access to other preferred sources of funding.

Now, return to the firm above, but assume that its marginal source of funding is retained earnings, thus corresponding to the New View. Retained earnings are a preferred source of investment financing from a tax perspective, because they represent “trapped equity” within the firm that will be subject to a dividend tax whether they are distributed in t_1 or reinvested and paid out in t_2 . Moreover, issuing additional equity would cause the firm owners to dilute their return on any investment, which is unnecessary if the firm has sufficient cash reserves available. Thus, a firm with a great deal of retained earnings held as cash has a low $\frac{\partial \pi(E)}{\partial E}$.

In this case, because the equity is trapped and is ultimately subject to the dividend tax, the firm will only reinvest the retained earnings so long as:

$$(1 - \tau_d) \frac{\partial \pi(R)}{\partial R} > (1 - \tau_d)\rho \quad \text{or, equivalently,} \quad \frac{\partial \pi(R)}{\partial R} > \rho \tag{1.2}$$

The dividend tax has no impact on the reinvestment decision, as the two terms cancel out. Likewise, a tax cut to τ'_d also has no effect.

At first, it might seem that the New View firms offer an appealing comparison group against the Traditional View firms to identify the effect of a dividend tax cut. However,

they are actually quite problematic because they are not predicted to issue equity in the first place. What would be ideal is a group that issues a great deal of equity procyclically, but whose issuance and investment decisions should not be affected by the dividend tax cut. I discuss such a group below.

Extending the Model to M&A

The model above only contemplates equity issuance in the form of stock sales to raise cash. But this is far too narrow. In reality, a significant majority of public firms (79%) issue equity every year in a variety of forms, ranging from public offerings and private placements to stock compensation, option and warrant exercises, securities conversions, and M&A. In each case, stock is being exchanged for some other item of value, whether it's cash, labor, elimination of debt, or interest in another company. The incentive effects of a dividend tax cut depend on the details of this exchange.

The Traditional View framework applies to many of these types of equity issuance. Ultimately, its predictions apply when stock is being exchanged for an asset or service that is not directly affected by the dividend tax cut.¹⁵ In each such case, the dividend tax cut raises the value of the stock relative to the item for which it is exchanged, incentivizing the exchange from the firm's perspective. Thus, the predictions apply not only to stock issuance intended to raise cash (e.g., public offerings, private sales, equity financing facilities, etc.), but also to many other types of issuance including stock as payment (e.g., to settle debts) or employee compensation. The predictions generally apply as well to options and warrants: following the formula of Black and Scholes (1973), the value of options and warrants rises

¹⁵“Direct” because the model does not attempt to account for dynamic general equilibrium effects.

after a dividend tax cut.¹⁶ The application is more complex for securities where a significant portion of the value is attributable to their non-equity aspects, such as convertible bonds or preferred stock. Fortunately, these latter securities make up only a small portion of the equity issuance observed in this study.

The incentive effects are quite different for M&A, however. In contrast with the Traditional View, a dividend tax cut should have minimal effects on overall equity issuance for M&A. The logic is similar to that of the New View: in a merger, the invested capital is also “trapped equity” that will be subject to the dividend tax regardless of whether the merger occurs, and so a dividend tax has no effect on issuance or investment incentives, *ceteris paribus*. The logic is explained below.

M&A can take many forms, but in essence all forms have a common economic structure: the shareholders of the acquiring company compensate the shareholders of the target company in exchange for their interest in the target company. This exchange is typically done in one of two ways: the acquiring company can pay the target shareholders in cash (a “cash merger”), or the acquiring company can issue new shares to the target shareholders, so that they become minority shareholders in the resulting combined company (a “stock-for-stock” merger). Stock-for-stock M&A by public firms represents a very large, highly cyclical amount of equity issuance.

In a stock-for-stock merger, the target shareholders act a bit like investors in the acquiring company: rather than contributing cash in exchange for stock of the acquirer, they are contributing the value of their business. Note that this value not only includes existing

¹⁶By warrants, I refer to securities sold by the firm (or tacked on to another transaction as a sweetener) that endow the holder with a right to purchase common shares at a pre-defined exercise price before an expiration date. Options are assumed to have similar terms, but are often awarded as executive compensation rather than sold to investors.

The price of an option can be modeled in a simplified way following Black and Scholes (1973):

$$C = S \cdot N(d_1) - X e^{-r \cdot t} \cdot N(d_2) \quad \text{where} \quad d_1 = \frac{\ln(S/X) + t \cdot (r + \sigma^2/2)}{\sigma \sqrt{t}} \quad \text{and} \quad d_2 = d_1 - \sigma \sqrt{t}$$

where C is the market value of the call option, S is the price of the underlying security, X is the exercise price, t is the time to expiration, r is the risk-free rate, σ^2 is the variance of the rate of return on the underlying security, and $N(d_1)$ is the cumulative normal density function evaluated at d_1 .

The variance of the rate of return on the stock will increase after the dividend tax cut because only distributions from earnings and profits are taxed as dividends. Thus, the distribution is wider in profitable states but unchanged in unprofitable states. Thus the market price of the option rises and enables the firm to sell the warrant for a higher price, raising more capital.

Note as well that these incentives may be attenuated or exacerbated by certain technical aspects of warrants or options, such as the interplay between the recognition of ordinary income by the investor and the offsetting deduction available to the firm. In a state where the warrants are exercised in the money, the firm enjoys an influx of capital equal to the exercise price while the investor recognizes ordinary income on the spread. The firm may also take a deduction for the amount of ordinary income recognized by the investor, which may not be of value if the firm is unprofitable. (Note that the trade-offs are different for qualified options, but these constitute the minority of options.) Thus the warrant represents a trade-off: on the one hand, this is less cash value to the firm upon exercise than if the firm had sold new stock at that time, but on the other hand the firm received some capital sooner.

assets, but also expectations of future profits. Importantly, this value is “trapped equity” because it is still within the target company, and thus all future profits will be subject to the dividend tax. Thus, the situation is similar to the New View, except that in this case the trapped equity is being invested by target shareholders, rather than being drawn from retained earnings.

If we assume that the target shareholders expect a pre-dividend-tax return of ρ on their interest in the target company, and if the acquiring company must issue some amount of equity E to compensate the target shareholders for their interest in the company, then the first order condition can be written as:

$$(1 - \tau_d) \frac{\partial \pi(E)}{\partial E} > (1 - \tau_d) \rho \quad \text{or, equivalently,} \quad \frac{\partial \pi(E)}{\partial E} > \rho \quad (1.3)$$

Note that this is exactly analogous to the New View prediction in Equation 1.2. Thus, a change in τ_d does not affect either the equity issuance or acquisition decision.

Model Predictions and Interpretation

The model offers two core predictions for this paper. First, when it comes to equity financing, firms with high $\frac{\partial \pi(E)}{\partial E}$ should issue additional equity to finance extra investment after the dividend tax cut. These will be firms who have productive investment opportunities, and thus have a high marginal value of extra cash, but who would otherwise be constrained in their ability to issue a desired amount of equity under a higher dividend tax. Hence, “Cash Short” firms. Second, firms engaging in stock-for-stock M&A but that have low $\frac{\partial \pi(E)}{\partial E}$ for equity financing should continue to issue equity largely unaffected by the dividend tax cut. Hence, “High M&A Issuers” as a comparison group.

To elaborate on the first prediction, what does it mean for a firm to be “constrained” in this context? One can think of the dividend tax as creating a “wedge” that raises the cost of equity financing relative to other sources of funding. The firm is “constrained” by the dividend tax to the extent this wedge precludes what would otherwise be the firm’s optimal course of action.¹⁷ But note that this constraint may be external or internal. On the one hand, it could be the result of skeptical investors, who—despite the firm’s desire to secure additional financing—are unwilling to invest due to dividend taxes on top of transaction costs, asymmetric information, agency costs, and other frictions. These firms are well described by the literature on financing constraints. But it could also be the case that the firm has perfect access to equity markets, and arrives at an interior optimum that shifts after the tax cut. After all, the dividend tax lowers the return for current shareholders, meaning they are less willing to dilute their stake to finance a new investment opportunity. These possibilities are demonstrated with numerical examples in Appendix A.1.

¹⁷This interpretation draws upon Fazzari et al. (1987); Kaplan and Zingales (1997).

Additional Considerations: Debt, Capital Gains, General Equilibrium

The model above is highly simplified, and does not account for several factors that could be important in financing and payout decisions. First, it does not offer clear predictions for the effects of a dividend tax cut on capital structure. On the one hand, a dividend tax cut would encourage firms to shift away from debt toward equity to the extent they are good substitutes, but on the other hand the lower investment hurdle rates and the extra safety offered by the availability of equity financing may encourage extra debt issuance. Which effects dominate? I investigate this question as part of my empirical analysis.

Second, the model does not account for share repurchases, which have grown in popularity as a form of payouts since the late 1990s. Unlike dividends, the tax liability for repurchases depends upon the investors' tax basis in the company's stock. Investors with a basis equal to (or greater than) the repurchase price face no capital gains tax liability (or realize a loss), even if the company has significant earnings and profits. But even so, gains are still taxed, meaning that capital gains rate changes create functionally similar financing and investment incentives as a dividend tax (*see* Moon, 2019; Becker et al., 2013, for a more detailed discussion). I handle this concern in two ways. I net out share repurchases from my measure of equity issuance, as repurchases will otherwise bias upward the estimated effect on equity issuance by Cash Short firms.¹⁸ I also factor in the change in the capital gains rate into the cost of capital when calculating elasticities of Cash Short responses, since these will also affect returns on equity investment.

Third, the analysis of M&A is highly simplified. The modeled transaction is assumed to be a tax-free stock-for-stock merger, but the merger could also be taxable. In that case the target shareholders would recognize capital gain on the sale of their stock to the extent the price exceeds basis. However, since capital gains rates were only modestly affected by JGTRRA relative to dividends, the effects should be small. As well, the dividend tax cut may change the sorting and efficiency of M&A transactions (Ohrn and Seegert, 2019), but my analysis is not concerned with the exact pairings of targets and acquirors, but rather magnitudes of equity issued, thus mitigating these concerns.

Finally, the model does not account for general equilibrium effects of the tax cut. It does not consider the dynamic effects of the tax cut on aggregate demand, or the indirect price effects of the tax cut through shifts in aggregate investment (for example, effects on ρ resulting from capital reallocation to equity-issuing firms). However, these effects are only a concern to the extent they differentially affect the two comparison groups.

¹⁸Share repurchases would otherwise appear as negative equity issuance, making equity issuance by High M&A Issuer firms look lower than it actually is.

1.4 Data and Empirical Strategy

Data

I use Compustat quarterly data on US public firms across a 26 year period from 1991 through 2017.¹⁹ As is customary, I exclude financial and utilities firms (SIC codes 4900-4999 and 6000-6999), as they have unique payout motives (Fama and French, 2001; Dittmar, 2000). Altogether there are 13,148 firms and 447,013 firm-quarters included in this investigation.

Compustat is the best dataset to carry out this investigation, for several reasons. First, it is essential in this project to distinguish between different types of equity issuance, *i.e.*, to determine whether the firm is issuing stock to raise cash or acquire another company. The Compustat data can be linked to companies' quarterly filings, which provide rich qualitative discussions about firm financing decisions and acquisitions. As well, these management discussions offer insights about expenditure choices, which I use to confirm my empirical results.

Second, the quarterly frequency is essential to observe firm financing decisions in response to particular financial states. The model in Section 1.3 predicts that firm responses to a dividend tax change will depend on the firm's financial circumstances. Annual administrative data is far too infrequent for this task, as it is impossible to know when the firm issues equity over the course of the year, and what the financial state of the firm is at the time of issuance.

Finally, the Compustat data include detailed balance sheet and cash flow information. Prior studies have focused primarily on capital investment responses, but to understand broader "non-capital" responses, it is essential to observe a full cash flow statement.

Measuring Equity Issuance

There are multiple ways to calculate equity issuance, and my analysis is robust to different measures. My default measure is the preferred measure of Fama and French (2005), which they describe as the "most accurate" measure of equity issuance, with some modifications. It is the market value of the quarterly change in the split-adjusted shares outstanding, then adjusted further for share buybacks and scaled by 2 years of lagged sales:

$$E_q = \frac{(Shares_q^{SA} - Shares_{q-1}^{SA}) \times \frac{1}{2}(Price_q^{SA} + Price_{q-1}^{SA}) + Buybacks_q}{\frac{1}{2} \sum_{t=1}^{t=8} Sales_{q-t}} \quad (1.4)$$

Scaling by sales allows comparisons across firm sizes. Sales are floored at \$100k to prevent unintended effects from firms with small or negative sales (the results are robust to higher or lower floors). The results are robust to other scaling variables, including lagged assets and revenue, but sales is the best measure for scaling: unlike assets, it is not directly impacted by the issuance of equity, and unlike revenue, it does not include unusual revenue events. I also

¹⁹Certain quarterly variables are only available beginning in the late 1980s, making 1991 the earliest possible year to begin. I stop prior to the TCJA to avoid possible contaminating effects.

adjust the equity issuance measure by netting out share repurchases, as these have become increasingly popular among large and profitable firms in the past two decades. Without this adjustment, the estimated results would be much larger because repurchases would be counted as negative issuance (predominately by large firms).

To focus as exclusively as possible on equity financing and M&A, rather than picking up smaller securities conversions or options exercises, as a default measure I set equity issuances below 3% of lagged sales to 0. However the results are largely unchanged by eliminating, raising, or lowering this restriction.

For robustness, I also consider three other measures of equity issuance, but each has drawbacks (see Fama and French, 2005). First, I consider stock sales scaled by lagged sales. However, sales do not adequately capture stock issued in mergers or awards to employees, or any other issuance that does not generate a cash flow to the firm. Second, I use a book measure of equity issuance: the change in shareholder equity net of the change in retained earnings. However, this measure will not accurately capture the value of equity issued in certain mergers, stock options, or stock dividends. Finally, I use the SDC Platinum measure of proceeds from new common issuance. However, the number of observations is small compared to the number of issues observed in the full Compustat dataset. As well, by recording announcements rather than executions, the timing, magnitude, and frequency may not align with actual issuance, and may undercount certain types of issuance.

Identifying Cash Short Firms

The model in section 1.3 predicts that the firms affected by a dividend tax cut will be those that have a high marginal value of extra cash from equity financing, but are constrained in part by a high dividend tax. These qualities are fundamentally unobservable, so one must adopt a method using observable data to approximate these qualities. Several approaches are possible: for instance, a full theoretical model in the style of (Whited and Wu, 2006), or a formula in the style of (Kaplan and Zingales, 1997), among others. In an effort to take an approach as robust as possible to any arbitrary decisions of a researcher, I use a battery of coarse indicators based on finance literature, in the style of Becker et al. (2013).

In total, I use six different indicators to identify Cash Short firms. For each indicator, unless otherwise specified, I categorize firm-quarters as Cash Short if they are in the bottom quintile across the 1991-2017 period. First, I use two measures of small size: lagged total assets, and lagged sales revenue. Size is an important indicator in the firm lifecycle literature, and smaller firms tend to rely more heavily on equity issuance for financing (Berger and Udell, 1998; Carpenter and Petersen, 2002a,b; Frank and Goyal, 2003; Fama and French, 2005). Second, I use lagged tangible assets, as this indicates how difficult it may be for firms to post collateral for debt financing (Campello and Giambona, 2013; Falato et al., 2020; Almeida and Campello, 2007). Third, I use the Hadlock and Pierce (2010) measure of financing constraints, as this measure is designed to capture a broad array of public firms

that would ideally utilize additional external financing.²⁰ Finally, I use two measures of cash flow, intended to capture how difficult it is for the firm to finance its activities with internal financing. The first of these is the ratio of lagged cash flow to lagged total assets as used in Becker et al. (2013). The second of these is a measure I construct using naive regression forecasts of revenue and operating expenditures: firms identified as having insufficient forecasted revenue to cover their operating expenses are categorized as Cash Short.²¹

Although I use the Hadlock and Pierce (2010) measure of financing constraints to help identify Cash Short firms, it is important to point out that being Cash Short is distinct from being financially constrained as contemplated in the finance literature. The above Cash Short indicators are meant to specifically capture a proclivity for equity financing, not external financing generally. Thus, my investigation focuses on a narrower scope of firms. The Hadlock and Pierce (2010) measure is still applicable, however, as it is designed to apply broadly across the Compustat population and overlaps heavily with firms engaged in equity financing.

Although it is important for robustness that each of the six Cash-Short indicators works separately, my preferred and default measure throughout the remainder of the paper is the union of all six indicators. That is, if a firm-quarter observation is categorized as Cash Short by any of the six indicators, it's categorized as Cash Short for the default indicator.

Table 1.1 presents descriptive statistics for the Cash Short firms in the pre-reform period. A few points stand out. First, the 107,666 firm-quarter observations constitute a sizable portion (36%) of all firm-quarter observations in the pre-reform period, indicating the size of the group under investigation. Second, the firms are generally quite small: although the top deciles of firm observations have over \$83m in total assets and \$75m in lagged sales, the medians have only \$12m and \$11m, respectively. That said, they still employ a large number of workers, with the median firm observation having 63 employees. Third, these firms are generally unprofitable. This indicates difficulty in generating revenue, meaning that the firms will have to rely on external financing (especially on equity, given questionable cash flows). Fourth, the scaled equity issuance is quite high, but this is largely driven by the upper end of the distribution. Fifth, the Cash Short firms are not especially capital intensive, spending half on CapEx relative to sales as the High M&A Issuer firms. Finally, the Cash Short firms are very R&D intensive, spending double the amount of the High M&A Issuers at the median and ten-fold in the top decile.

²⁰The measure of financing constraints developed by Hadlock and Pierce (2010) applies across a broad array of public firms, making it well-suited for this study, as opposed to other measures of financing constraints more focused on subsets of public firms.

²¹I use a simple naive regression forecast, where each quarter is forecasted using ten years of lags, to predict year-ahead revenue and operating expenditure. Firms with insufficient cash holdings and forecasted revenue to cover their operating expenditures are categorized as Cash Short.

Identifying High M&A Issuers

To identify the High M&A Issuers, I employ a simple logistic regression model to generate propensity scores for large M&A issuance. I merge data on the value of stock-for-stock M&A transactions from the Securities Data Corporation with the Compustat data. I generate a binary dependent variable spanning all observations with nonmissing equity issuance data, equal to 1 if more than half of the firm’s equity issuance over the next four quarters is for M&A and 0 otherwise. My predictor variables are the lags of log total assets (and its squared term), log tangible assets, book leverage, sales growth over the previous two years, the sales-to-asset ratio, and the log of the previous two years of lagged sales. I rank all firm-quarters by their propensity score, and I categorize the top quartile as “High M&A Issuers.”

Table 1.1 presents descriptive statistics for the High M&A Issuer firms in the pre-reform period. A few points stand out, largely in contrast to the observations about the Cash Short firms. First, these firms are very large, with medians of \$750m total assets and 2746 employees. They are also very profitable, generating a 15% profit margin. Relative to the Cash Short firms, they are also more capital intensive and engage less in R&D.

Validation

How well does the above empirical approach identify the intended sets of firms for the analysis? The Cash Short group should demonstrate a proclivity for issuing equity to raise cash, while the High M&A Issuer group should demonstrate a proclivity for issuing equity for M&A. I test this by randomly selecting 100 quarterly filings of firms with nonzero equity issuance measures and categorizing their primary purpose of equity issuance. The results are presented in Figure 1.2. It is clear that indeed the Cash Short firms are overwhelmingly issuing equity for a cash financing purpose, while the High M&A Issuers are overwhelmingly issuing equity for M&A.

Estimation Approach

I estimate the effects of the dividend tax cut on equity financing and expenditure by Cash Short firms using a differences and differences analysis against the High M&A Issuers. The identifying assumption is that the groups would trend parallel were it not for the dividend tax cut.

Equation 1.5 is my main specification to produce all figures, unless otherwise specified:

$$E_{fnq} = \alpha + \sum_{\substack{\mathcal{T}=-11 \\ \mathcal{T} \neq 0}}^{\mathcal{T}=14} \mathbb{1}\{year = \mathcal{T}\} \times \beta_{\mathcal{T}} Short_{fnq} + \theta Short_{fnq} + \delta_f + \gamma_{nq} + \varepsilon_{fnq} \quad (1.5)$$

The regression is estimated on quarterly data in the 26-year period between 1991:Q3 and 2017:Q2. The annotations f , n , and q refer to firm, industry, and quarter, respectively.

Industries, unless otherwise specified, are the 30 Fama-French industries based on 4-digit SIC codes. E is equity issuance by a firm in a given quarter, as measured in Equation 1.4. (Note that E is replaced with appropriate expenditure measures when estimating the effects on expenditures.) $Short$ is a dummy that takes the value 1 if the firm-quarter is Cash Short, 0 if the firm-quarter is a High M&A Issuer. The $Short$ dummy is interacted with annual dummies to estimate the differences between the two groups in a given year, where years are specified in four-quarter intervals before or after the tax cut, which occurred roughly at the end of 2003:Q2. The vectors δ and γ represent firm and industry-by-quarter fixed effects, respectively.

Since the identification assumption is parallel trends, I scale the dependent variable for all observations in each of the two groups by their groups' pre-reform mean, multiplied by 100. As a result, the interpretation of a point estimate of 50 is that the Cash Short group is trending above the High M&A Issuer group in that given year by 50 p.p. relative to the Cash Short group's pre-reform mean. If both groups trend parallel in proportion to their pre-reform means, then the point estimates will be 0.

Note that this specification is intentionally unbalanced. That is, firms can move into or out of the Cash Short and High M&A Issuer categories in any given quarter. This is important because the the tax cut will affect any firm in a Cash Short state even long after it has been enacted, even if that firm had previously been a very large and profitable firm. The goal is thus to determine how firms respond to being in a Cash Short state, and how that response changes after the tax cut.

To address concerns about possible changes in composition resulting from an unbalanced specification, I weight all post reform observations within each of the two groups to achieve a the same distribution as the years shortly before the tax cut. More precisely, I create a 30x20 "grid" of bins, where firm observations in each year are categorized into one of 600 bins according to their industry (30) and lagged total assets (20). I weight the bins in all post re-form years to match the distribution of firms in the two years prior to the tax cut.

Due to volatility across the 26 year period, I winsorize the data at the 3%/97% threshold across the entire period, and at the 5%/95% threshold within each quarter, unless otherwise specified. While magnitudes are sensitive to the choice of winsorization (heavier winsorizing tends to dampen magnitudes), the overall results are not.

To estimate average effects across the post-reform period, I run the following specification:

$$E_{fnq} = \alpha + \beta Post_q \times Short_{fnq} + \theta Short_{fnq} + \delta_f + \gamma_{nq} + \varepsilon_{fnq} \quad (1.6)$$

Analogous to the interpretation above, in this specification β is interpreted as the extra equity issued by the Cash Short group over the High M&A Group on average in the post-reform period, as a percentage of their pre-reform means.

1.5 Results

Equity Issuance

The equity issuance response to the dividend tax cut by Cash Short firms appears large, sharp, and sustained. Figure 1.3 presents the main results from Equation 1.5. For the 12 years leading up to the dividend tax cut, the Cash Short and High M&A Issuers exhibit extremely similar patterns in quarterly common equity issuance, lending strong evidence to validate the core identifying assumption of parallel trends. Immediately after the tax cut, however, there is a large and sudden increase in equity issuance by Cash Short firms relative to the High M&A Issuers, a break that is generally sustained throughout the post-reform period. I estimate that Cash Short firms increased their equity issuance on average by 86% ($\pm 11\%$) in the post-reform period over what their equity issuance would have been otherwise.²²

These results are extremely robust. As seen in Figure A.1 in the Appendix A.2, the results hold for a balanced panel, where the categorizations of firms as Cash Short or High M&A Issuer are determined at the time of the tax change. They also hold for a specification that includes a battery of controls, including quartics of lags of: the sales-to-assets ratio, sales growth over the previous year, book leverage ratio, and Tobin's Q.²³ As well, as seen in Figure 1.4, the results are robust to the choice of indicator used to identify Cash Short firms. While the default indicator (the union of all six indicators) is preferred, discussed above in Section 1.4, each Cash Short indicator exhibits extremely similar results independently. Finally, as seen in Figure A.2, although the Fama and French (2005) split-adjusted market measure of equity issuance is preferred (as discussed in Section 1.4), the sharp break at the time of the tax cut followed by higher equity issuance is clearly observable in different measures of equity issuance. The results are also robust to changes in the thresholds and methodology used to identify the Cash Short and High M&A Issuer groups. For example, even though the bottom quintile is used for the Cash Short indicators, the results remain strong at other thresholds. This conclusion applies as well to changes in the High M&A Issuer threshold. For the High M&A Group, the results are also robust to changes in the logistic prediction model, and the results are similar even if blunt indicators are used to approximate likely M&A activity.²⁴

To estimate aggregate effects on the overall magnitude of equity issuance, I run Equation 1.6 weighted by the previous two years of sales. I estimate that equity issuance by Cash Short firms has been approximately 68% ($\pm 33\%$) higher than it would have been without

²²I calculate this by using Equation 1.6 to estimate extra equity issuance (scaled by lagged sales) relative to the pre-reform mean, and then use this to back out the counterfactual post-reform equity issuance.

²³Certain common controls like size, age, and profitability are too highly correlated with the categorizations to serve as useful controls.

²⁴For example, as observed in Fama and French (2005), firms that are particularly large and profitable tend to issue a good deal of equity for M&A. My results are extremely similar if instead of using a propensity score model to identify the High M&A Issuers, I instead simply categorize firms in the top half of both lagged total assets and lagged profitability as High M&A Issuers.

the tax cut, or roughly \$132bn (\pm \$64bn) in total financing through 2017.²⁵ Although this sales-weighted estimate is noisier, this is a sizable amount compared to the total value of all equity issuance by Cash Short firms in the post-reform period of \$326bn.²⁶

The estimated effects of the dividend tax are largest for firms that are smaller, less profitable, and that have low tangible assets, as seen in Figure A.3. As well, the effects appear strongest on the intensive margin, as firms that have recently issued more equity tended to have larger increases after the dividend tax cut.

The estimated impacts on equity issuance across industries are presented in Figure A.4 in Appendix A.2. The effects are not concentrated in any particular industry or sector, but rather spread widely across many. That said, there tends to be a larger effect on firms that are in “high-tech” industries (such as chemicals, computers, telecom, electrical components), health tech (pharmaceuticals, medical equipment), low-tangible asset industries (business and personal services), and industries with speculative outcomes (oil & gas). In short, these observations (in combination with the types of firms that exhibited the strongest responses, discussed above) align with the discussion in Hall and Lerner (2010), in that these firms have traits that position them well to take advantage of lower cost equity financing.

Capital Structure

As discussed in Section 1.3, theory provides opposing predictions about the direction of the effect on capital structure: while the substitution effect suggests that firms will shift away from debt toward more equity financing, the combination of owners’ payout incentives and a better capitalized balance sheet encourage more debt. Which effects dominate?

As seen in Figure A.5 in Appendix A.2, the payout and balance sheet effects appear to have dominated the substitution effect. The Cash Short firms clearly did not reduce debt after the tax reform, and even tended to issue additional debt. As well, the average book leverage ratio of Cash Short firms rose from 0.26 in the pre-reform period to 0.37 in the post-reform period. Thus, it appears Cash Short firms took advantage of the opportunity to issue additional debt, which contributes to the financing of the additional expenditure observed below. This finding is also corroborated in the financing regression in Table A.2, where it’s clear that Cash Short firms enjoyed net inflows of additional debt financing after the tax cut.

Expenditure

Although prior empirical work on payout taxes has focused on capital investment outcomes, I find that an overwhelming majority of the extra financing appears to be devoted to “non-

²⁵To calculate this aggregate effect in a way that avoids the outsize effects of a relatively small and noisy set of high-sales firms, as a conservative measure I exclude Cash Short firms with lagged sales over the median amount, roughly \$150 million annually.

²⁶This total is calculated using the Fama and French (2005) split adjusted measure. It also excludes small issuances (below 3% of lagged sales) to avoid picking up smaller securities conversions or options exercises.

capital” investments, notably R&D and operating expenditures (particularly SG&A). I show this with two approaches. First, I run the regression in Equation 1.5, but using as the dependent variable the sum of the next eight quarters of expenditure, scaled by lagged sales and by the pre-reform mean, just as in the case of equity. The interpretation is thus analogous: the point estimates indicate the average extra expenditure by Cash Short firms over the High M&A firms relative to their respective pre-reform means. I repeat this analysis for different categories of expenditure. This first approach thus gives an impression of how a given expenditure category changes for the average Cash Short firm, but it does not give a sense of how dollar magnitudes compare across categories. For that, I employ a second approach that allows a relative comparison of dollar expenditures across different categories by the average Cash Short firm, discussed below.

The premise of this section is that the extra cash inflow from equity financing must go somewhere: either spent or held as cash & cash equivalents. The cash flow statement breaks down the aggregate inflow and outflow over a given period (quarterly in this case) into three major categories: operating cash flow, investment cash flow, and financing cash flow.²⁷ These three categories, which may each be positive or negative, sum to equal the change in the firm’s cash holdings.²⁸ The equation must balance: extra inflow results in extra cash holdings, extra outflow draws down cash holdings. I use these relationships to identify extra expenditures financed by the extra equity issuance.

The results for the first test (*i.e.*, documenting the average response) on capital expenditure are presented in Figure 1.5. The results are decidedly underwhelming relative to the changes in equity financing. Although there is a small bump in the 2000s, this extra investment is tiny relative to the amount of capital raised through equity issuance. As well, evidence from the public finance literature suggests this bump may be best attributable to unrelated but contemporaneous investment tax incentives targeting small businesses (Zwick and Mahon, 2017).²⁹ Thus, the main takeaway is that the equity financing does not appear to be directed toward capital investment.

In stark contrast, the results for operating expenditures in Figure 1.6 are much larger and reflect both the pattern and magnitudes seen in the equity issuance estimates.³⁰ The right panel shows the net operating cash-flow, which almost exactly mirrors operating expenses. This juxtaposition reveals that the extra expenditures were not financed by profits, but by

²⁷Operating cash flow generally includes operating revenues (e.g. sales revenue), net of expenses like salaries, rents, production costs, and R&D. Investment cash flow generally includes income from sales of tangible assets or securities net the firm’s investments in capital expenditures, securities, or acquisitions. Financing cash flow generally includes proceeds from sales of equity or debt net of repurchases and payouts to investors.

²⁸There are of course other adjustments, such as for exchange rates in the case of multinational businesses.

²⁹Also in the JGTRRA were various investment incentives including increased small business deductions for tangible property investment and bonus depreciation. See Section 1.2 and footnote 12 for a discussion. Zwick and Mahon (2017) investigated the responses to these incentives and found that small businesses exhibited a 95% larger response than larger businesses.

³⁰Note that the operating expenditure variable is from the income statement. Data on specific cash outflows is not available for operating cash flows.

other sources, and in patterns very similar to the observed extra equity issuance.

The results are even more stark for R&D expenditures, seen in Figure 1.7. The Cash Short firms were already intensively investing in R&D prior to the tax cut (as seen in Table 1.1), but yet immediately after the tax cut there is a large jump, indicating that they are investing an extra amount equal to over 100% of the pre-reform mean. Once again, the pattern closely resembles that of equity issuance.

While the above results offer a sense of relative changes within expenditure categories, a second test permits a more direct comparison of how the average Cash Short firm makes allocations of the extra financing across different expenditure categories. The results are presented in Figure 1.8, interpreted as “how many extra dollars of expenditure did the average firm allocate to a given category relative to a dollar of lagged sales?” In other words, this graph is a reflection of where extra cash was devoted across categories, after accounting for firm size using lagged sales. I find that only a tiny amount (roughly 1%) is allocated to capital expenditures. By comparison, roughly 40% is devoted to R&D and 54% to operating expenditures. Using the broader definition of intangible investment as R&D plus 30% of SG&A expenditure (as in Peters and Taylor, 2017) suggests that 46% is devoted to intangible investment. There are also small amounts devoted to extra cash holdings and other investments such as securities.

Employment and Long Run Sales

Are these extra investments productive? Evidence from employment outcomes and longer run sales suggest that they indeed are. Figure 1.9 presents the results for employment growth before and after the tax cut. The specification is the same as the main equity issuance regression in Equation 1.5 and Figure 1.3, but where the dependent variable is calculated as the percent change in the number of employees reported at the end of the firm’s current fiscal year over the average of the previous two years’ employment.³¹ The break at the time of the tax cut is sharp, and I estimate that the Cash Short firms exhibited an extra 10pp (± 2 pp) growth over the High M&A Issuers in the post-reform period.

Figure 1.10 presents the results for longer run outcomes, measured by observing future sales. Sales are likely the best measure for longer run performance, because assets will fluctuate with financing and revenue can be volatile (e.g., revenue can jump if the company sells off assets, sending an incorrect signal). Again, the specification is the same as in Equation 1.5 and Figure 1.3, but with a different dependent variable: the percent change in sales calculated by using average of the next 5 years of sales revenue over the preceding two years of sales revenue.

The results in Figure 1.10 are striking, but also require some extra explanation. In the post-reform period, the average Cash Short firm appears to grow an additional 26pp (± 10 pp) of sales revenue over the next five years above Cash High Firms, relative to their previous two years of sales, indeed a very large amount. One caveat, however, is that this result

³¹Employment data is only available annually on 10-Ks, not quarterly.

excludes the tails of the long run sales distribution to focus on “typical” firms. The sales outcomes are highly volatile and cyclical, where top-performing firms do very well in booms and poor-performers do very badly in recessions, and this phenomenon is much stronger for Cash Short firms. To mitigate this volatility near the tails, I trim the data (rather than winsorizing) to 20%/80%. This strict trimming means that the results should be interpreted as reflecting the performance of “average” or “median” firms, rather than the population of Cash Short firms. It is nevertheless highly informative, when interpreted appropriately.

1.6 Economic Interpretation

The results in this paper support a coherent narrative about how firms respond to a policy shock that lowers the cost of equity financing. Firms that have a high marginal value of extra cash from equity financing, but that are at least partly constrained from raising capital on account of the dividend tax, appear to respond quite strongly to the tax cut by issuing substantially more equity. These responsive firms are ones that are well-poised to avail themselves of equity financing, as described in corporate finance literature (Hall and Lerner, 2010; Brown et al., 2012; Hsu et al., 2014; Hall, 2002). They are smaller, unprofitable firms with low tangible capital and tenuous cash flows. These firms are also in industries that are speculative, high-tech, or service-oriented. Likewise, they tend to use the proceeds for investments other than capital investment.

This narrative nicely reconciles the contrasting theories of the “Traditional View” and the “New View,” as well as contrasting evidence in recent literature. Under the Traditional View, firms are responsive to the reduced cost of capital, raise additional cash, and increase investment. Under the New View, firms draw upon sources of finance other than equity, and so are unaffected by the tax cut. I confirm, as predicted by Auerbach and Hassett (2003), that both views are accurate, but for different firms. What was missing from the framework of these two competing theories was a practical articulation of what causes firms to fall under the ambit of the Traditional View as opposed to the New View. This paper provides that missing piece.

Elasticity of the Financing Response

Having identified a set of responsive firms, it is important to succinctly measure the magnitude of their response in a way that can inform future policy discussions. I estimate a large elasticity of equity financing with respect to the cost of capital for Cash Short firms. Following literature back to Poterba and Summers (1983), the corporate cost of equity capital—i.e., the pre-tax return required to make an equity-financed investment worthwhile—can be written:

$$\text{Cost of Capital} = \frac{\rho}{(1 - \tau_{corp}) [\phi(1 - \tau_{div}) + (1 - \phi)(1 - \tau_{cap})]}$$

The three tax rates are the corporate income tax rate τ_{corp} , the dividend tax rate τ_{div} , and the long-term capital gains tax rate τ_{cap} , while ϕ reflects the share of future profits paid out as dividends. As in Section 1.3, ρ is the opportunity cost of capital. Parameterizing the model following Yagan (2015) and Desai and Goolsbee (2004), I estimate an elasticity for equity financing to cost-of-capital of $-3.7 (\pm 1.8)$.³²

At the time of writing, it does not appear that this parameter has been estimated before, making it difficult to corroborate. That said, two pieces of evidence suggest the reasonableness of this estimate. First, Moon (2019) estimates an investment elasticity for cash-constrained firms after a capital gains tax cut, calculating an elasticity to the net-of-tax rate of 2.86 (which is similar to my estimated financing elasticity when measured by the net of tax rate, at 3.1 ± 1.5). Second, I also calculate the average response in terms of R&D investment, and compare that to existing literature. I calculate an elasticity of R&D to the cost of capital of $-1.8 (\pm 0.4)$, falling within the range of past findings (Wilson, 2009; Agrawal, Rosell, and Simcoe, 2014; Hall, 1993; Hines Jr, Hubbard, and Slemrod, 1993; Bloom, Griffith, and Van Reenen, 2002; Ladinska, Non, Straathof, et al., 2015). These two comparisons suggest that my estimated financing elasticity is indeed reasonable.

Because this parameter is important, it is equally important to interpret it correctly. My estimation reflects a sales-weighted average across the firms I identify as Cash Short firms. Only a subset of all corporations rely on equity financing as a marginal source of finance, with some more so than others. In fact, the unweighted average elasticity (as opposed to sales-weighted) is $-4.8 (\pm 0.6)$, suggesting that low-sales firms tended to respond more strongly. To apply this parameter going forward, it is thus important to assure it is applied to a representative population of firms that is neither too broad or too narrow.

A final point of consideration is the payout ratio ϕ . I assume an even split between dividends and capital gains for payouts to investors, but if firms increasingly resort to buy-backs (as has been the trend), the effects of a dividend tax cut on the cost of capital will be dampened, and thus so will any equity financing response.

Extension to Private Firms

An important question that this paper cannot answer is whether these results apply to private firms. Public capital markets offer an efficient way for firms to access a deep and broad reservoir of equity financing, and it's unclear whether the results may be extended to private financing markets. The best evidence comes from Alstadsæter et al. (2017) and Moon (2019), who evaluate responses of private firms to a payout tax changes in Sweden and Korea, respec-

³²To calculate this, I use the results of the sales-weighted regression in Table A.1 in section A.2, which is the most applicable for macroeconomic interpretations. Using the main equity regression would suggest a larger and more precise elasticity of $-4.8 (\pm 0.6)$, which would be interpreted as the estimated elasticity of the average firm in the Cash Short sample, unweighted by sales. This calculation assumes a corporate income tax rate of 35%, a dividend tax rate reduction from 44.7% to 20.8%, a capital gains rate reduction from 24.7% to 19.7%, and a payout ratio of 0.5, where ρ is assumed to be the contemporaneous 1-year treasury rate of 1.01%.

tively, and find that there is a strong response especially by cash-constrained firms. There is also support from Zwick and Mahon (2017), who find small and low-cash firms respond significantly more to investment incentives than larger firms. In addition, most of the stock sales I observe by Cash Short firms appear to be in the form of private placements, warrants, and options, which do not make use of public markets. These observations, together with my estimated elasticities above, suggest that the response may well have been quite strong for unlisted firms as well.

1.7 Tax Policy Implications

There is a long and rich literature about optimal policy regarding dividend taxes, discussing both “corporate integration” proposals that aim to improve efficiency as well as distributional concerns that arise from payout tax cuts.³³ While these topics are important, my paper focuses on a narrower aspect of the 2003 dividend tax cut: what it reveals about financing constraints and investment responses.

A central motivation behind the tax cut was the stimulation of the economy through additional capital investment. My results, complementing those of Yagan (2015), suggest that the policy was poorly targeted and overbroad for this objective. I find that only a subset of firms are highly sensitive to the cost of equity financing, and that these firms are generally quite small. In contrast, it is large corporations that dominate the playing field: among US corporations, fewer than 1 percent have more than \$100 million of annual gross receipts, but these giants pay roughly two-thirds of all corporate salaries, collect three-quarters of all corporate receipts, and own over 90% of corporate depreciable assets.³⁴ The mechanism of action behind the dividend tax cut—reducing the cost of capital to encourage additional

³³A rich and longstanding literature exists on considering the benefits of “corporate integration,” eliminating the double-taxation of the corporate entity and investors to decrease distortions (*see* Hubbard, 1993; Graetz and Warren Jr, 2016; Avi-Yonah and Chenchinski, 2011). The Treasury Department also issued a detailed report summarizing policy alternatives (US Treasury Dept., 1992, *Report of the Department of the Treasury on Integration of the Individual and Corporate Tax Systems: Taxing Business Income Once*). Indeed, before the Bush Administration settled on a compromise that became the dividend tax cut, the gist of its initial proposal was to “end double taxation on dividends.” (President Bush’s Remarks to the Economic Club of Chicago in Chicago, Illinois. January 7, 2003. *Public Papers of the Presidents of the United States*. *See also*, Joint Committee on Taxation, 2005, *Description Of Revenue Provisions Contained In The President’s Fiscal Year 2004 Budget Proposal*.) In this regard, a lower dividend tax could reduce or eliminate distortions that: favor debt over equity financing, disincentivize payouts and thus keep capital inefficiently reinvested in corporations with fewer growth opportunities, favor certain forms of payouts over others, and favor passthroughs over the corporate form. (For a survey of the debt-equity distortion, see De Mooij (2012). For discussion and empirical tests of the allocation of capital after lower payout taxes, see Becker et al. (2013); Alstadsæter et al. (2017).) The stakes are high for these issues, as there are of course significant equity-efficiency trade-offs to consider as well Chetty and Saez (2005). Over \$2.4tn of tax-preferred dividends have been paid out since 2003 (IRS Statistics of Income, Individual Income Tax Returns: Complete Reports). Over one third of this income has accrued to the top 0.1% of earners Saez and Zucman (2016).

³⁴*See* footnote 4.

equity financing—entirely misses these outside firms, which have sufficiently low marginal values of cash from equity financing that they are not motivated to issue any new equity in response to a reduced cost of capital.³⁵ Not to mention that the tax cut wholly neglects business entities other than C-corporations, including S-corporations, partnerships, and sole proprietorships.

But some firms did respond quite strongly to the reduced cost of equity capital. The findings in this paper suggest that many smaller, cash-constrained firms, despite having productive investment opportunities, are limited in their ability to finance those investments by taxes and other financing frictions. Debt financing, which is comparatively favored in the tax code by the existence of interest deductions, is often not viable for these firms because of their low collateral value, low or inconsistent cash flows, or the speculative nature of their long-run prospects. Instead, they must rely on equity financing, which comes with high asymmetric information costs (Myers and Majluf, 1984), resulting in a market failure where the productive investment is not made. In a perfect world we would not want tax policy to discriminate between firms, but in light of these market imperfections, is there perhaps a more targeted policy that could support the equity financing or investment efforts of these cash-constrained firms?

An attempt to subsidize equity financing already exists in the federal tax code, but there are numerous issues that raise concerns about its efficacy. Enacted in 1993 with the aim to subsidize equity financing by small businesses, the “qualified small business stock” provisions of Section 1202 offer a capital gains exclusion for long-term holders of stock issued by certain small C-corporations with total assets under \$50 million.³⁶ Prior research has indicated that this provision has helped small businesses raise additional capital (Guenther and Willenborg, 1999). But the design of the policy is complex with somewhat arbitrary boundaries, creating both inefficient distortions and opportunities for substantial tax avoidance. The \$50 million asset cap used to determine the eligibility of issuers poorly targets cash-constrained companies, creates incentives to slow the company’s growth, and leaves room for shenanigans around intangible assets that are difficult to value.³⁷ Also, eligibility restrictions exclude

³⁵Note that the marginal value of extra cash may be low for a number of reasons: the firms may have exhausted low-hanging investment opportunities, they may have ample cash holdings or sufficient cash flow to finance any investments on the horizon, or they may have enough tangible capital to take on debt to finance their investments rather than relying on equity.

³⁶See Joint Committee on Taxation, 1993, *Summary of the Revenue Provisions of the Omnibus Budget Reconciliation Act of 1993*. See also Viswanathan (2020), Viard (2012) and Lee et al. (2020a) for discussions of the provision and its history.

³⁷The asset calculation for eligibility generally considers basis and old fair market values of assets rather than current fair market value. Assets of the corporation are measured as the sum of cash, the fair market value of any property contributed to the corporation at the time of the contribution, and the adjusted basis of other assets (IRC §1202(d)(2)). Thus, a company with low-basis intangibles generated by the company could own assets substantially greater than \$50 million in value but still qualify for the provision. As noted by Viswanathan (2020), Lyft had a valuation substantially in excess of \$50 million while still qualifying as an eligible small business. Even if valuable assets are contributed to the corporation, if they are not traded on a market (namely intangibles), it is difficult for authorities to assess the reported valuation. In addition, businesses are disqualified if they ever exceed the \$50 million limit, including immediately

some industries in which firms may be more well-suited to rely on equity financing.³⁸ Perhaps most concerning of all, however, is the opportunity the provision creates for strategic tax avoidance by sophisticated investors, which turns the provision into a taxpayer-funded subsidy for wealthy individuals rather than for cash-constrained firms with productive investment opportunities.³⁹ An effective policy to lower the cost of capital for cash-constrained firms requires more calibrated targeting, simpler rules, and better guardrails.

It is important to realize, however, that even a simple, well-targeted policy with effective anti-abuse rules may still result in much of the tax benefit accruing to investors rather than cash-constrained firms. This is a consequence of demand and supply elasticities. A golden rule of public economics is that the benefit (or burden) of a subsidy (or tax) is not determined by the statutory rule of who receives the subsidy or who must pay the tax, but rather by the elasticities of the market participants. If the company sells its equity in a competitive capital market, where investors compete over expected gains (thus bidding up the stock price), the value of a tax subsidy should accrue predominantly to the firm. This assumption underlies my model in Section 1.3 as well as the theory in much of the literature on financing constraints (e.g. Kaplan and Zingales, 1997), as public markets are indeed quite competitive. But if the investor has market power (which could be the case in private capital markets), or if firms are more inelastic than the investors, then more of the benefit of the tax subsidy would accrue to the investor. An analysis of the likely incidence is thus a critical prerequisite for any targeted equity financing subsidy.

A more direct alternative to address the market failure of underfunded investment by these cash-constrained firms is to subsidize the investment directly, rather than to subsidize equity financing. But this would require a departure from the current policy governing investment expenses, which does little to accommodate unprofitable, cash-constrained firms. In general, businesses may depreciate or amortize their investments over time, and in some cases may expense them in the year the investment is made. There are also credits against businesses' tax liability for certain specific investments, such as green energy and low-income housing.⁴⁰ Even when it comes to stimulus packages, recent policy toward small businesses

after an equity financing (IRC §1202(d)(1)). Thus, a growing company requiring additional capital for productive investments may face perverse incentives to seek a smaller than optimal amount of financing, or to intentionally slow its growth to retain its eligibility for subsidized financing.

³⁸In this paper I show how firms in low-tangible asset industries, high-tech industries, and speculative industries tend to respond more to the lower cost of equity capital. Yet Section 1202 excludes businesses involving health and engineering services, as well as extractive industries (IRC §1202(e)(3)).

³⁹See Lee et al. (2020a), Lee et al. (2020b), and Lee et al. (2020c) for discussions of different strategies. In general, with appropriate planning, investors can: (a) roll over gains held less than the minimum 5 years into new qualifying investments to avoid gain recognition; (b) gift or transfer qualifying stock to family or to a trust to minimize the effect of a \$10 million-per-taxpayer limitation (a practice known as “stacking”); and (c) strategically contribute higher-basis assets to small corporations and time the sale of higher-basis qualifying stock to exclude gain above the \$10 million-per-taxpayer limit.

⁴⁰The general business tax credit includes credits for equipment to produce green energy and for the construction, acquisition, or rehabilitation of low-income housing, as well as numerous other activities (IRC §38).

has focused on offering additional deductions for capital investments.⁴¹ But deductions and non-refundable credits only reduce the tax liabilities of profitable ventures, rather than putting cash into the hands of cash-constrained firms. Although these deductions and credits can be carried forward, cash-constrained firms may not survive to reap the benefits. The results in my paper suggest that the availability of cash is an important barrier to investment for these firms. This finding corroborates the work of Zwick and Mahon (2017), who find that although small firms are substantially more responsive to investment incentives than large firms, these small firms *only* respond if the incentive generates a cash benefit for the firm immediately.

These considerations apply in particular to R&D and intangible investment. The evidence in this paper suggests that many of the firms responsive to the reduced cost of equity are in high-tech industries, and that intangible investment constitutes a significant portion of the investment response. R&D is also a public good in that it advances knowledge and technology, so it is especially unfortunate if underinvestment occurs as a result of financing constraints. But yet the tax code provides little opportunity for small, cash-constrained firms to realize cash benefits from investment in the near term. Taxpayers may deduct or amortize intangible-producing expenses.⁴² Additionally, there is a tax credit to encourage experimentation activities.⁴³ But again, these provisions function more as a reward for successful firms that become profitable than as a boost for cash-constrained firms looking to finance investments.⁴⁴ It is perhaps no surprise that 89% of research credit subsidies

⁴¹In response to the 2001 and 2008 recessions, the stimulus packages included additional deductions for capital investment as their primary tax support for small businesses. The two main growth incentives for businesses in the Jobs and Growth Tax Relief Reconciliation Act of 2003 were bonus depreciation and increased section 179 expensing for small businesses, both targeting capital investment. The American Recovery and Reinvestment Act of 2009 likewise included extra section 179 expensing, as did the Hiring Incentives to Restore Employment Act of 2010. See Joint Committee on Taxation, 2005, *General Explanation Of Tax Legislation Enacted In The 108th Congress* and Joint Committee on Taxation, 2011, *General Explanation Of Tax Legislation Enacted In The 111th Congress*.

⁴²The tax treatment of the expense will depend on the nature of the expense. Certain expenses like employee wages and advertising are deductible immediately (IRC §162). Research and experimentation costs, however, must be capitalized and amortized over a five-year period (IRC §174). (This rule applies for tax years beginning after December 31, 2021. In prior tax years, expenses could be deducted immediately. The rule was amended by the TCJA in 2017 because “tangible and intangible property created through research and experimentation activities provide value to a business beyond a single tax year.” HR Rep. No. 409, 115th Cong., 1st Sess. 282 (2017).) Acquired intangible assets are generally amortized over a fifteen-year period (IRC §197). Finally, other intangible assets, the expense for which could not be deducted, are generally depreciated over the course of their useful lives or over a fifteen-year period (IRC §167).

⁴³The credit is for activities to discover information that is technological in nature, relying on physical, biological, engineering, or computer sciences (IRC §41).

⁴⁴Note that the Protecting Americans From Tax Hikes Act of 2015 permitted companies small companies to apply up to \$250,000 of the credit against social security payroll taxes, so long as they had both (a) under \$5 million in gross receipts and (b) fewer than five years of positive gross receipts. See Joint Committee on Taxation, 2017, *General Explanation Of Tax Legislation Enacted in 2015*. While this amendment indeed provides a quicker cash benefit, the benefit is smaller for firms with fewer employees.

go to businesses with over \$100 million in annual receipts.⁴⁵ Through this lens, the current policy framework also tends to discourage competitive entry in innovative industries, favoring incumbents.

In light of these observations, an alternative policy might take the form of a refundable investment credit for qualified businesses, where the eligible investment extends beyond capital investment. Although a refundable credit actively puts cash into the hands of qualifying businesses, from a taxpayer perspective the effect is not practically different from a non-refundable tax credit used by a large profitable firm. But in this case the subsidy not only addresses underinvestment in light of positive externalities (e.g. energy credits, the low-income housing tax credit, or the research tax credit), but also as a result of asymmetric information and other frictions that constrain financing opportunities. And while the policy would involve line-drawing for firm eligibility, and would require careful drafting of anti-abuse rules, it could nevertheless serve as a welfare-promoting second-best solution given the policy constraints.

1.8 Conclusion

Ever since the seminal work of Modigliani and Miller (1958), research on the real effects of dividend taxation has focused overwhelmingly on capital investment responses. In this paper I show that this focus appears to have overlooked substantial effects on both firm financing and investment through “non-capital” pathways by smaller, cash-constrained firms. This finding also helps reconcile what have seemingly been conflicting observations in empirical literature.

The empirical innovation in this paper is to frame the tax cut as a shock to the cost of equity financing—rather than a change in the cost of capital for a particular type of investment—and thus to focus on identifying the financing response before identifying an investment response. To accomplish this, I exploit the fact that equity issuance for M&A (as opposed to equity issuance to raise cash for other purposes) is both procyclical and should theoretically not be incentivized by the tax cut. I thus use firms with a high propensity for stock-for-stock M&A as a comparison group to identify the effect of the tax cut on equity issuance by firms likely to issue equity to raise cash, whose incentives are affected by the tax cut. My results indicate that smaller, cash-constrained firms responded quite strongly to the tax cut. Not only did they raise a substantial amount of additional capital through equity issuance, but the primary investments financed were “non-capital” in nature: namely operating expenditures and R&D.

Perhaps the most valuable insights arise from the observation of which firms are affected and why. The highly responsive firms are not large, cash-rich corporations, but rather small, cash-constrained firms that are often unprofitable with low tangible capital. They have high marginal values of extra cash, but are unable to raise their optimal amount of capital on account of frictions and taxes, resulting in underfunded productive investments.

⁴⁵IRS Statistics of Income, Corporation Research Tax Credit, Figure B.

So even though a broad dividend tax cut may not be wise policy to achieve a specific objective of incentivizing additional capital investment, the results here suggest that there may nevertheless be value to a more targeted policy approach that helps firms overcome these constraints.

Tables

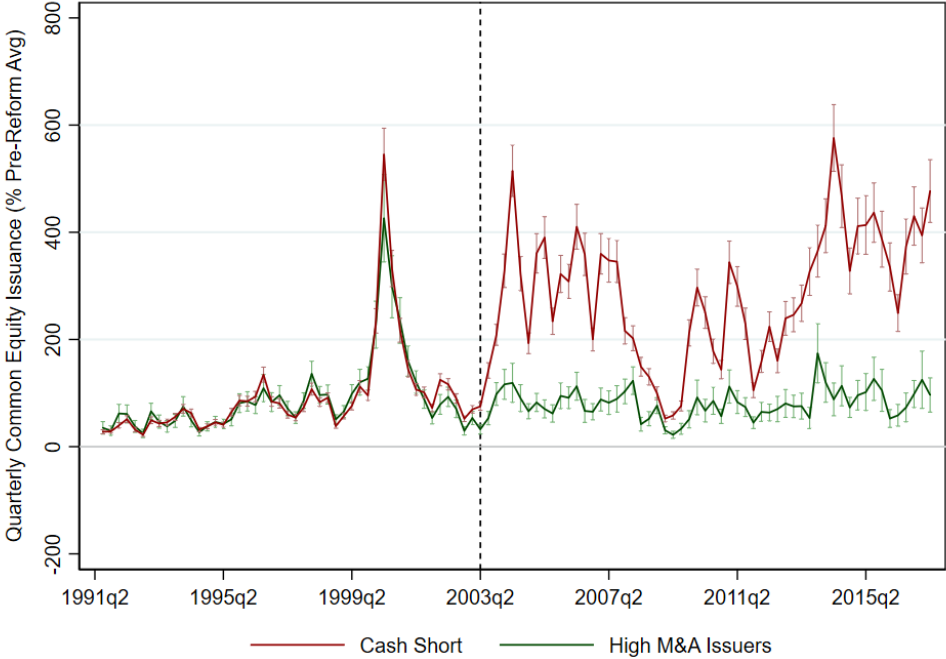
Table 1.1: Pre-Reform Descriptive Statistics

	Cash-Short				High M&A Issuers			
	Mean	10th	Median	90th	Mean	10th	Median	90th
Characteristics								
Lagged Total Assets (\$m)	57.9	2.5	11.8	83.3	1,263	202	750	3,276
Lagged Sales (\$m)	60.5	1.2	10.6	75.6	1,219	110	653	3,272
Lagged Tangible Assets (\$m)	26.4	0.5	3.5	29.9	601	27	251	1,696
Lagged Profit Margin (%)	-55	-181	-8.8	12	14	3.1	15	33
Employment	297	9	63	373	5,338	366	2,746	14,062
Outcomes								
Total Equity Issuance (\$m)	12.2	0.0	1.0	28.4	84.3	1.4	30.6	253.8
Scaled Equity Issuance (%)	92	0.0	5.9	301	38	0.2	4.7	88
Scaled CapEx (%)	15.6	0.6	4.3	55	17.2	2.2	8.5	47
Scaled Operating Exp. (%)	180	71	112	372	110	70	98	152
Scaled R&D (%)	63	0.0	11	239	13.7	0.0	5.0	28
Firm Quarters	107,666				40,522			

Notes: Dollar amounts are in millions. Percentages are of the previous two years of sales, other than profit margin, which is calculated as 1 minus the previous two years of operating expenditures over sales revenue. Winsorization is conducted as described in Section 1.4.

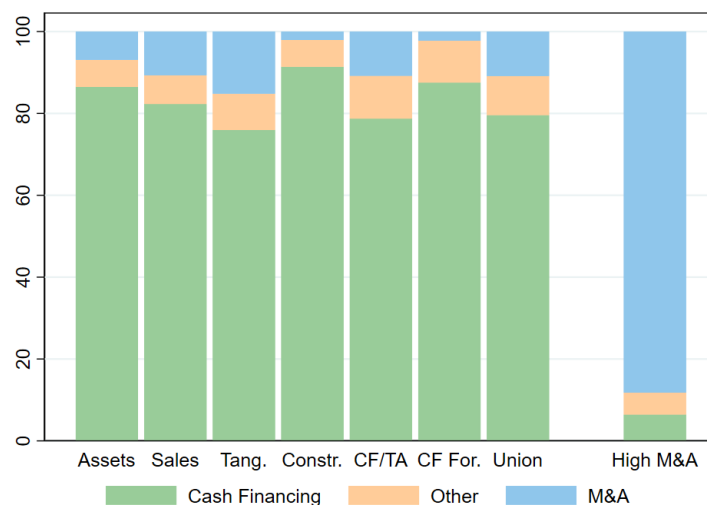
Figures

Figure 1.1: Equity Issuance by Cash Short vs. High M&A Issuer Firms, 1991-2017



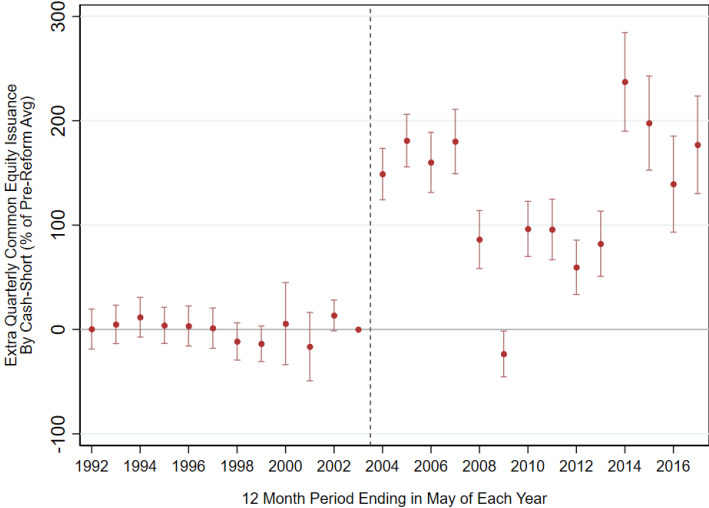
Notes: Equity issuance is measured as the value of the split-adjusted change in shares outstanding on a quarterly basis, based on Fama and French (2005), scaled by lagged sales. See Equation 1.4 for the precise calculation. Equity issuance of each group is scaled by the pre-reform average (1991:Q3-2003:Q2). Firms in post-reform years are nonparametrically weighted across 600 bins to match the distribution of firms in the two years prior to the tax cut in terms of sales and industry composition. Error bands are 95% confidence intervals.

Figure 1.2: Types of Equity Issued by Cash Short vs. High M&A Issuers



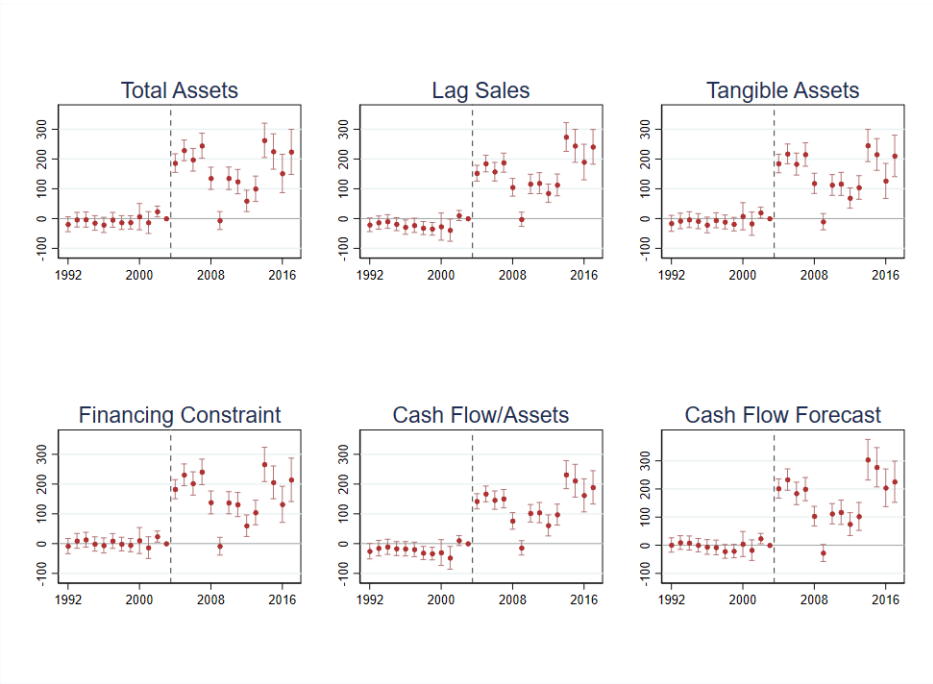
Notes: The colors of each bar indicate the share of equity issued by type for each group. The first six bars correspond to the six Cash Short indicators, and the seventh is the Union of the six. The far right bar is the High M&A group. Equity counting toward “Cash Financing” includes any issuance that either raises cash or is covered by the Traditional View incentives described in Section 1.3, including public offerings, private placements, equity issued as payment or compensation, options and warrants. Equity counting toward M&A includes either stock-for-stock M&A or equity issuance to raise cash to fund a cash merger or acquisition. All other types of issuance (generally preferred stock and debt conversions) fall into “Other.”

Figure 1.3: Extra Equity Issuance by Cash Short Firms



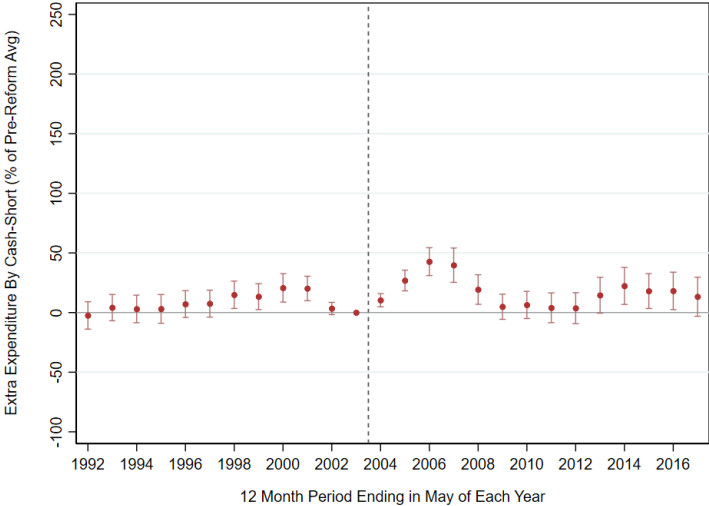
Notes: Includes firm and industry-by-quarter fixed effects. Regression is given in Equation 1.5. Each point estimate is the coefficient on a dummy variable for Cash Short interacted with the year (i.e, 4-quarter periods before and after reform). Post-reform observations are nonparametrically weighted across 600 bins to match the distribution of firms in the 2 years prior to the tax cut in terms of sales and industry composition. Observations are scaled by pre-reform means of their respective groups, so that the point estimates can be interpreted as the p.p. increase of Cash Short firms over High M&A Issuers relative to their pre-reform means. Error bands are 95% confidence intervals with standard errors clustered by firm.

Figure 1.4: Different Cash Short Indicators



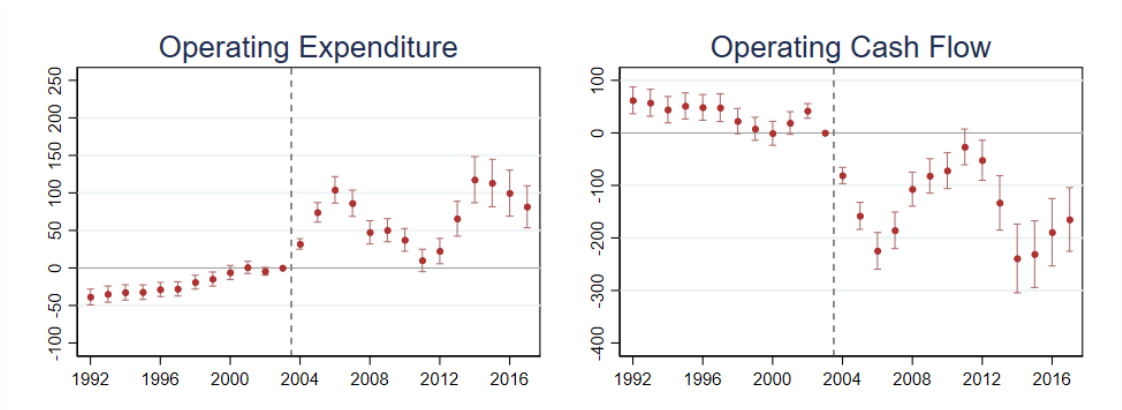
Notes: Each Cash Short indicator corresponds to a single indicator discussed in Section 1.4. Other details are the same as Figure 1.3.

Figure 1.5: Extra Capital Expenditures by Cash Short Firms



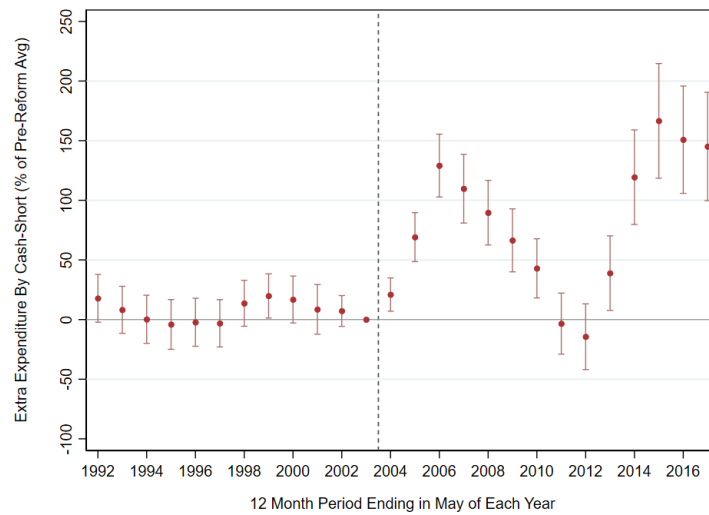
Notes: Specification is the same as in Figure 1.3, but dependent variable is next eight quarters of capital expenditure scaled by previous two years of sales. Axes are scaled so that they are comparable with Figure 1.6 and Figure 1.7.

Figure 1.6: Extra Operating Expenditure vs. Cash Flow by Cash Short Firms



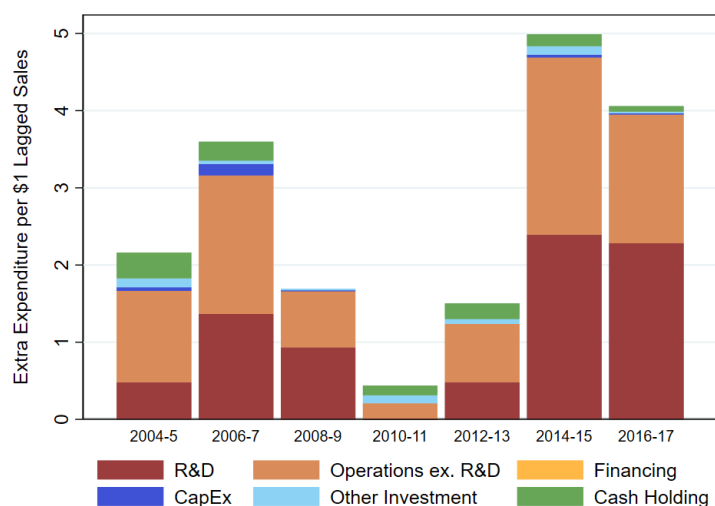
Notes: Specification is the same as in Figure 1.3, but dependent variable is next eight quarters of operating expenditure (left) and operating cash flow (right), scaled by previous two years of sales. Axes are scaled so that they are comparable with Figure 1.5 and Figure 1.7.

Figure 1.7: Extra R&D Expenditures by Cash Short Firms



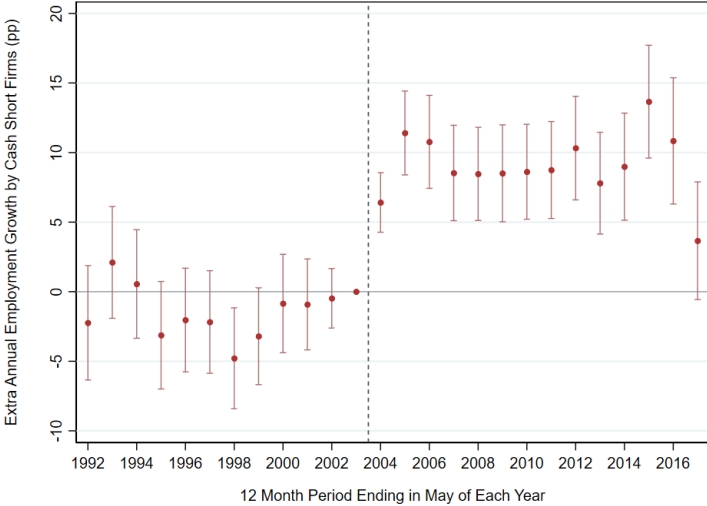
Notes: Specification is the same as in Figure 1.3, but dependent variable is next eight quarters of R&D expenditure scaled by previous two years of sales. Axes are scaled so that they are comparable with Figure 1.5 and Figure 1.6.

Figure 1.8: Extra Expenditures by Cash Short Firms on Average, by Category



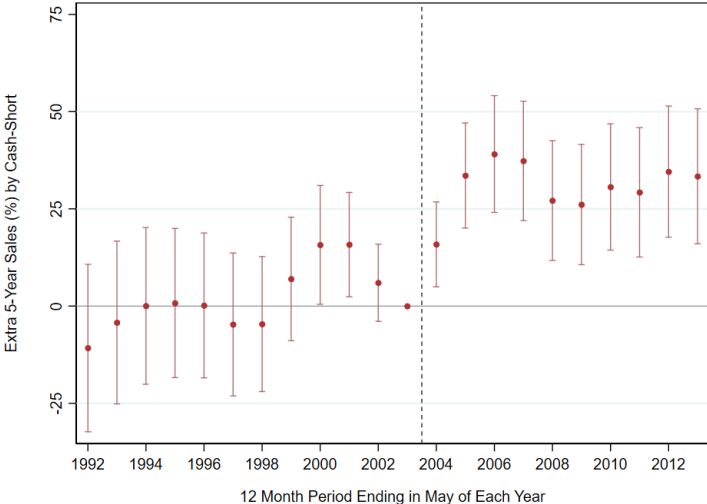
Notes: Regressions specification is given by Equation 1.6, except that dependent variable is the next eight quarters of expenditure in the given category. The dependent variables are not scaled by pre-reform means, so the point estimates can be interpreted as extra dollars of expenditure by the average Cash Short firm per dollar of lagged sales over the previous two years.

Figure 1.9: Employment Response



Notes: The dependent variable is calculated as the percent change in the number of employees reported at the end of the firm’s current fiscal year over the average of the previous two years’ employment. (Employment data is only available annually on 10-Ks, not quarterly.) Other details are the same as Figure 1.3.

Figure 1.10: Long Run Sales Response



Notes: The dependent variable is the percent change in sales, calculated by using average of the next 5 years of sales revenue over the preceding two years of sales revenue. Due to high volatility in the tails, observations are trimmed at the 20%/80% thresholds. Other details are the same as Figure 1.3.

Chapter 2

Partnership Income and Tax Havens

2.1 Introduction

Partnerships are the fastest growing class of business entity in the United States and represent over one third of all reported business income, yet a substantial portion of this income has remained untraceable by economists.¹ Even after pioneering work by Cooper et al. (2016), who study federal tax records in 2011, about 20% of income is flowing to unidentifiable owners and 15% is caught within unresolvably complex entity arrangements.² Such opaqueness is not surprising. In fact, partnerships are often used in sophisticated tax planning for the very reasons that make them difficult to study: they are highly flexible “passthrough” entities that are not subject to federal income tax, they are governed by arcane rules that are often difficult to enforce, and they can be used to create complex multi-tier entity arrangements spanning multiple jurisdictions where the owners may have little connection to the United States.

In this paper I address this missing information, using new approaches that allow me to describe the country, domestic or foreign status, and type of recipient for over 99% of partnership income from 2005 to 2019. This effort is made possible by both drawing upon a broader set of federal tax records than before and by applying new algorithms to available data. As a result, this paper offers (1) the first look at trends in partnership income flows over time with administrative data, (2) the first detailed description of previously “missing” partners, and (3) new insights about the scale of the use of partnerships in international tax planning.

¹Partnership income represented 38% of net business income in 2017 (including capital gains). Calculated from publicly available data from the IRS Statistics of Income. See Section 2.2 for details on the calculation. For a broader discussion of changes in business income over time, see Joint Committee on Taxation, Present Law and Data Related to the Taxation of Business Income, Hearing before the Senate Committee on Finance, September 19, 2017, JCX-42-17, available at <https://www.jct.gov/publications/2017/jcx-42-17/>.

²To be more precise, the work by Cooper et al. (2016) used 2011 tax data to describe the type of the partner (i.e. the entity type or individual) for 80% of partnership income, as well as the domestic or foreign status of the recipient for roughly 80% of partnership income. See Section 2.4 for additional details.

This paper offers three primary contributions to our understanding of where partnership income goes and who receives it. First, the new data reveal that much more partnership income flows to foreign owners than was previously thought.³ About 17% of partnership income since 2011 has flowed to a foreign owner—roughly double the share estimated in Cooper et al. (2016).⁴ Second, both the type of recipient (e.g. individual, corporation, trust, estate, etc.) and the character of income (e.g. dividends, interest, capital gain, etc.) varies significantly by destination, a fact that reveals important insights about how partnerships are used in investment structures and tax planning.

Third, and most importantly, I find that most of the income flowing to foreign owners flows to tax havens. Between 2011 and 2019, I estimate that roughly \$1.2 trillion of income reported by partnerships flowed to owners in tax havens.⁵ The largest portion of these flows—roughly \$500 billion—went to the Cayman Islands, where zero tax is imposed on this income.

There are also large flows to other tax havens, each of which offers certain appealing attributes to attract wealth from abroad. Roughly \$240 billion has flowed to owners in other “zero corporate tax” jurisdictions similar to the Cayman Islands, such as the British Virgin Islands or Channel Islands. Another \$250 billion has flowed to owners in “conduit” countries that are not only low-tax countries but also often facilitate movement of profits from low- or zero-tax jurisdictions back to larger economies, such as the Netherlands or Switzerland. Roughly \$180 billion has flowed to owners in other tax havens, many of which are known more for a lack of transparency than for low rates, such as Samoa, Fiji, or Trinidad and Tobago.⁶ An additional \$210 billion has flowed to owners with undisclosed foreign residence (almost all of whom report a US address, but cannot be linked to an identifiable country of residence for tax purposes). A list of countries in each group of havens is available in Table 2.1.

Very little US tax is collected on this income, despite the fact that the vast majority appears to arise from within the United States.⁷ Although there are generally high with-

³I use “owner” throughout the paper to refer to the partners that are not themselves partnerships (e.g. individuals, corporations, trusts, estates, etc.). Partnerships can be (and are often) stacked into tiered structures, where partnerships are themselves partners in subsidiary partnerships. Because partnerships are passthrough entities, income flows up through these tiered structures, but it must “exit” the chain at some point by being allocated to a non-partnership “owner.”

⁴Throughout the paper, I categorize individuals and entities as foreign or domestic for empirical analysis to align as closely as possible with their treatment under US federal tax rules. For example, business entities organized in the United States are domestic (even with a foreign address), while entities organized in foreign jurisdictions are foreign (even if they have a US address). See footnote 30 for a more detailed discussion.

⁵Dollar values throughout the paper are presented in 2020 dollars, adjusted using the GDP implicit price deflator from the Bureau of Economic Analysis.

⁶See the EU list of non-cooperative jurisdictions, which has evolved over time as policies have changed. As of October 2021, nine jurisdictions remained on the list. See Council Conclusions, October 5, 2021, available at <https://www.consilium.europa.eu/media/52208/st12519-en21.pdf>.

⁷By “arise from within the United States,” I mean to capture not only the concept of US source income (see footnote 40), but also income effectively connected with US trades or businesses (see footnote 39), as well as gains from the disposition US assets (such as US stocks and securities). This concept is challenging

holding tax rates imposed on outbound flows to tax havens—30% or higher, depending on the destination, recipient, and type of income—only about \$33 billion of US tax was withheld between 2011 and 2018, an amount commensurate with official IRS statistics documenting a very low effective tax rate (roughly 3%) on aggregate outbound flows to tax havens.⁸

What is going on? The data suggest that these flows to tax havens are mostly driven by financial investment firms using entity arrangements that take advantage of exemptions in US tax law and that shield both foreign and certain US investors (typically US tax-exempts) from reporting and taxation. In short, investment firms organize a “blocker” corporation in a tax haven, and have certain investors make investments through this entity rather than into the fund directly. By positioning the blocker between these investors and the fund, the investors are shielded from US tax obligations. In addition, if the investments are carefully managed to generate certain types of passive income (namely capital gains and interest income), there should be zero US tax on outbound flows, while at the same time there is zero or little tax incurred by the blocker in the tax haven. A simplified structure is presented in Figure 2.4.

Three categories of investors benefit from this arrangement. First, foreign investors, who can avoid disclosures and filings to US tax authorities, and who may also be able to lower their overall tax liabilities. Second, US tax-exempt investors, who are able to avoid what would otherwise be “unrelated business taxable income.” And third, investors engaged in evasive behavior, who may be US or foreign, and who benefit from the lack of disclosures beyond the blocker entity.⁹ While these groups are distinct with unique motivations, it is not possible to empirically disentangle them using available federal income tax data, largely because the blocker entities conceal the identities of ultimate investors from US authorities.

While the arrangement is appealing for the investors described above, it is important to point out that it is generally *not* appealing for US taxable investors. It risks incurring unnecessary taxes, limits use of losses, and subjects the US investors to anti-abuse regimes.¹⁰ Thus, it is likely that almost all of the flows to tax havens observed here ultimately go to one of the three groups listed above.

How does the arrangement work and what does it accomplish, while also minimizing US taxes and avoiding anti-abuse rules? These points are discussed in detail in Section 2.5, but as a brief overview:

- US tax rules require extensive reporting by partnerships about their partners. In addition, because partnerships are passthrough entities, partners themselves usually face

to estimate because it is not directly reported. Depending on the measurement approach, I estimate that between 73-94% of reported income flowing to tax havens likely arises from within the United States. The share for the Cayman Islands may be as high as 98%. See Appendix B.2 for discussion.

⁸See Luttrell (2018), as well as other years. For a discussion of the withholding calculation, see Appendix B.2.

⁹Evasion by US investors has become much more difficult after the additional reporting requirements on foreign financial companies imposed by FATCA, discussed in more detail in Section 2.6.

¹⁰For a detailed discussion of the downsides for US taxable investors, see Section 2.5.

US tax and reporting obligations. But if investors instead invest through a blocker corporation, it is the blocker that faces these obligations, generally shielding the investors and any activities above the blocker from US authorities.¹¹

- Income flowing abroad to tax havens is generally subject to high US withholding taxes, but by managing investments carefully these taxes can be avoided. Very generally, the United States imposes both (a) a withholding tax on income flowing to foreign partners if that income is effectively connected with a US trade or business, to be withheld at the highest marginal tax rate applicable to the recipient,¹² and (b) a 30% withholding tax on income from other US sources. However, a series of law changes has exempted certain passive investment income from withholding, even when flowing to tax havens: trading in US securities has been exempted from treatment as a taxable US trade or business for foreigners, and most interest and capital gains are exempted from the scope of taxable US source income. Thus, by structuring investments in US securities to specifically generate interest and capital gains—a task made easier as US companies have shifted to share repurchases over dividends—funds can generally avoid US taxes.
- By organizing the blocker in a tax haven such as the Cayman Islands, the entity itself faces zero or little tax locally on the income it receives.
- US tax-exempt investors—such as universities, charitable organizations, foundations, and pension or retirement funds—are subject to “unrelated business income tax” on income derived either from business activities unrelated to the organization’s exempt purpose or from debt-financed (leveraged) investments. However, if the income is first received by the blocker corporation, it can be transformed into exempt dividends or capital gains before reaching the investor.
- By investing through a blocker, foreign investors have some flexibility to choose how income returns to them, in some cases potentially reducing taxes beyond the United States. The blocker can be organized either as a corporation or as a tax-neutral “hybrid entity,” i.e. a passthrough under local law but that elects to be treated as a corporation for US tax purposes (in which case, from a foreign perspective, the income would simply pass through the blocker without ever accumulating in the tax haven). The optimal arrangement will depend on the laws of the jurisdiction and the investor’s circumstances. For instance, if the foreign investor is in a jurisdiction with especially lenient tax rules—such as another tax haven—a blocker organized as a corporation

¹¹An important exception to this is reporting pursuant to FATCA, which requires annual reporting on US investors and other interests owned by US persons in foreign financial companies, discussed further in Section 2.6.

¹²The highest applicable rates are 37% for individuals and 21% for corporations, but prior to the Tax Cuts and Jobs Act of 2017 these rates were 39.6% and 35%, respectively.

might be used to convert income into a tax-preferred type, such as dividends or capital gains.¹³

- Blocker corporations also shield foreign investors from US estate tax, since it is the blocker corporation (rather than the investor) that owns the US assets subject to tax.
- US anti-abuse rules designed to prevent accumulation of passive income in tax havens (i.e., rules for Controlled Foreign Corporations and Passive Foreign Investment Companies) are not triggered by this arrangement, so long as the investors owning the blocker are foreign or US tax-exempt investors.

The story above is confirmed in the data, as seen in Figure 2.6: most of the income flowing to tax havens is from the investment industry, goes to entities that are likely blockers, and is of a type that is not subject to withholding. In addition, these flows appear to be growing over time. For the Cayman Islands, the destination of the largest portion of these flows, 98% of the income is flowing from finance and related industries (88% from the investment industry alone), 94% is received by entities that are corporations, hybrids, or other entities that could potentially be used as blockers, and 83% is passive investment income that is generally not subject to US withholding tax. The trends are similar for other havens, albeit slightly less stark.¹⁴ These flows to tax havens are very different than the flows to US owners, which are much more likely to go to individuals (44%), come from industries other than financial investment (66%), and to be operating income (42%) rather than passive investment income.

The data also suggest that these arrangements are highly prevalent in the investment industry. I find that between 23-26% of reported partnership income in the investment industry either flows to or from a tax haven, and that 37% flows through partnerships with partners that are likely blockers in tax havens. This will not be surprising to those familiar with the industry: the entity arrangements described above are well-known, and setting up funds to take advantage of these rules is not uncommon.¹⁵ But while there was awareness of these practices, little was known about their scale. What this paper offers, therefore, is the first empirical analysis to describe the magnitude of income involved in these arrangements.

Beyond describing these blocker arrangements, I also find evidence that two tax policies enacted in 2010 led to a substantial increase in reported income flowing to foreign owners, a jump clearly observable in Figure 2.2. The first is the Foreign Account Tax Compliance Act

¹³Most high-income economies have anti-abuse rules similar to the United States that tax passive income accumulating in low-tax jurisdictions. So for many foreign investors, there may be no options to legally avoid tax rates imposed by their home jurisdiction.

¹⁴For other havens, 90% of the income is from finance and related industries, 76% specifically from the investment industry, 73% is of a type generally not subject to US tax, and 89% is received by entities that potentially could be used as blockers.

¹⁵See publications by practitioners and commentators, including for example Lhabitant (2007); Sheppard and Sullivan (2008); Ng (2009); Taylor (2010); Miller and Bertrand (2011). The IRS also has published a technical guide describing this arrangement: IRS (2017), Hedge fund basics, LB&I International Practice Service, available at https://www.irs.gov/pub/int_practice_units/jti_c_05_01_04_01.pdf.

(FATCA). FATCA both (a) imposed new withholding taxes on a broader range of outbound payments than had previously been subject to tax or reporting, specifically including capital gains on financial assets, and (b) imposed new reporting requirements on a range of parties, making it more likely for authorities to spot underreporting by cross-referencing returns. Second, Congress also enacted new rules taxing “dividend equivalent” payments to foreigners, shutting down a practice where foreign investors facing high withholding rates could enter into swap agreements enabling them to receive the income from dividends without triggering withholding.

The findings in this paper contribute to important discussions about US tax policy in a world where large amounts of capital are invested through tax havens. For historical context, the US tax exclusions that make the arrangements described above possible were enacted with the explicit purpose to attract foreign capital to the United States. Indeed, the United States is by far the leading destination for international portfolio investment, and the country benefits greatly from this position by enjoying abundant capital to finance new businesses and investments as well as by lowering borrowing costs for households, businesses, and the government. But the new evidence presented here—of large amounts of passive investment income flowing tax-free from the United States to anonymous investors shielded by entities in tax havens—brings to light more complex trade-offs, and highlights how the path that foreign investment takes matters as well. These tax haven arrangements shift tax burdens away from anonymous investors onto American taxpayers, they generate deadweight loss by expending resources on complex legal arrangements that cater to avoidance rather than bona fide business purposes, and they generate externalities that encourage a “race to the bottom” across nations to attract foreign capital. Although it is beyond the scope of this paper to evaluate the full policy implications of these issues, it is nevertheless important that future analysis weigh these trade-offs in support of a well-informed tax policy.

This paper contributes to several areas of ongoing academic research. First and foremost, the paper extends the initial groundbreaking work of Cooper et al. (2016) to paint a richer and more complete picture of who owns partnerships and receives partnership income. In particular, it is the first to provide detailed information about previously unidentified (especially foreign) recipients, and the first to describe trends over time. Second, the paper contributes to a burgeoning literature about the role of tax havens in facilitating tax avoidance or evasion. But while there has been excellent empirical research quantifying the use of tax havens by multinational corporations for profit-shifting and other forms of corporate tax avoidance (Huizinga and Laeven, 2008; Clausing, 2016; Dowd et al., 2017), as a sink for wealth (Tørsløv et al., 2018; Alstadsæter et al., 2018; Zucman, 2021), or for outright evasion (Gravelle, 2009; Johannesen and Zucman, 2014; Hanlon et al., 2015; De Simone et al., 2020), this paper is the first to empirically describe flows to tax havens through partnership structures. Third, the findings about the increased reporting after 2010 contribute to a growing literature on the importance of third-party reporting in deterring underreporting (Kleven et al., 2011; Pomeranz, 2015).

The remainder of the paper is organized as follows. Section 2.2 offers background on the tax characteristics of partnerships and their growing use over the past two decades.

Section 2.3 discusses the data I use to conduct the investigation. Section 2.4 summarizes new descriptive statistics, patterns, and trends over time observable in the data. Section 2.5 explains the use of tax haven entities in tax planning for foreign investors, and how these arrangements are observable in the data. Section 2.6 discusses the jump in reported income after 2010, and the apparent relationship to policy changes that year.

2.2 Background on Partnerships

Partnerships, as the term is used throughout this paper, refers to businesses taxed as partnerships under US federal tax law. Although there are many different possible legal forms of business entities under state and local law, for US federal tax purposes all business entities with at least two owners are classified as either a corporation or a partnership.¹⁶ For example, while an entity may be a limited liability company (LLC) organized in Massachusetts or a Gesellschaft mit beschränkter Haftung (GmbH) organized in Germany, each will be treated as either a partnership or a corporation under US federal tax law.

Since 1997, partnerships have rapidly grown in terms of both number of filers and income reported. In that year the IRS enacted new “check-the-box” rules permitting owners of most entities to elect classification as a partnership or corporation, simplifying what was previously a cumbersome multi-factor test.¹⁷ By 2017, there were 3.9 million partnerships filing US tax returns, a 136% increase over the number in 1996, representing a much larger increase than S-corporations, C- and other corporations, or sole proprietorships. Partnerships reported \$2.2 trillion in net income in 2017 (including capital gains), roughly quintupling the amounts from 1996. Partnerships represented 38% of all business net income reported on US tax returns in 2017, doubling their share from 1996.

This growth of partnerships has been concentrated in finance and related industries.¹⁸ Net income in these industries increased over 800% between 1996 and 2017, rising to 73% of all reported partnership income. The growth is even larger when focusing solely on portfolio income in these industries, which grew over 1000%.

This dramatic rise of partnerships, especially for portfolio income in finance and related industries, is not surprising given how partnerships are taxed. Partnerships offer many advantages that are uniquely well-suited to minimize taxes on portfolio investments through investment fund structures. First and most importantly, partnerships are “passthrough” entities that are not subject to federal income tax. Instead, income and losses “pass through” the partnership and are included on the federal tax returns of the partners, as if earned by

¹⁶Treas. Reg. §301.7701-2(a).

¹⁷See Treas. Reg. §§301.7701-2 and -3. See also Simplification of Entity Classification Rules, 61 Fed. Reg. 66584 (Dec. 18, 1996). Under the prior rules, the IRS recognized “that there is considerable flexibility under the current rules to effectively change the classification of an organization at will.” I.R.S. Notice 95-14, 1995-14 I.R.B. 7. See Field (2008) for discussion of this regulatory change.

¹⁸Defined as two-digit NAICS codes 52 (Finance and Insurance), 53 (Real Estate, Rental and Leasing), and 55 (Management of Companies and Enterprises).

them directly.¹⁹ Second, the character of income (i.e. whether the income is capital gain, ordinary income, etc.) is preserved for the partner as it passes through the partnership.²⁰ This is especially important when the income is a type of tax-preferred income that permits investors to pay taxes at reduced rates. Third, partnership tax rules offer unparalleled flexibility to divide up income among the owners of the entity.²¹ And fourth, partnership tax rules permit investment managers to receive a portion of their compensation as tax-preferred capital gain, rather than ordinary income. Such compensation, often referred to as “carried interest,” is used extensively throughout the investment fund industry.²²

These tax advantages of partnerships have also made them very difficult for economists to study. First, the passthrough nature of partnerships and flexible allocation rules facilitate “stacking” partnerships in complex multi-tier entity structures. Put another way, partnerships can be partners in other partnerships, often leading to large interconnected webs, sometimes even creating infinite “loops.” This problem is well discussed by Cooper et al. (2016), who note that over a quarter of partnership income flows to other partnerships, and that 9 million of the 25.5 million partners are part of arrangements that involve unresolvable infinite loops. Second, because partners can be in any jurisdiction, many have limited connection to the United States, and may not even file a tax return (either properly or improperly). Third, partnership tax rules are so arcane and the entity structures so complex that enforcement is exceedingly difficult, an issue exacerbated by the fact that partnership income goes overwhelmingly to very high income, sophisticated taxpayers. For example, an individual making less than \$25,000 was 12 times more likely to be audited than a partnership in 2020,²³ and evidence suggests that when partnership audits are conducted they

¹⁹See IRC §§701, 702.

²⁰See IRC §702(b) clarifies that “character...shall be determined as if such item were realized directly from the source from which realized by the partnership, or incurred in the same manner as incurred by the partnership.”

²¹“Flexibility” for partners was in fact an explicit goal of the US Congress in drafting the partnership rules, and is manifested in numerous important ways. S. Rep. No. 1622, 83d Cong., 2d Sess. 89 (1954); H.R. Rep. No. 1337, 83d Cong., 2d Sess. 65 (1954). For example, partners may choose how to allocate income and losses among themselves to achieve business and tax objectives, and are not required to follow partners’ pro rata interests in the partnership. See Section 704(a), providing that “A partner’s distributive share of income, gain, loss, deduction, or credit shall, except as otherwise provided in this chapter, be determined by the partnership agreement.” Partners may choose their preferred accounting method, which can materially affect the allocation of income and tax liabilities of partners. See Treas. Reg. §1.704-3(a)(1). Appreciated assets can be distributed to partners tax-free. See §731(a) and (b). Partners may elect whether or not to adjust their tax basis in exchanges of partnership interests. See IRC §§734(a) and 743(a).

²²Prequin estimates that essentially all private capital funds are compensated through a carried interest arrangement, with over 80% of funds charging 20% of profits (see Prequin (2017)). See also Joint Committee on Taxation, Present Law And Analysis Relating To Tax Treatment Of Partnership Carried Interests, July 10, 2007, and Congressional Research Service (2020), “Taxing Carried Interest,” Report No. R46447, available at <https://crsreports.congress.gov/product/pdf/R/R46447>.

²³See Internal Revenue Service Data Book, 2020, available at <https://www.irs.gov/pub/irs-pdf/p55b.pdf>. Note the Bipartisan Budget Act of 2015 changed partnership audit rules, effective for tax years beginning after 2018. For discussion, see <https://www.irs.gov/businesses/partnerships/bba-centralized-partnership-audit-regime>.

fail to detect a substantial amount of underreporting, largely due to a lack of resources to investigate and challenge the complex arrangements (Guyton et al., 2021).

2.3 Data

I use data from de-identified US federal tax records from 2005 through 2019 to describe the owners of partnerships as well as the flows of income through partnerships. I expand upon the approach of Cooper et al. (2016), who described the owners of partnerships by matching recipients to other tax returns in tax year 2011. I both draw upon a broader set of data and develop new algorithms to describe recipients who were previously unidentifiable. I discuss these new data and techniques used below. Additional details are available in Appendix B.1.

Schedule K-1 data

Because partnerships are passthrough entities, income and losses of the partnership flow through to the partners. These amounts must be reported separately for each partner on an information return (Schedule K-1) to be filed with the IRS. All US partnerships and (with only certain exceptions) all foreign partnerships with either US source income or income effectively connected with the conduct of a US trade or business must, at the conclusion of their taxable years, file both (1) a form 1065 partnership tax return, and (2) a Schedule K-1 return for every partner.²⁴

The universe of Schedule K-1 filings constitutes the core data for this analysis. From these filings, data is available on the net income (or loss) allocated to each partner that is: ordinary business income, net rental real estate income, other net rental income, interest income, ordinary dividends, royalties, section 179 deductions, net short term capital gain, and net long term capital gain. Unless otherwise specified, my default measure of income throughout the paper is the net income to each partner from the sum of these available categories.²⁵ Other income, gain, loss, or deduction allocation data is not available.²⁶

Prior work: matching K-1 filings to other returns

The K-1s can be matched to other federal tax returns using masked (de-identified) Taxpayer Identification Numbers (TINs) of the recipient partner. Cooper et al. (2016) use this technique, matching the recipients to annual tax returns to describe the type of partner in tax year 2011. I replicate this effort for years 2005-2019, matching recipients to 29 different

²⁴See IRC §6031 and regulations thereunder, especially Treas. Reg. §1.6031(a)-1(a) and (b).

²⁵This measure corresponds closely to what would be taxable income if the recipient is taxable on all categories of this income.

²⁶Notable missing income categories thus include qualified dividends (i.e. dividends taxed at capital gains rates) and dividend equivalents. Data are available, however, for guaranteed payments, but since these are not allocated income I do not include them in partnership income flows.

annual tax returns listed in Table 2.2. The type of recipient can generally be determined quickly by virtue of the match: for example, a partner that can be uniquely matched to a form 1120 is a corporation, while a partner uniquely matched to a form 1065 is a partnership, and so on. About 70% of income flowing to partners since 2011 can be matched to an annual return in this way, after making important accuracy adjustments discussed in Appendix B.1.

Cooper et al. (2016) additionally match partners to the masked TINs reported on withholding forms 8805, 1042-S, and 8288-A. These forms report withholding on payments to foreign persons, and thus can be used to identify the domestic or foreign status of the partner (albeit not the type of entity). I replicate this approach as well, which can account for about 4% of the income to K-1 recipients since 2011, again after making accuracy adjustments.

I thus estimate that matching K-1 recipients to the annual returns and withholding forms mentioned above can describe about 74% of the income flowing to partners. Many of the unmatched recipients receive a great deal of partnership income, notably many high-income partners, and are thus especially important in understanding flows. There are a myriad of possible reasons for this failure to match, ranging from benign to less benign. The most benign of these is that the partner is not required to file (for example, a foreign partner that has no reportable income). Other fairly benign reasons include either reporting or data errors. A less benign possibility is that these missing matches reflect underreporting, or at least behavior that obfuscates the partner's tax situation. Evidence suggests this last possibility is nontrivial, as discussed later in Section 2.5 and especially Section 2.6.

New approaches to describing the owners of partnerships

Since only about 74% of partnership income can be accounted for by matching to the returns described above, new approaches are needed to describe the unidentified partners. I thus apply several new techniques that, in combination, permit me to describe the recipients of over 99% of income flows in terms of type of recipient, domestic or foreign status, and country.

First, I match the K-1 recipients to a broader array of tax returns than prior work. These new returns do not provide income information that would be necessary to replicate the investigation by Cooper et al. (2016), but they do at least provide some insight about the type of partner, the partner's domestic or foreign status, or country more generally. These additional returns fall broadly into two categories. First, I attempt to match unresolved partners to annual returns filed in prior or future years, because TINs are unique and are not reused over time (thus a match using the masked TIN to a return in a different year should describe the same taxpayer).²⁷ Second, I attempt to match the K-1 recipients to other returns and tax records that report various non-income information to the IRS, such as applications for an Employer Identification Number (where the type of entity is reported)

²⁷It is possible that the status or classification of a taxpayer has changed over time. For example, an entity may change its tax classification or an individual who is an alien may become a US citizen. While these changes are of course possible, individuals nevertheless remain individuals, and entities remain entities. Moreover, these status changes are generally uncommon phenomena.

or reports from parent corporations about their consolidated groups (where subsidiaries are reported, who do not file returns themselves). Additional details and a list of returns matched are discussed in Appendix B.1.

In addition to broader matching efforts, I also develop algorithms that can infer the country of address, the type of partner, and the domestic or foreign status from other non-identifying information recorded on the K-1. Regarding the country of address, this information is not recorded directly as structured data, but in most cases the city or country of the address can be observed in unstructured text data on the K-1. I develop an algorithm that correctly identifies the foreign country from this information with $> 99.9\%$ accuracy.

The entity type of the partner can similarly be inferred from non-identifying information contained on the K-1. Legal abbreviations for entity types are often recorded. For example, a corporate partner will often be denoted with an “Inc.” or “Corp.” on the K-1, and a limited partnership will often be denoted with an “LLP” or “LP.” These abbreviations vary distinctly by country jurisdiction. For example, “PLC” is used in commonwealth countries like the United Kingdom or Australia to denote public limited companies, while “AG” denotes the rough equivalent in Germany, an Aktiengesellschaft. I develop a database of over 800 common legal entity denotations across 72 jurisdictions as a reference,²⁸ which I then use as the basis for an algorithm that categorizes the partners.²⁹ I also supplement this approach with an iterative bag-of-words algorithm that uses common non-identifying words in the unstructured data to predict the entity type with high accuracy. Error testing with known entity types suggests that these inferences are accurate for $> 99\%$ of observations.

Finally, the foreign or domestic status of the partner can be inferred using a combination of the information collected above. I attempt, as best as possible, to categorize individuals and entities as foreign or domestic to align with their treatment under US federal tax rules.³⁰ Most of this information is from matched filings. For example, taxpayers filing forms 1040

²⁸I create this database of legal entity types and abbreviations using a combination of the Entity Legal Forms Code List compiled by the Global Legal Entity Identifier Foundation (GLEIF) (available at <https://www.gleif.org/en/about-lei/code-lists/iso-20275-entity-legal-forms-code-list>, accessed June 23, 2021) and the European Central Bank AnaCredit entity database (available at https://www.ecb.europa.eu/stats/money_credit_banking/anacredit/html/index.en.html, accessed June 23, 2021).

²⁹This algorithm takes into account text position, spacing, rarity/commonness of the entity type, country of jurisdiction, and other features to minimize incorrect categorizations.

³⁰An individual is a US person if the individual is a citizen or a resident alien, while the individual is a foreign taxpayer if the individual is a nonresident alien. See IRC §§2(d), 871(a)(1), 7701(b), and note that resident and nonresident aliens have specific meanings for federal tax purposes (where a resident alien includes not only permanent residents but also other aliens with substantial presence or that make an election to be taxed as US persons). A corporation or partnership is domestic if it is created or organized in the United States, and otherwise is foreign. See IRC §7701(a)(4) and (5). Rules for the taxation and residency of trusts and estates are more complex. See IRC §7701(a)(30) and (31). Generally, a trust will be a US person if a US court has primary supervision authority and a US person has authority to control all substantial decisions. The domestic or foreign status of the estate depends on facts and circumstances, notably including the location of assets, the location of the administration, and the location of the representative. See Boyle (2007).

or 1120 are domestic, while taxpayers filing forms 1040-NR, 1120-F, or 1120-FSC are foreign. And while many forms are not determinative in this way, some filings like the form 1065 directly record domestic or foreign status, and other forms like the form 5471 record the country of incorporation or organization of foreign entities. When partners cannot be matched to returns that identify domestic or foreign status, I use the inference from the entity algorithm above. For example, a “GmbH” is a foreign entity, while a “PBC” (a public benefit corporation) is domestic. In cases where no inferences can be made, I use the address as the best approximation of foreign or domestic status.

Categorization of types of partners

For purposes of this paper I categorize all partners into one of seven broad types, listed in Table 2.2. To make these categorizations, I follow the approach described above in Section 2.3: when the partner can be uniquely matched to an annual return, the entity type is determined by that match; when a unique match is not possible, inference is drawn from other tax records and other non-identifying information available on the K-1, notably information about the form of legal entity as organized under its local law (e.g. whether it is an LLC, a PLC, or a GmbH, among many others). Thus, Table 2.2 documents three things: (1) the list of tax returns associated with each category of entity, (2) a small sample of common legal entity types (if any) that are associated with that category, and (3) whether this information alone (i.e. the matched return or legal entity) can be used to determine the domestic or foreign status of the partner.

As previously clarified in Section 2.2, for purposes of this paper the term “partnership” is used specifically to refer to an entity taxed as a partnership under US federal tax law. Thus, to be categorized as a partnership, the entity must actually file as a partnership for federal tax purposes.³¹

Similarly, for purposes of this paper I only categorize entities as corporations if they are classified as corporations under US tax law. I follow the rules under Treas. Reg. §301.7701-2 to make this determination, meaning that partners categorized as corporations include entities that either can be matched to a corporate return or that fall into one of the categories of entities taxed as corporations under the regulations (notably if the entity is on the list of *per se* corporations organized under foreign jurisdictions).³²

Entities with at least two owners and that are not required to be classified as corporations (e.g. an LLC) may be classified as either a partnership or a corporation under the check-the-box rules, at their owners’ election (as discussed in Section 2.2). In these cases, if the

³¹Inferring that an entity is an LLP only reveals its status under local law, not under federal tax law.

³²Entities that are classified as corporations are listed in Treas. Reg. §301.7701-2, but notably include: business entities organized as corporations under US federal or state law, joint-stock companies under US state law, state-owned business entities, and a list of specified entities organized under the laws of foreign jurisdictions, known as *per se* corporations. For example, a Sociedad Anonima organized in Argentina or an Aktiengesellschaft organized in Austria will be classified as corporations, and may not elect to be classified as partnerships.

entity cannot be matched to the return of a partnership or a corporation, it is not possible to know the classification for federal tax purposes. I refer to these entities that could fall into either category as “hybrids/other companies.”

Sometimes partnership income is received into an account held by a custodian on behalf of the ultimate beneficiary. These may include bank accounts, investment accounts, or retirement fund accounts. I categorize these recipients as custodial accounts for purposes of this paper.

The remaining categories are relatively straightforward, including individuals (which include sole proprietorships), trusts and estates, and tax-exempt/government entities. Where I can infer that the payee is an entity and not an individual, but where the entity type is difficult to determine from information available, I categorize the payee simply as an “entity.” Finally, when the information available yields no insight about the type of partner, I register the partner as being of unknown type.

2.4 A New Comprehensive Picture of Income Flows

The new data offer numerous findings and stylized facts about partnerships and income flows. Three of these stand out as especially changing our previous understanding. First, a much larger portion of reported income is flowing to foreign persons than previously thought. Second, the nature of these flows varies significantly by destination in terms of the character of income, industry, and type of recipient. And third, a growing majority of these flows go to tax havens: roughly \$1.2 trillion flowed to owners in tax havens between 2011 and 2019.

A look at previously unidentified partners

The data work discussed in the previous section permits a more comprehensive picture of income flowing to the owners of partnerships than what was previously possible. Prior research by Cooper et al. (2016) was able to describe the type of owner (i.e. entity type or individual) for 80% of partnership income, as well as the domestic or foreign status of owners for 80% of partnership income, but did not describe the country of foreign persons.³³ By comparison, the data work in this paper permits a description of the owner for over 99% of income in terms of all three dimensions: the type of recipient, the likely domestic or foreign status, and the country of foreign persons.

So who were these previously missing partners? Figure 2.8 compares the partners as described in Cooper et al. (2016) against the partners as I describe them in this paper using the

³³I arrive at these numbers by the following deduction. First, the type of entity was not known for the 13% of income received by partners that remained totally unidentified, and for the approximately 7% of income received by foreign persons that were not matched to a form 1120-F or 1120-FSC. The domestic or foreign status cannot be identified for the 13% of income flowing to unidentified recipients and the 7% flowing to partners with an unidentified EIN. The status may also not be knowable for tax-exempts (reflecting up to another 6% of income).

new data. The largest portion are foreign: more than double the share previously estimated is going to foreign partners. I also find substantially larger shares going to corporations and to trusts and estates. I find additional income going to higher tier partnerships as well. But I also see some groups receiving a smaller share than previously estimated, notably US individuals, dropping from roughly one third to one quarter of reported income.

What's driving these differences? Most of the changes come from being able to describe the previously unidentified partners, where the majority of that income was going to foreign partners and corporations. These findings confirm the suspicion of Cooper et al. (2016) who predicted this to be the case.³⁴ The previously unidentified corporations appear to be non-filing subsidiaries in larger consolidated groups, meaning that they could not be matched to an annual return directly. The previously unidentified foreign partners are also unable to be matched to annual returns, but for unclear reasons.

There are two other reasons for the differences observed in Figure 2.8. There is also a trend, as observed in Figure 2.2 and Figure 2.3, where more income is flowing to foreign partners. Cooper et al. (2016) focused exclusively on 2011, whereas the new data incorporates these more recent years. Finally, I use new methods to improve accuracy of matches between K-1s and annual returns, which I estimate affects as much as 21% of the flows. These methods are discussed in Appendix B.1.

Where in the world was this missing income going? Largely to tax havens. Figure 2.9 presents the top 20 identified countries of the foreign persons that are among the newly identified partners. A full 13 of the 20 are tax havens, with well over \$200 billion flowing to partners in the Cayman Islands alone.

Where in the world is partnership income going?

Combining the newly identified partners discussed above with a richer description of previously identified partners, a new comprehensive picture of the flows of partnership income emerges. First and foremost, the share of income flowing to foreign persons is much higher than previously thought. As seen in Figure 2.3, a large and rising portion of partnership income flows to foreign owners, representing 17% of partnership income between 2011-2019, roughly double previous estimates.

Where is this income going? Most of it to tax havens, as seen in Figure 2.2 and Figure 2.3. Roughly \$1.2 trillion has flowed to owners in tax havens since 2011, representing about 10% of income flowing to owners of partnerships.

The largest portion of this income goes to the Cayman Islands, where about \$500 billion has flowed to owners since 2011. The Cayman Islands has established itself as a leading offshore financial center that caters to the asset management industry and that offers: zero taxes on business and investment income, a well developed financial services industry, and investor-friendly laws and regulations (Fichtner, 2016). It is the domicile of more than half

³⁴See pg. 117 of Cooper et al. (2016): "Note that the income shares for the unidentified partner types most closely resemble a mix between the foreign entity and C- corporation income shares."

of the world's hedge funds, and as of 2020 is reported to have more than \$5.5 trillion in portfolio investment from abroad.³⁵

But other tax havens receive large partnership income flows as well. I break tax havens down into four categories for this analysis, presented in Table 2.1. Given the scale of flows, I treat the Cayman Islands as a unique category itself. Second, the “Zero Rate” havens are tax havens with a zero corporate tax rate, like the Cayman Islands. These havens fulfill a similar role in international finance, offering a zero-tax jurisdiction to establish a corporation that can receive income flows that would be taxed in other jurisdictions. I estimate that about \$240 billion flowed to zero-rate havens other than the Cayman Islands, notably including the British Virgin Islands (about \$85 billion), Bermuda (about \$56 billion), as well as Jersey and Guernsey (about \$40 billion each).

Third, “Other Haven” countries have been classified as havens often for reasons besides low tax rates. These countries often lack transparency about the details of the tax regime or enforcement, have limited or inadequate regulatory supervision of offshore financial services, have ring-fenced the offshore financial services sector from the rest of the domestic economy, or have little effective information exchange with international tax authorities (see OECD, 2000). I estimate that about \$250 billion flowed to these havens, notably including Luxembourg (about \$82 billion) and Curaçao (about \$54 billion).

Finally, “Conduit” countries are countries that have low corporate tax rates, but also are more well connected to larger economies through treaties, trade, and law and culture more generally. These countries, in addition to their low rates and legal integration with advanced economies, often stand out as facilitating flows of income from low-tax (or zero-tax) jurisdictions back to larger higher-tax economies where ultimate owners may reside. A succinct description is available in Garcia-Bernardo et al. (2017):

[Conduit countries] typically have low or zero taxes imposed on the transfer of capital to other countries, either via interest payments, royalties, dividends or profit repatriation. In addition, such jurisdictions have highly developed legal systems that are able to cater to the needs of multinational corporations. Conduits play a key role in the global corporate ownership network by allowing the transfer of capital without taxation. In this way, profit from one country can be re-invested in another part of the world paying no or little taxes. Countries such as the Netherlands and Ireland have been criticized for these types of activities.

There are four conduit countries I flag in this study, each of which is among the top 20 jurisdictions. These include the Netherlands (about \$141 billion), Singapore (about \$43 billion), Switzerland (about \$39 billion), and Ireland (about \$29 billion). The United Kingdom is often included in this list as well, which I estimate received about \$170 billion.³⁶

³⁵See IMF, Coordinated Portfolio Investment Survey, Table 8: Derived Portfolio Investment.

³⁶I exclude the UK from my list as a conservative measure, because it is also one of the United States' largest trading partners.

I also find a substantial amount flowing to owners I refer to as being resident in “undisclosed” foreign jurisdictions. In other words, I have evidence that they are indeed foreign individuals or entities, but do not have sufficient information to assign a specific foreign jurisdiction for tax residence purposes. In most of these cases, the owner reports a US address on the K-1 (e.g. a GmbH with a New York address). Out of the roughly \$210 billion I estimate flowing to these owners, about 99% appears to flow to US addresses, with individuals constituting roughly 60% of these flows. Another 10% appear to flow to custodial accounts of foreigners located in the US, and about 20% flow to business entities.

Variation by destination, and trends over time

The income flowing to US owners is very different than income flowing to foreign owners in terms of industry composition, character of income, and the type of entity receiving the income. These differences are highlighted in Figure 2.10, Figure 2.11, Figure 2.12 and later in Figure 2.15.

First, it is well known that finance and related industries constitute the majority of partnership income flows, but I find that this share varies substantially by the destination of the income. Flows to US owners between 2011-2019 are 63% from the finance industry and about 34% from the investment industry specifically, whereas the shares are much higher for flows to foreign owners at 87% and 70%, respectively. The share of finance is more extreme in flows to Cayman Islands partners, constituting 98%, with 88% from the investment industry. The main industry driving the distinction is professional services (e.g. law or consulting), which represents 10% of flows to US partners but only about 2% to foreign owners. In the US there is also a scattering of industries that have small but notable share—such as information (4%), health (3%), wholesale trade (2%), and construction (2%)—which add up when aggregated.

The trends over time for the industry composition are very stable for the US and Cayman Islands partners, but for other foreign partners the share of finance has grown notably. Part of this is likely due to a jump in reported income in portfolio income after 2010 (perhaps attributable to FATCA, discussed in detail in Section 2.6). But even after 2011, the share of finance is growing. The industries with previously large but falling shares are mostly pharmaceuticals and petroleum-related industries, which are components of manufacturing.

Second, the type and character of income flowing to US partners is substantially different than flows to foreign partners. Ordinary business income constitutes 42% of the income flows to US partners 2011-2019, and real estate income constitutes another 11%. For foreign partners these two types of income represent only 14% and 2% respectively. Similarly, whereas portfolio income comprises a large share of the income to foreign partners—notably capital gains (52%), interest (16%), and dividends (14%)—US partners have a much smaller share represented by portfolio income: 31% capital gains, 8% interest, and 7% dividends. The Cayman Islands are even more pronounced in their divergence from the flows to US owners, with portfolio income constituting 96% of partnership income flows, and an especially large share (29%) represented by interest. In terms of trends over time, while the US shares have

remained relatively stable aside from the financial crisis (where portfolio income dropped in share), the share of portfolio income to foreign persons has been increasing over time.

Third, the type of recipient is also distinctly different by destination, as observed below in Figure 2.15, which presents the owners by type. A large portion of income flowing to US partners flows to individuals (44%) and trusts and estates (16%). By comparison, only 14% of income to foreign persons goes to individuals, and only 3% to trusts and estates. The majority instead goes to business entities, mostly corporations (38%) and hybrid/other private companies (19%). A decent portion as well goes to entities where the types could not be categorized based on the information available (19%). Again, the Cayman Islands represents a more pronounced departure from the US, with 55% flowing to corporations and 23% to hybrid/other companies, and only 1% going to individuals. These shares have remained fairly stable since 2011.

Income distribution over time

Consistent with prior studies, I confirm that partnership income is highly concentrated among top earners. Of the partnership income flowing to households, roughly two-thirds (60-70%, depending on the year) flows to the top 1%. Very little flows to the bottom 90% of earners (i.e. only 12-18%). In fact, a larger portion of partnership income goes to the top 0.01% of earners (i.e. 17-21%) than to the bottom 90%. The top 0.1% of earners receive 37-44% of partnership income. I also find that this pattern has been largely consistent over time, as seen in Figure 2.13.³⁷

2.5 What's going on? Evidence of blocker arrangements

The new data suggest that these flows of partnership income to tax havens are largely driven by financial investment firms using entity arrangements that shield both foreign and US investors from reporting and taxes. By setting up a “blocker” corporation in a zero- or low-tax jurisdiction, and having foreign and certain US investors invest through this entity rather than directly into the fund, the investors can be shielded from certain tax obligations. Most of the income flowing to the blocker is not taxed by the United States, and the blocker typically faces zero tax in the tax haven. Once the income is in the blocker entity, it can be retained there or distributed either back to the United States or to a foreign jurisdiction in a tax efficient manner.

³⁷To calculate these trends, I match the K-1 payees to form 1040 individual returns, and determine where each individual recipient falls within the US income distribution by comparing adjusted gross income reported on the form 1040 to the distribution calculated using data from the IRS Statistics of Income.

The role of a blocker entity in a fund structure

a. Tax and reporting issues arising from the use of partnerships

Although partnerships offer many advantages that make them appealing to investment funds (discussed in detail in Section 2.2), the passthrough nature of partnerships also creates certain reporting and tax obligations for recipient partners. These obligations may be undesirable for investors who hope to avoid interactions with tax authorities, for either benign or less benign reasons. Blocker corporations organized in tax havens can be used to shield investors from these obligations.

First, all US partnerships and (with few exceptions) all foreign partnerships with income that is either effectively connected with a US trade or business or that is US source income must file a partnership return, as well as a schedule K-1 for each partner, thus disclosing information about the partners and the income they receive.³⁸ Second, if the income is effectively connected with a US trade or business, the partnership must also withhold on this income at the highest applicable rate and report this information to the IRS.³⁹ Third, if the income is US source income, the partnership must withhold at a 30% rate (unless a lower rate can be claimed under a treaty) and report this information to the IRS.⁴⁰ Fourth, a special problem arises for US tax-exempt investors: unrelated business taxable income (UBTI). The rules are complex, but if the partner is a tax-exempt investor (such as a university, charitable organization, foundation, or pension or retirement fund) and the income received is either derived from a business activity unrelated to the organization's exempt purpose or from a debt-financed (leveraged) investment, then the income received by the tax-exempt organization will be taxable at corporate rates.⁴¹

³⁸See footnote 24 and accompanying text.

³⁹See IRC §§871(b), 882, 875(1), 1446, and forms 8804 and 8805. The highest applicable rates are 37% for individuals and 21% for corporations, but prior to the Tax Cuts and Jobs Act of 2017 these rates were 39.6% and 35%, respectively. This income is taxed on a net basis, meaning that deductions may be applied.

⁴⁰US source income is income that is not effectively connected with a US trade or business but that arises from US sources and is "fixed, determinable, annual or periodical" income, which generally includes all income other than capital gains. See §§871(a) and 881. Partnerships must withhold on payments of US source income to foreign partners (except in the case of a nonwithholding foreign partnership as described in Treas. Reg. §1.1441-5(c)(3)(v)) on a gross basis (meaning deductions do not apply) at a 30% rate, unless an exemption applies or a reduced rate is available under a treaty. See §§1441 and 1442. A foreign payee can claim a reduced rate of withholding or an exemption if such benefit is available under a bilateral treaty between the United States and the foreign person's country of residence. In such cases, the final tax rate depends on the type of income: it is often reduced to 15% for dividend income, and 10% (or sometimes 0%) for interest and royalty income. The payee may file a W-8BEN or W-8BEN-E with the withholding agent to claim such exemption or reduced rate. For a list of rates under bilateral tax treaties, see IRS Tax Treaty Table 1: Tax Rates on Income Other Than Personal Service Income Under Chapter 3, Internal Revenue Code, and Income Tax Treaties, available at https://www.irs.gov/pub/irs-utl/Tax_Treaty_Table_1_2019_Feb.pdf.

⁴¹Income is generally UBTI if it is from a trade or business regularly carried on by the organization that is unrelated to its exempt purpose. See IRC §§511 and 512. Likewise, if the organization is a partner in a partnership engaged in such unrelated activities, the income flowing to the organization attributable to these activities is UBTI for the tax-exempt organization. See IRC §512(c). An important exclusion, however, is that most passive investment income is not UBTI, notably dividends, interest, and gains or losses on the

b. Basics of the blocker structure

An investment fund can avoid these issues for both its foreign and US tax-exempt investors by adding a “blocker” corporation organized in a low- or zero-rate tax haven into its fund structure. This entity serves as a partner in the investment fund, and the foreign or US tax-exempt investors invest in this blocker corporation rather than in the fund directly. As a result, all the reporting and tax obligations are incurred by the blocker rather than by the ultimate investors. And because the blocker is organized in a tax haven, little or zero tax is owed on the income it receives from the partnership.

A very simple example fund arrangement that utilizes a tax haven blocker corporation is portrayed in Figure 2.4, known as a “Master Feeder” structure. This structure is designed to accommodate the different tax needs of investors by letting them invest into separate “Feeder” funds, rather than investing into the “Master” fund directly. The Master Fund is the main investment entity that owns the portfolio of investments, and may either be a US partnership or foreign partnership organized in a tax haven like the Cayman Islands.⁴² The Master Fund has two limited partners that serve as Feeders: a US limited partnership through which US taxable investors invest, and a blocker entity organized in a tax haven, through which foreign and US tax-exempt investors invest.⁴³ This blocker entity may be a corporation or any other business entity that elects to be classified as a corporation under the check-the-box rules.

By “checking the box” to classify the tax haven entity as a corporation for US tax purposes, all of the US reporting and tax obligations incurred on account of being a partner in the fund are borne by the blocker rather than by the investors. Similarly, any information reported by the partnership about its partners will be about the blocker entity, not the investors.⁴⁴ Note that this benefit is especially appealing if the investor is not an individual or corporation, but is a foreign partnership that itself may have many foreign partners.

disposition of securities. See IRC §512(b). But there is also an important exception to this exclusion: the income generated by any asset acquired using debt *is* taxable as UBTI. See IRC §512(b)(4). Note as well that fees paid to the fund would likely generate UBTI for tax-exempt investors. The amount that is UBTI is determined by the amount of indebtedness relative to the adjusted basis of the income-producing asset. See IRC §514.

⁴²Using a foreign partnership makes it easier to avoid any foreign portfolio companies qualifying as a controlled foreign corporation, and also permits the master fund to avoid assuming withholding responsibility on US source income. See Treas. Reg. §1.1441-5(c), explaining that for payments to a nonwithholding foreign partnership, the payer treats the partners as the payees and must withhold appropriately.

⁴³Limited partners do not engage in management of the fund, and enjoy limited liability. This is in contrast with a general partner, which has management power but also faces unlimited liability. In the structure described here, Feeders are limited partners, while typically two more entities are created to represent the investment professionals: an investment manager (also a limited partner) that receives a management fee, and the general partner, which receives a performance allocation (carried interest). The general partner is organized as an LLC, which protects investment professionals with limited liability. For more discussion about hedge fund structures, see Freeman and Nitschke (2003); Lhabitant (2007); Miller and Bertrand (2011).

⁴⁴For example, information included on a schedule K-1, form 8805 or form 1042-S will be about the blocker.

c. Withholding taxes

By carefully managing investments to ensure they generate only certain types of income (namely interest and capital gains), funds can avoid US withholding tax by ensuring that the blocker does not receive either effectively connected income or taxable US source income. As a result, even though the United States has few tax treaties with tax haven countries (where treaties are used by foreign persons to reduce withholding rates), the absence of a treaty is not a concern because there is no withholding on this income.

This result is attributable to the confluence of three separate tax rules. First, foreigners who trade in securities and commodities are exempted from being treated as engaged in a taxable trade or business in the United States—thus the blocker will generally not be treated as receiving effectively connected income by virtue of the trading activities of the investment fund.⁴⁵ Second, most interest payments received by the blockers are covered by the “portfolio interest exemption,” a rule that broadly exempts interest payments on most debt instruments to foreign persons from the withholding tax on US source income.⁴⁶ Finally, capital gain on the sale of US financial assets by a foreign person is generally not subject to US tax.⁴⁷ Thus, a fund can structure its investments for foreign and tax-exempt investors so that the blocker receives income mostly (or entirely) as capital gains and interest, minimizing US tax. This practice has become much easier as US companies have shifted toward share repurchases over dividends as a preferred way to return capital (Grullon and Michaely, 2002; Zeng and Luk, 2020).

d. US tax-exempt investors

The blocker enables US tax-exempt investors to avoid receiving UBTI. Any income that would have been UBTI from the fund in the hands of the tax-exempt organization is absorbed by the blocker corporation. The tax-exempt investor can then receive this income as dividends or capital gains (by either selling or liquidating the investment). Both dividends and capital gains are excluded from UBTI.⁴⁸ In addition, anti-abuse provisions penalizing US taxpayers for accumulating assets in low-tax jurisdictions do not capture this arrangement.⁴⁹

⁴⁵See IRC §864(b)(2). The exemption applies to both trading through an independent agent or broker or trading on the taxpayer’s own account. Treasury clarified through regulations that partners in investment partnerships were covered by the exemption. See Treas. Reg. §1.864-2(c)(2)(ii). The exemption does not apply to dealers.

⁴⁶See IRC §871(h) and §881(c). The exemption is generally not available for interest on foreign bank loans, 10-percent shareholders of the debtor, or to CFCs when the interest is received by a related person.

⁴⁷US source income excludes almost all gains from sales of property. See IRC §871(a) and Treas. Reg. §§1.871-7(a)(1) and 1.1441-2(b)(2)(i). In addition, source rules define income from the sale of personal property as foreign source if the seller is a foreign person. See §865(a). Capital gains of foreign persons are generally only subject to US tax when they are effectively connected with a US trade or business, arise from a US real property interest (see IRC §§897 and 1445), fall into specific categories in IRC §§871(a) or 881(a), or when an individual caught in the unlikely case of IRC §871(a)(2).

⁴⁸For additional analysis, see Joint Committee on Taxation, Present Law And Analysis Relating To Tax Treatment Of Partnership Carried Interests II, September 6, 2007. See also Brunson (2012).

⁴⁹The PFIC rules do not apply unless the income would be “taxable to the organization under Subpart

e. Foreign investors

For foreign investors, the blocker entity offers some flexibility to choose how income ultimately flows back to the investor. In particular, the blocker can be organized as a corporation under local law, or the blocker can be designed to be tax neutral as a “hybrid entity”—i.e., organized as a partnership for purposes of local and foreign law while checking the box under US tax law so that it is treated as a corporation for US tax purposes. In this case, from the perspective of the investor’s jurisdiction, the income simply flows through the blocker.

The optimal arrangement, and any further entity arrangements above the blocker, will depend entirely on the investor’s idiosyncratic circumstances and the laws of the investor’s jurisdiction. For instance, if the foreign investor is in a jurisdiction with especially lenient tax rules—such as another tax haven—a blocker organized as a corporation might be used to receive ordinary income (e.g. interest income), which could then be extracted by the investor from the corporation as tax-preferred dividends or capital gains. On the other hand, strong anti-abuse rules in the investor’s jurisdiction may make the hybrid approach more appealing. In addition, there may be important non-tax considerations that factor into the decision, such as industry-specific regulations.

The challenge for most foreign investors in high-income countries is that most of these jurisdictions have anti-abuse rules preventing deferral or otherwise taxing passive investment income in low-tax jurisdictions.⁵⁰ Thus, for many foreign investors there may be no additional tax reductions through creative structuring, at least without engaging in evasive activity.

In addition to the above points, a blocker entity may protect the foreign investor from the application of the US estate tax. Foreign investors are subject to the estate tax to the extent of their property “situated within the United States.”⁵¹ The rules are complex, but without the blocker, the investor could face tax on either the interest in the partnership or its US assets.⁵²

f. US taxable investors

Blocker arrangements in tax havens are generally not appealing for US taxable investors, for several reasons. First, unlike foreign investors, the blocker does not shield the US taxable investor from IRS reporting: as a US person, the investor must file US tax returns. Second, the US taxable investor does not benefit from potential tax reduction in the same ways that US tax-exempt investors or foreign investors do. To the contrary, using the blocker entity will potentially incur unnecessary withholding taxes on US source income (notably on dividends) and also risks incurring tax on effectively connected income if the blocker is

F” (Treas. Reg. §1.1291-1(e)(1)), but Subpart F rules usually do not apply because the ownership of the blocker can be organized to ensure that the entity is not a Controlled Foreign Corporation (e.g. the US owners can make sure to own less than 10% each — see generally IRC §§951 and 957). Even if Subpart F did apply, the income included would typically be passive investment income and thus would not constitute UBTI, and thus would not be taxable, so that the PFIC rules are not triggered.

⁵⁰See EY (2019) *Worldwide Corporate Tax Guide*, and prior years.

⁵¹IRC §2106.

⁵²See Cassell et al. (2003) for detailed coverage of this issue.

deemed to be carrying on a US trade or business. The US taxable investor could avoid these taxes by simply investing through a partnership. Third, if the fund's investments generate net losses, the blocker will prevent these losses from passing through to the investor to offset other gains or income.

Finally, the US taxable investor is also subject to anti-abuse rules that are designed to discourage accumulation of passive income in tax havens: the Controlled Foreign Corporation (CFC) rules and Passive Foreign Investment Company (PFIC) rules. The CFC rules prevent deferral of US taxation on income received by foreign corporations substantially owned by US persons. If the CFC rules are triggered, the US investor is taxed on the investment income received by the blocker, even if none of that income is distributed to the investor.⁵³ If the CFC rules are not triggered, the blocker will instead be subject to the PFIC rules, whereby the investor must either choose to currently pay taxes on undistributed income of the blocker or face high tax rates later upon disposition of her interest in the blocker.⁵⁴ In most cases, these anti-abuse rules leave the investor in at best a comparable position to what would have been the case if she instead invested through a partnership, and at worst in a position with a substantially higher tax liability.

But while US taxable investors do not generally benefit from a blocker arrangement, investors engaged in evasive behavior may still benefit, as the blocker makes it difficult for US tax authorities to ascertain where the income goes beyond the blocker. Although empirical research suggests such evasive behavior may have been nontrivial in previous decades (Hanlon et al., 2015), the passage of FACTA in 2010—which requires additional reporting by foreign financial entities about US owners, including by investment funds—has made evasion through such arrangements more difficult.⁵⁵ Likewise, recent research suggests that although US persons account for some of the world's offshore hidden wealth, it is small share relative to the size of US wealth overall (Alstadsæter et al., 2018). Unfortunately, however, it is likely impossible with available data to ascertain whether, or to what extent, arrangements like these facilitate evasion as opposed to avoidance, since the presence of a foreign blocker conceals the investors above that blocker.

⁵³Very generally, a foreign corporation is a CFC if more than 50% of the stock of that corporation (by vote or value) is owned by “US shareholders.” US shareholders are US persons who each own (directly, indirectly, or constructively) at least 10% of the stock of the corporation. See IRC §§951, 957, 958. If the corporation is a CFC, US shareholders must include in their current gross income their pro rata shares of certain income of the CFC, even if it is not distributed to the shareholder (generally passive investment income, earnings invested in US property, and other income that is easy to shift between entities). See IRC §§951, 952.

⁵⁴A foreign corporation is a PFIC if at least 75% of its income is passive or at least 50% of its assets generate passive income. See IRC §1297. Unlike CFCs, no minimum ownership is required—the rules apply to any US shareholder owning any portion of the corporation. The rules are complex, but very generally, the investor has three options. The investor may elect to be taxed on her share of income received by the PFIC (i.e., the Qualified Electing Fund option) or to be taxed annually at ordinary rates on the increase in the value of the stock of the PFIC (i.e., the mark-to-market option). See IRC §§1293-1296. If no election is made, the investor is subject to the default option: tax imposed upon the disposition of the interest in the PFIC at ordinary rates, plus imputed interest accrued over time. See IRC §1291. For most investors, the Qualified Electing Fund option is preferable.

⁵⁵See Section 2.6 for a more detailed discussion of FATCA.

Evidence of these arrangements in the data

The new data strongly suggest that these income flows to tax havens are driven by entity arrangements like those described above. In short, I find that the vast majority of the partnership income flowing to tax havens is in the finance industry (specifically in the investment industry), is received by entities that can serve as blockers (corporations or hybrids eligible to check the box as corporations), and is mostly of a character that is exempt from US tax.

First, as discussed previously in Section 2.4, income flowing to tax havens is overwhelmingly in the finance industry, especially in the investment industry. Breaking down the flows further by type of haven destination, as shown in Figure 2.14, reveals that the tax havens most amenable to this type of arrangement (i.e. the Cayman Islands and other zero-rate jurisdictions) exhibit the highest concentration of income in finance and portfolio investment. I estimate that 88% of income flowing to owners in the Cayman Islands between 2011 and 2019 arises from the portfolio investment industry, as does 81% of the income to owners in other zero-rate havens.

Relatedly, I find that tax havens represent a substantial portion of the investment industry's total flows. I estimate that 23-26% of all partnership income in the investment industry flows either to or from a tax haven.⁵⁶ I also estimate that roughly 37% of all partnership income in the investment industry flows through partnerships that have at least one partner that is likely a blocker in tax havens.

Second, most of the income flowing to tax havens is received by entities rather than individuals—specifically by corporations or hybrid entities that are able to check the box to be classified as corporations for US tax purposes. As shown in Figure 2.15, this pattern is most apparent for the Cayman Islands and for other zero-rate tax havens, where this arrangement makes the most sense. In the Cayman Islands in particular, 77% of the income received is by either corporations or hybrid entities, and another 16% is received by entities where the type cannot be determined but which could also be entities eligible for this arrangement. Honing in on these undetermined entities, I find that 99% of the income flowing to them in the Cayman Islands and 98% flowing to them in the other zero-rate havens is in the finance industry, further suggesting that many of these entities are functioning as blockers as well.

Third, the income flowing to tax havens is substantially of a character that is not subject to US tax. As discussed previously, capital gains to foreign persons are generally not taxed by the US, and interest income is generally exempt through the portfolio interest exemption.⁵⁷ The overwhelming majority (83%) of income flowing to the Cayman Islands falls into these exempt categories, and 75% of income flowing to other zero-rate havens does as well. In addition, the trading safe harbor likely covers almost all of the income flowing to these

⁵⁶I calculate the range as follows. For the low end, I look only at income flowing to owners, and identify the country of the owner and the country of the partnership from which the income flows. For the high end, I include income flowing to higher-tier partnerships as well, but exclude flows to partnerships in the same country as the lower-tier partnership to minimize double-counting.

⁵⁷See footnote 47 and footnote 46.

havens, given the predominance of passive income and that these flows are largely in the finance industry.⁵⁸

These inferences are confirmed by withholding data reported on Forms 8805 (income effectively connected to a US trade or business) and 1042-S (US source income). As shown in Figure 2.5, little of this income is effectively connected to a US trade or business, likely on account of the trading safe harbor. As well, little tax is collected on US source income, as most of the income flowing to havens falls into an exempt category, as confirmed by Figure 2.17. In particular, much of the income flowing to tax havens is capital gains and portfolio interest.

I also find evidence that partnerships are frequently set up in the Cayman Islands as “Master Funds” in a structure similar to the one depicted in Figure 2.4. In this case, the income flows up from a Cayman Islands partnership (rather than from a US partnership) to the “Feeder” entities that separately serve US taxable investors and other investors. I estimate that at least \$340 billion between 2011 and 2019 flowed through such Cayman Islands Master Funds.⁵⁹ I also estimate that about \$210 billion flowed through partnerships with similar ownership structures in other zero-tax havens. In total, I estimate that roughly \$320 billion of the net income reported on the K-1s of tax haven partnerships flowed back to the US, as seen in Figure 2.18.⁶⁰

It is important to note that other tax havens are much less amenable to this type of tax planning structure, namely because of the non-zero corporate tax. If the investors are indifferent between jurisdictions on other respects, there is no reason to incur unnecessary taxes by incorporating a blocker entity in a higher-tax jurisdiction. As a result, the large amount of income flows to other jurisdictions likely reflect different motivations and structures. This is especially the case for the “other haven” countries. The decomposition of income suggests that there are more individual, custodial, and trust recipients in these jurisdictions, and less income originates in finance. Some may largely be legacies of a previous era of planning, such as Curaçao.⁶¹ But many others specialize in secrecy, raising concerns about their prominence.

Issues for US tax policy

These findings offer new evidence that contributes to ongoing discussions about US tax policy. In particular, the large flows to tax havens highlight complex policy trade-offs.

⁵⁸See footnote 45.

⁵⁹I identify Cayman Islands Master Funds by finding partnerships organized in the Cayman Islands that have at least one partner that is a US partnership and at least one partner that is an entity in a tax haven. This is likely a lower bound, because it does not capture more complex arrangements.

⁶⁰It’s important to note that some, likely small, portion of this income may be double-counted. For example, income could flow through a Cayman Partnership, back to a US partnership, back to a tax haven partnership, and back to a US partnership. But the transaction costs of these additional layers, with no tax benefit, suggest any such double-counting is minimal.

⁶¹Curaçao was a more prominent offshore financial center prior to the 1980s. See van Beurden and Jonker (2021) for a discussion of the history.

On the one hand, there is value to attracting foreign investment. The US tax exclusions that make these tax haven arrangements possible—namely the trading safe harbor and the portfolio interest exemption, each described above—were enacted with the explicit purpose to attract foreign capital to the United States.⁶² Indeed, the US economy benefits greatly from abundant foreign portfolio investment, which finances new businesses and investments and lowers borrowing costs for households, businesses, and the government.

On the other hand, the new evidence presented here—revealing large amounts of passive investment income flowing tax-free from the United States to anonymous investors shielded by entities in tax havens—raises issues that highlight how the path that foreign investment takes is important as well. First, under the current framework a tax burden is shifted onto American taxpayers: in addition to any foregone revenue on these flows, blockers in tax havens shield tax-exempts from UBTI and foreigners from estate tax, but most importantly the blockers make it more difficult for US authorities to detect evasion or underreporting of other US tax liabilities.⁶³ Second, there is deadweight loss: capital and labor are expended to create and maintain the offshore arrangements for investors, valuable resources that could be devoted to more productive bona fide business activities. Third, there are externalities: condoning activities in tax havens to attract capital encourages a “race to the bottom” across nations.⁶⁴

In light of these trade-offs, empirical research is needed to assess the likely net effects of

⁶²For a discussion of the trading safe harbor and portfolio interest exemption, see footnote 45 and footnote 46, and accompanying text, respectively. The trading safe harbor was enacted as one of many provisions in the Foreign Investors Tax Act of 1966 to promote foreign investment, with the particular goal being to reduce uncertainty over the tax treatment of foreign persons investing and trading through domestic agents. See Sen. Rep. 1707, 89th Cong., 2d Sess. 9 (1966), and Tillinghast (1967). The portfolio interest exemption was enacted as part of the Deficit Reduction Act of 1984, and was intended specifically to support debt-issuing US companies competing for foreign capital in the Eurobond market. Prior to the enactment of the portfolio interest exemption in 1984, US companies faced additional costs competing for capital in the Eurobond market, typically having to gross up lenders for any withholding tax to remain competitive with foreign companies in jurisdictions where withholding was not imposed on outbound interest payments. To avoid the tax, US companies typically issued debt through a shell company subsidiary organized in the Netherlands Antilles. An exemption for US source interest payments was claimed under the US-Netherlands bilateral tax treaty. See Staff of Joint Committee on Taxation, 9th Cong., 2d Sess., General Explanation of the Revenue Provisions of the Deficit Reduction Act of 1984, at 391 (1984). Although the exclusion of capital gains from US source income is also relevant, in that much of the income flowing to tax havens is capital gains, the historical context is different in that the exclusion was driven mostly by concerns of administrability. The concern was that it would be difficult for the payor to ascertain the foreign seller’s adjusted basis in the asset to withhold on the net amount, and withholding on the gross amount appeared draconian. See Veliotis (2019) for a discussion of the history and this topic generally.

⁶³The shifted tax burden is exacerbated by the strong trend of US companies opting for share repurchases over dividends as a preferred way to return capital to shareholders. The repurchases, unlike dividends, are not caught by withholding on US source income.

⁶⁴To clarify the point on externalities: by enacting a policy that attracts highly mobile capital, other nations are encouraged to enact equally or more lenient policies to attract the capital back, constraining public revenue and further incentivizing investment in the havens. See Wilson (1999); Slemrod and Wilson (2009); Keen and Konrad (2013). For a discussion of the international responses in the years after the United States’ enactment of the portfolio interest exemption, see Avi-Yonah (2000).

policy counterfactuals. The economic incidence of a tax policy depends on the elasticities of the market participants. Some existing research suggests that cross-border portfolio investment is sensitive to taxes (Desai and Dharmapala, 2011; Jacob and Todtenhaupt, 2020), but these studies do not focus on investment flowing into the United States, which is in a league of its own when it comes to attracting foreign portfolio investment.⁶⁵ For many reasons, demand for access to US capital markets is likely much more inelastic than for any other country, which would offer more space to adopt tax policies addressing these issues.⁶⁶ That said, unilateral action is not the only alternative—in fact, in dealing with tax havens a coordinated policy is theoretically optimal to minimize externalities incurred by an otherwise unilateral actor (Slemrod and Wilson, 2009; Keen and Konrad, 2013).⁶⁷

In addition to this general discussion regarding outbound flows to tax havens, there is also a more specific question about whether the treatment of US tax-exempt investors is appropriate. US tax-exempt investors use tax haven blockers to avoid UBTI, primarily by shielding them from a fund's debt financing. Evidence suggests this practice is prevalent.⁶⁸ But the anti-leverage rules were originally enacted to prevent abusive sale-leasebacks, rather than bona fide investment (see Brunson, 2012). Thus, current rules are a strange middle-ground that neither allows nor blocks leveraged investments: US tax exempts still invest with leverage tax-free, but must re-route their investments through a tax haven to do so. Is this a loophole that should be closed, or an inefficiency that should be eliminated?

It is beyond the scope of this paper to answer all of the policy questions posed here. As noted in the introduction, the focus of this paper is to empirically describe the income flows to the owners of partnerships, and to shed light on arrangements never before quantified. But one point is clear: given the magnitude of the flows presented here, policy choices in this space are likely highly consequential.

⁶⁵From IMF data, the United States not only is the leading destination for international investment, but boasts four times the amount of the next non-haven country, the United Kingdom. See IMF, Coordinated Portfolio Investment Survey, Table 8: Derived Portfolio Investment.

⁶⁶The United States is the largest economy in the world by nominal GDP, has by far the largest consumer market, is the world's largest importer and second largest exporter, boasts the world's largest stock market, issues government debt that is considered a world safe haven asset, is defended by the world's largest military, controls the world's reserve currency, and is by any measure consistently among the most resilient, dynamic, and innovative economies.

⁶⁷Notable efforts have been made toward international tax cooperation in recent years to address avoidance and evasion. See Mason (2020) for a general overview. For an overview of recent OECD and G20 initiatives, see OECD/G20 Inclusive Framework on BEPS Progress: Progress Report, September 2021, available at <https://www.oecd.org/tax/beps/oecd-g20-inclusive-framework-on-beps-progress-report-july-2020-september-2021.pdf>.

⁶⁸See Prequin (2014), suggesting a majority of US-based investors in US hedge funds (by count) are tax-exempt. See also Silber and Wei (2015).

2.6 Additional income reporting after 2010

I find a large jump in income reported to foreign partners on K-1s between 2010 and 2011, which can be clearly seen in Figure 2.2 and Figure 2.3. After decomposition analysis, the pattern of the increase suggests that it was prompted in large part by a combination of (a) additional reporting requirements under the Foreign Account Tax Compliance Act (FATCA) and (b) new rules about the taxation of dividend equivalent payments to foreign persons.

a. FATCA

Enacted in March 2010 as a measure to reduce evasion by US taxpayers, FATCA imposes a new 30% withholding tax on a broad range of payments to foreign entities, a tax which can only be avoided if the foreign entity is in compliance with new reporting requirements regarding any accounts or interests held by US persons.⁶⁹ In particular, the act imposes new filing requirements for “foreign financial institutions,” which include banks, broker-dealers, custodians of retirement funds, and notably investment funds like hedge funds, private equity funds, and venture capital funds.⁷⁰ The new withholding tax applies to payments that are not otherwise subject to withholding, including portfolio interest and capital gains on financial assets.⁷¹

The imposition of a new withholding tax broadly covering capital gains on portfolio investment is notable, because these capital gains are generally not otherwise taxed when received by foreigners.⁷² In fact, because such capital gains are not US source income, they were not even reported on form 1042-S. Thus, prior to FATCA, capital gains received by foreigners that were not reported on a K-1 were generally not required to be reported elsewhere. But FATCA changed this. Figure 2.19a shows an enormous jump of nearly \$50 billion annually in reporting of long term capital gains to foreign owners on K-1s after 2010.⁷³ By comparison, no jump occurs for capital gains reported to US owners on K-1s as seen in Figure 2.19b.

This sudden increase in reported income extends beyond capital gains, notably to other decompositions where one would expect an effect from FATCA. Figure 2.19c shows ordinary income flowing to owners that could not be matched to an annual return, but that I infer to be custodial accounts (such as bank accounts) or trusts (which are often held by banks or

⁶⁹See IRC §§1471-74. For a discussion of the provisions, see Joint Committee on Taxation (2011) General Explanation Of Tax Legislation Enacted In The 111th Congress. For discussion of motivation, see US Dept. of the Treasury, General Explanations of the Administration’s Fiscal Year 2010 Revenue Proposals, p.43.

⁷⁰See IRC §1471(d)(5).

⁷¹See IRC §1473(1)(A).

⁷²See footnote 47.

⁷³Note that although we see a jump in 2011, FATCA did not take effect in 2011. The law, by its own terms, did not apply to payments prior to 2013. See section 501(d) of the act (Pub. L. No. 111-147, § 501(d)). Why do we see a jump in 2011 and not 2013? Two reasons. First, the law grandfathered in payments on obligations made in the two years prior to the effective date, creating an incentive to establish clear documentation of payments in 2011. Second, waiting until the effective date to fully report income risks a retroactive challenge by tax authorities for underreporting on prior payments.

other financial institutions). These types of accounts are squarely within the space covered by extra FATCA reporting, and so we see a jump even in ordinary income. Finally, by comparison, I plot ordinary income reported to foreign owners for whom an annual return could be matched, in Figure 2.19d. For these owners, there is no jump in reported income.

These findings align with recent research on the importance of third party reporting (Kleven et al., 2011; Pomeranz, 2015). In short, I find that the extra reported income is concentrated in flows to owners who were either not filing returns (especially owners who are custodial accounts or trusts) or who are receiving long term capital gains, which was not reported elsewhere. By imposing new reporting requirements on (1) payors making payments to foreign entities, (2) foreign entities (notably foreign financial institutions), and (3) US persons with foreign financial assets, FATCA not only gathered additional information on outbound flows and foreign financial assets, but also diversified reporting across multiple parties, all serving to increase the chance of tax authorities identifying underreporting on K-1s.

b. Dividends

In the same law in which FATCA was enacted, Congress also created new rules for the taxation of “dividend equivalent” payments to foreign persons.⁷⁴ Prior to this law, foreign investors had developed a way to avoid high withholding tax rates on US source dividends by engaging in swap agreements (i.e. notional principal contracts).⁷⁵ The new law taxed these payments as if they were dividends, thus removing the incentive to circumvent outbound dividend payments.⁷⁶

Figure 2.20 shows these incentives manifested in the data. Prior to 2011, investors in jurisdictions without bilateral treaties with the United States, or where the treaty withholding rate on dividends was high, (i.e. the left panel) had a strong incentive to engage in these swap contracts rather than receiving dividends directly. After the new law, this incentive was eliminated. A substantial jump is observed at this time in dividends reported on K-1s to such jurisdictions. By comparison, the right panel represents owners in countries with low withholding rates, where the incentive to engage in such contracts was much smaller. Likewise, there is little change in dividends reported around the time of the new law.

⁷⁴Pub. L. No. 111-147, §§ 541. The rule is currently codified at IRC §871(m).

⁷⁵A foreign investor has the incentive to engage in such a swap if the investor is in a country to which a high withholding rate on dividends applies (such as the Cayman Islands, which has no bilateral treaty with the United States, meaning dividends will be subject to a full 30% withholding tax). In a simple version of the swap, the foreign investor temporarily transfers the stock to an investment bank before a dividend payment, and then enters into an equity swap to receive a payment reflecting the value of the dividend. The payment on the swap agreement is sourced by reference to the residence of the payee. See Treas. Reg. 1.863-7(b)(1). Thus the payment is not treated as US source income subject to withholding. See Miller and Schwartz (2016) for a discussion.

⁷⁶See IRC §871(m). The authority is broad, giving the Treasury the power to tax any other payment “substantially similar” to this swap arrangement as well. See IRC §871(m)(1)(C).

2.7 Conclusion

Partnerships, despite their rapid growth over the past two decades, have remained by far the most opaque class of business entity for economists. A combination of legal complexity, large interconnected entity structures, and data issues have prevented economists from being able to describe the destination or type of owner for roughly 20% of partnership income.

In this paper I use a broader set of federal tax records and new techniques to describe the type of partner, the partner's domestic or foreign status, and country for over 99% of partnership income reported on K-1s. Numerous findings update our understanding of partnership income flows and who receives this income, but three stand out in particular. First, I estimate that the amount of income flowing to foreign owners between 2011-2019 (17%) is roughly double previous estimates. Second, I find that the nature of these flows differs greatly between US and international owners: compared to the United States, income flowing abroad is almost entirely from finance and related industries, is received by entities rather than individuals, and is portfolio investment income. Third, and most importantly, I find that most of the income flowing abroad flows to tax havens—over \$1 trillion since 2011. The Cayman Islands is by far the most popular destination, receiving roughly \$500 billion.

But despite the scale of these flows to tax havens, the majority are subject to zero US tax. Evidence suggests a prevalent use of entity arrangements by investment firms that take advantage of exemptions in US tax laws and that shield both foreign and certain US investors (typically US tax-exempts) from reporting and taxation. More precisely, by organizing a “blocker” corporation in a tax haven, anonymous investors are able to avoid US reporting and tax obligations, and certain investors are able to lower their overall tax liabilities. Meanwhile, investments can be structured to generate certain types of passive income (namely capital gains and interest income) to avoid US withholding on outbound flows to the tax haven.

I also find a large jump in reported income flowing abroad after the imposition of two policies in 2010. First, FATCA subjected a broader range of outbound income to reporting and possible withholding, in addition to imposing new multi-party reporting, making it easier to catch underreporting. Second, I also see a jump in reported dividends, apparently in response to a policy that shut down arrangements intended to avoid US withholding tax on dividends.

These findings contribute to our understanding of partnerships and international income flows in several ways. First, they expand upon previous work attempting to understand where partnership income goes, providing the first look at previously missing recipients and offering the first view of trends over time. Second, they offer the first description of the magnitude of flows from partnerships to tax havens, in particular those using prevalent entity arrangements to shield investors from tax and reporting. Finally, they contribute to literature about tax reporting, underlining the importance of third-party reporting in discouraging underreporting.

Tables

Table 2.1: List of Tax Havens by Category

Category of Haven	Countries
Cayman Islands	Cayman Islands
Zero-Rate Haven ¹	Anguilla, Bahamas, Bahrain, Bermuda, British Virgin Islands, Guernsey, Isle of Man, Jersey, Maldives, Pitcairn Islands, United Arab Emirates ²
Other Haven	Andorra, Antigua & Barbuda, Belize, Cook Islands, Costa Rica, Curçao, Cyprus, Djibouti, Dominica, Gibraltar, Grenada, Hong Kong, Jordan, Lebanon, Liberia, Liechtenstein, Luxembourg, Macau, Malta, Marshall Islands, Mauritius, Micronesia, Monaco, Montserrat, Nauru, Niue, Panama, San Marino, Seychelles, Sint Maarten, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Taiwan, Tonga, Turks & Caicos, Vanuatu, Western Samoa
Conduit Country ³	Ireland, Netherlands, Singapore, Switzerland

Sources: OECD (2000); Hines Jr (2010); Garcia-Bernardo et al. (2017).

1: Imposes zero corporate tax rate. Corporate rates are generally collected from the EY World-wide Corporate Tax Guide, KPMG Corporate Tax Rate tables, and PWC Tax Summaries.

2: The United Arab Emirates imposes a corporate tax on certain oil companies and bank branches, but the effective rate for most corporations is 0%. See PWC Tax Summaries, available at <https://taxsummaries.pwc.com/united-arab-emirates>, accessed June 23, 2021.

3: The United Kingdom is often included as a conduit country, but I exclude them from this analysis because they also represent one of the United States' largest trade partners. The amounts flowing to the UK and to each conduit country independently can be observed in Figure 2.9.

Table 2.2: Describing Partners by Entity Type

Domestic in **bold**, foreign in *italics*, or entities that could be either are normal font

Type of Partner	Matched Forms and Example Legal Entities
Individual (incl. sole prop)	1040 , 1040-C, -F, -NR Legal entities include: <i>S.P.</i> , <i>S.A.U.</i> , <i>e.c.</i> , ...
Partnership	1065, 1065-B Legal entities are not used to identify partnerships ¹
Corporation	1120 , 1120-C , -H, -L, -ND, -PC, -REIT, -RIC, -S, -SF, -F, -FSC Legal entities include: Corp., Inc., PSC , PBC , <i>PLC</i> , <i>S.A.</i> , <i>Bhd.</i> , ...
Hybrid/Other Company	1066 ² Legal entities include: LLC, LLP, ¹ <i>Pty. Ltd.</i> , <i>BV</i> , <i>GmbH</i> , <i>SNC</i> , ...
Tax-Exempt/Governmental	990, 990-C, -PF, -R, -T, -ZR Legal entities include: <i>AISBL</i> , <i>MTU</i> , <i>SoR</i> , <i>sfs.</i> , ...
Trusts & Estates	1041 , 706 , 5227 , <i>3520-A</i> Trusts are generally not created by registering an entity ³
Entity	Identified as an entity, but not easily categorizable
Unknown	Insufficient information to categorize the partner

Notes: This table reports how each type of partner is categorized into entity types for purposes of this paper. Partners are categorized based upon the annual return to which they can be matched, or, if a match is not possible, based on ancillary information available. An inference can sometimes be made from the legal entity receiving the K-1, as it is organized under local law. Where applicable, a short list of some common legal abbreviations are given as examples of legal entities that would be assigned to that category. It may also be possible to infer whether the partner is domestic or foreign from the matched return or the legal entity type; these cases are denoted with bold and italics for domestic and foreign, respectively; where the information cannot be used to infer domestic or foreign status, the font is normal.

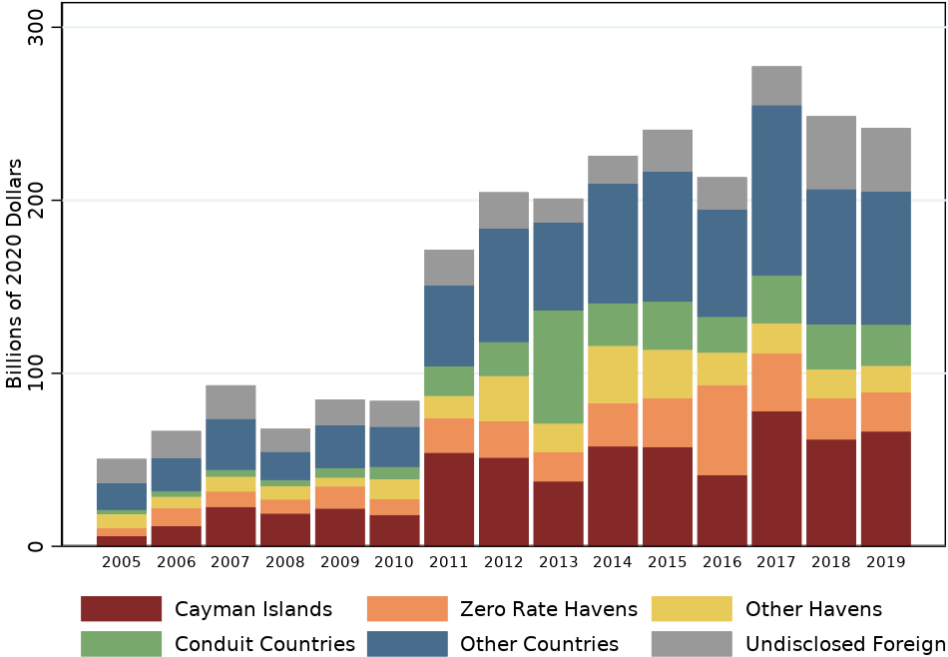
¹ Because my definition of a partnership is that the entity is taxed as a partnership for US tax purposes, it is not possible to know if an entity legally organized as a partnership is in fact a partnership for US tax purposes unless it can be matched to a filing. I thus categorize them by default as a hybrid/other company.

² I categorize REMICs as a hybrid/other company because corporations and partnerships may be REMICs.

³ Trusts are generally not created by registration of an entity with local authorities, as you would create a corporation, a charitable organization, or a hybrid company like an LLC. Trusts are created by actors under local law generally by executing a trust agreement defining the terms of the trust.

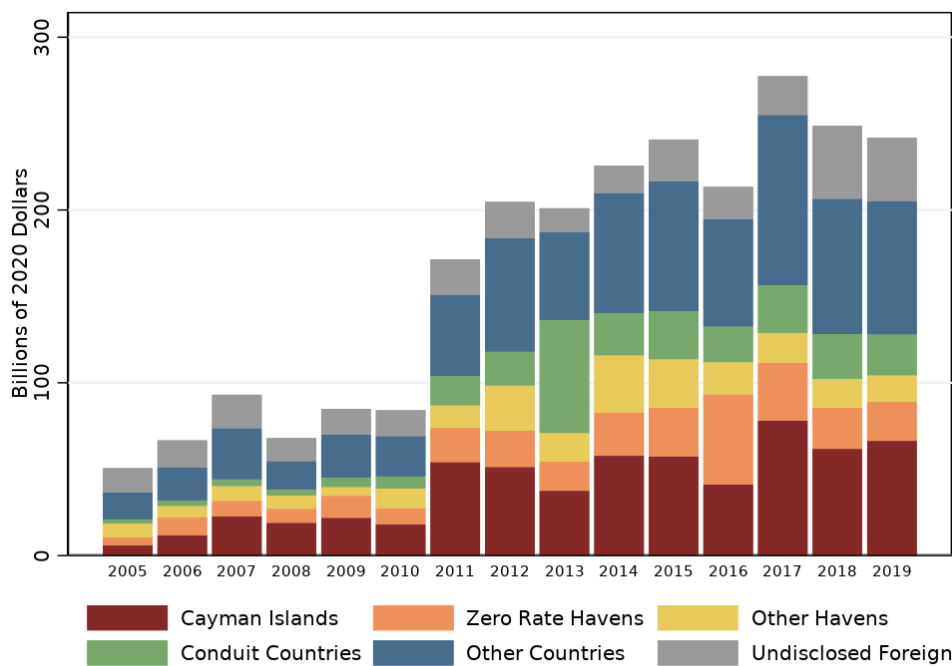
Figures

Figure 2.1: Partnership Income Flowing to Foreign Owners, by Destination, 2005-2019



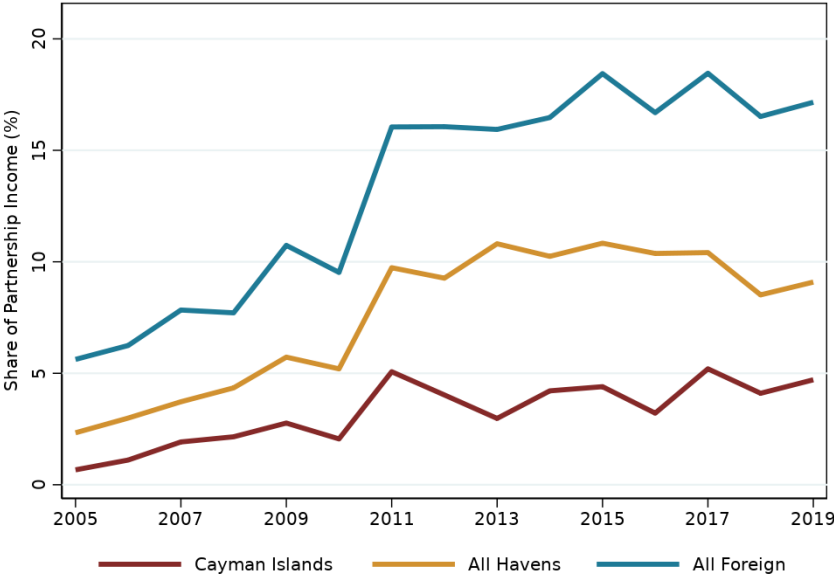
Notes: Amounts reflect the sum of net income flowing to each owner as reported on K-1s, by destination (i.e. excluding higher-tier partnerships, so the totals reflect only amounts received by non-partnership recipients). See Section 2.3 for a discussion of the measurement of net income. Countries in each category are listed in Table 2.1. The large jump between 2010 and 2011 is discussed in Section 2.6. “Undisclosed foreign” partners refer to individuals and entities that I can determine to be foreign, but for whom the country of residence for tax purposes cannot be determined from the information given, usually because they report a US address without identifying their country of tax residence.

Figure 2.2: Partnership Income Flowing to Foreign Owners, by Destination, 2005-2019



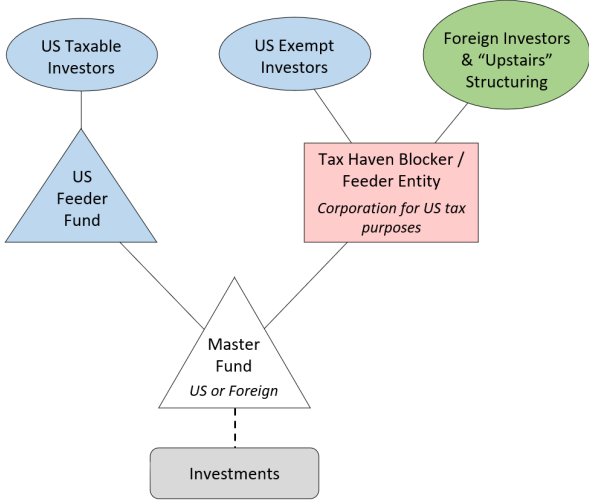
Notes: Amounts reflect the sum of net income flowing to each owner as reported on K-1s, by destination (i.e. excluding higher-tier partnerships, so the totals reflect only amounts received by non-partnership recipients). See Section 2.3 for a discussion of the measurement of net income. Countries in each category are listed in Table 2.1. The large jump between 2010 and 2011 is discussed in Section 2.6. “Undisclosed foreign” partners refer to individuals and entities that I can determine to be foreign, but for whom the country of residence for tax purposes cannot be determined from the information given, usually because they report a US address without identifying their country of tax residence.

Figure 2.3: Share of Partnership Income Flowing to Foreign Owners, 2005-2019



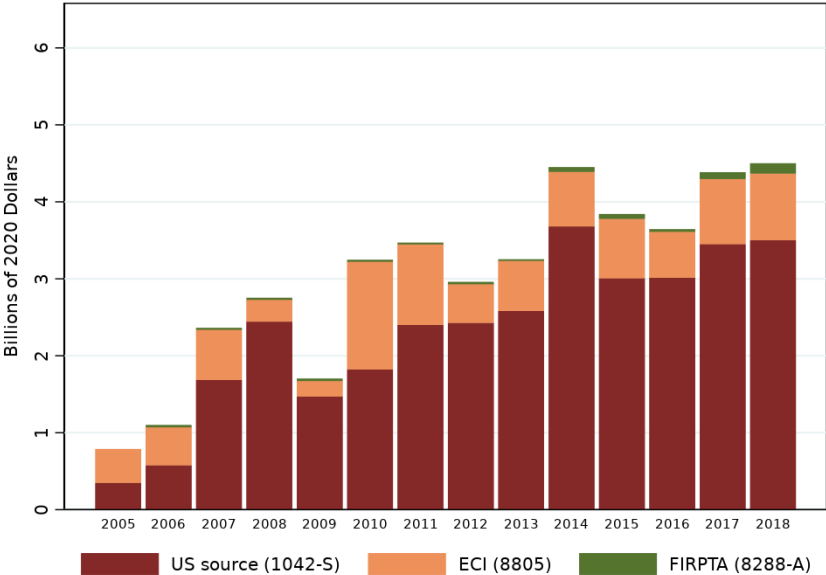
Notes: Point estimates reflect the share of net income reported on K-1s flowing to owners (i.e. excluding higher-tier partnerships) that flows to foreign owners in each respective destination. “All Havens” includes all countries listed in Table 2.1.

Figure 2.4: A Simplified Investment Fund Structure with a Blocker Corporation



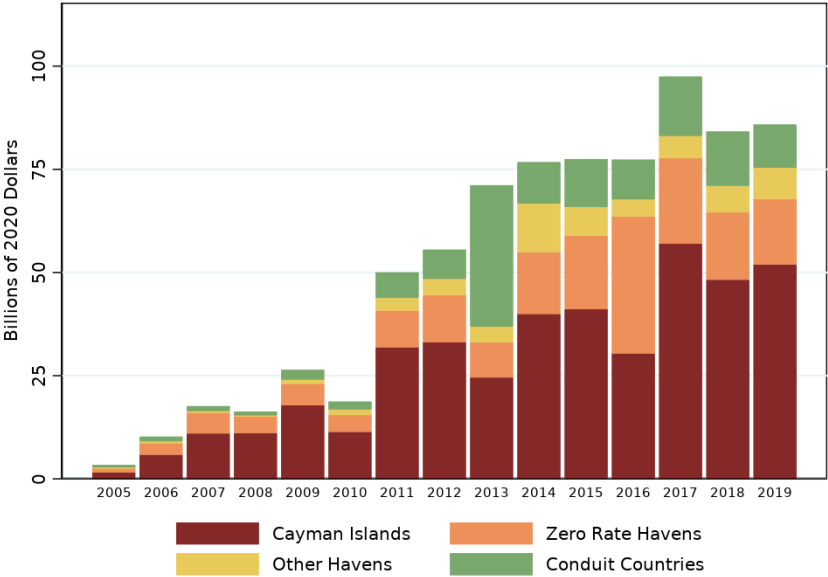
Notes: Boxes are entities taxed as corporations and triangles are entities taxed as partnerships for US federal tax purposes. Circles represent the owners of the entities, who may be individuals or other entities. The investments are made by the Master Fund, which may be either US or foreign. Foreign and US tax-exempt investors invest through the corporate blocker organized in a tax haven (e.g. a Cayman Islands entity), while US taxable investors invest through a US limited partnership. The general partner and investment manager are not pictured. See Section 2.5 for additional discussion.

Figure 2.5: Estimated Tax Withheld on Flows to Owners in Tax Havens, 2005-2018



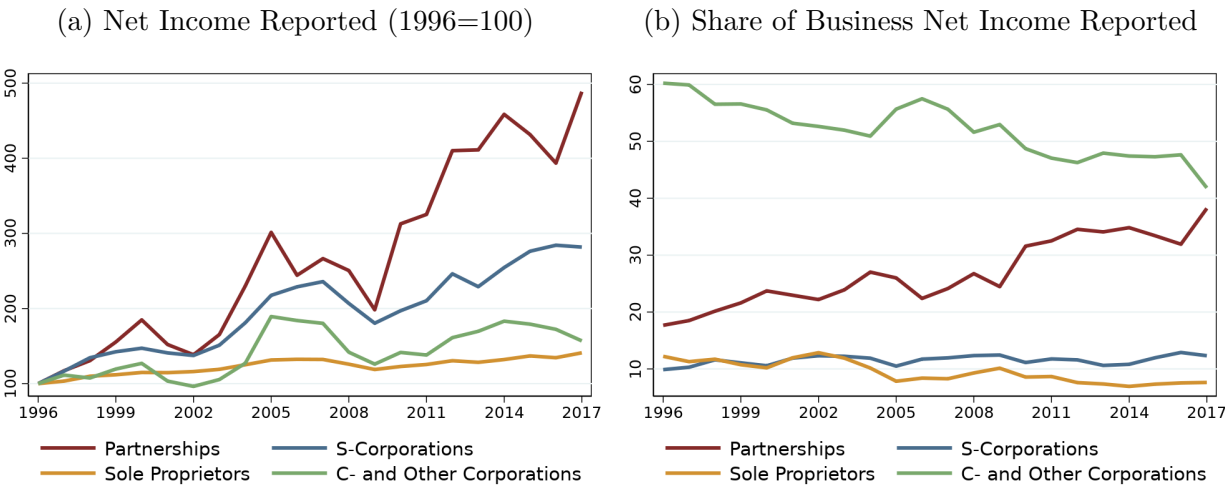
Notes: Amounts are tax withheld as reported on Form 8805 (effectively connected taxable income), Form 1042-S (US source income subject to withholding), and Form 8288-A (dispositions of US real property interests). Form 8805 data is from publicly available reports by the Statics of Income. Form 1042-S and 8288-A data is collected from federal tax records. The time series stops in 2018 because form 8805 statistics are not yet reported for 2019. The upward trend mostly reflects increasing amounts of dividends flowing to tax havens through partnerships, which are subject to high withholding rates (see Figure 2.20, showing an upward trend in dividend income). See Appendix B.2 for additional details on withholding data and calculations.

Figure 2.6: Withholding-Exempt Income from the Investment Industry Flowing to Likely Blockers in Tax Havens, 2005-2019



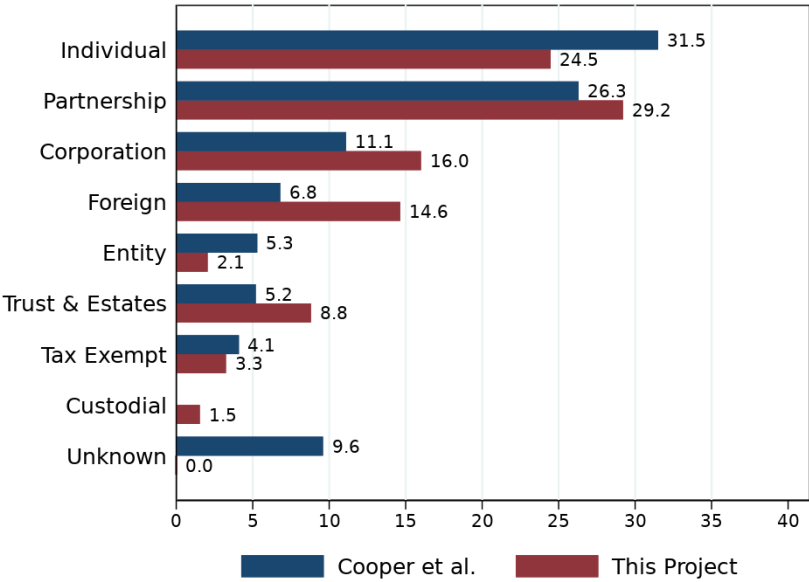
Notes: Amounts are net positive capital gains and interest income (which are generally not subject to withholding) flowing from partnerships in the investment industry (NAICS 5239) to likely blocker corporations.

Figure 2.7: Growing Use of Partnerships



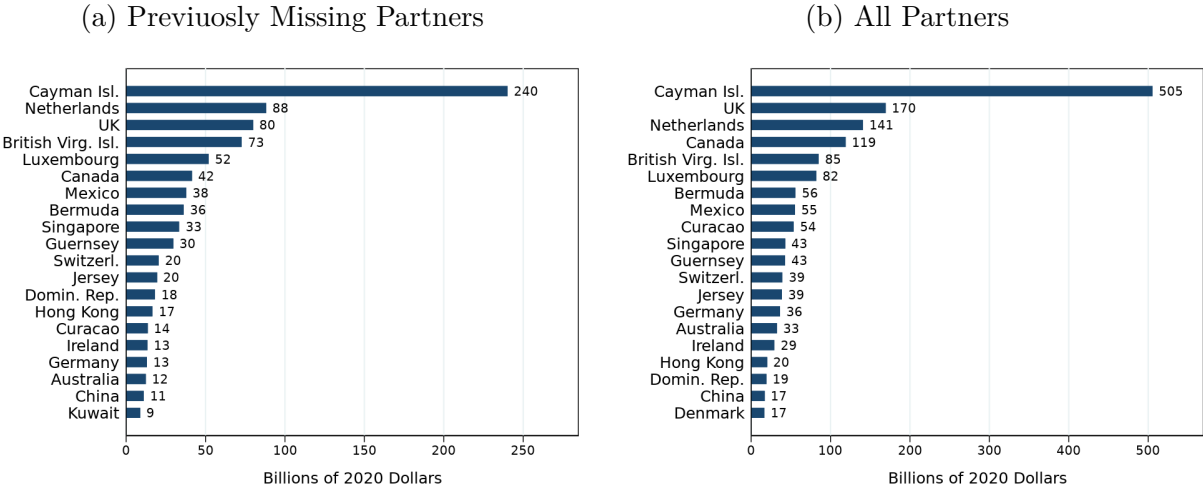
Notes: Net income includes capital gains. Calculated from publicly available data from IRS Statistics of Income. Data used are: Corporations: Table 1; Partnerships: Table 1; S-Corporations: Tables 1, 2.4, and 4.6; Sole-Proprietorships: Table 1. See <https://www.irs.gov/statistics/soi-tax-stats-business-tax-statistics>

Figure 2.8: Cooper et al. (2016) vs. This Project, Share of Income Received



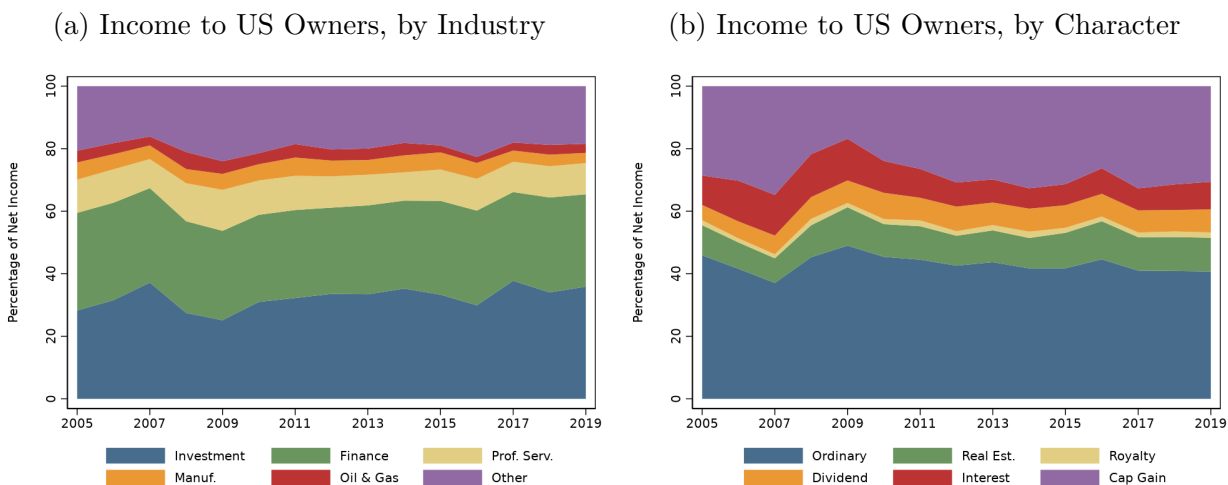
Notes: Blue bars reflect the distribution of net income flows to different types of partners as described by Cooper et al. (2016). The red bars reflect new estimates for flows between 2011 and 2019. The changes are driven by (1) identifying the roughly 20% of income flowing to previously unidentified partners, (2) trends with more income going to foreign owners since 2011, and (3) adjustments to data that improve accuracy when describing partners, discussed in Appendix B.1.

Figure 2.9: Where is Partnership Income Going? Top Foreign Countries, 2011-2019



Notes: Previously missing partners refers to the partners unidentified by previous techniques, but that can now be described in this paper. The values reflect net income flowing to owners of partnerships (i.e. excluding higher-tier partnerships). Undisclosed or unknown destinations are excluded. See Appendix B.1 for discussion of how destination is determined.

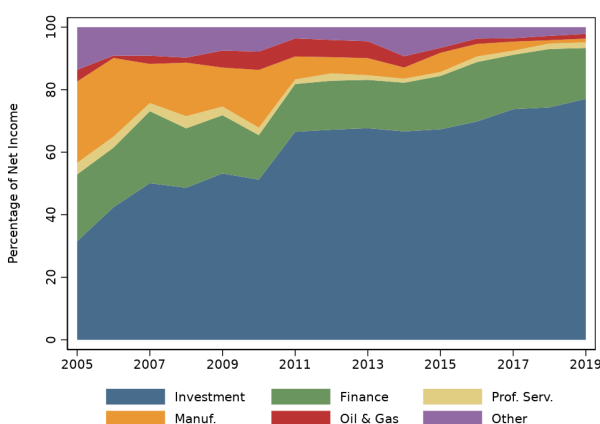
Figure 2.10: Variation in Composition Over time: US Owners



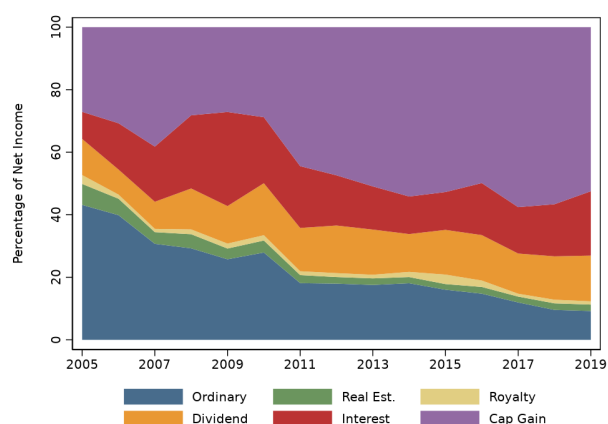
Notes: Income is net income received by owners (i.e. excluding higher-tier partnerships). Industries are grouped using NAICS codes. Investment is 5239. The rest are organized by 2-digit NAICS codes. Finance is 52 (finance and insurance, excluding investment), 53 (real estate and leasing) and 55 (management of companies and enterprises). Professional services is 54. Manufacturing is 31, 32, and 33. A substantial portion of the manufacturing income is attributable to pharmaceutical and petroleum production.

Figure 2.11: Variation in Composition Over time: Foreign Owners

(a) Income to Foreign Owners, by Industry



(b) Income to Foreign Owners, by Character

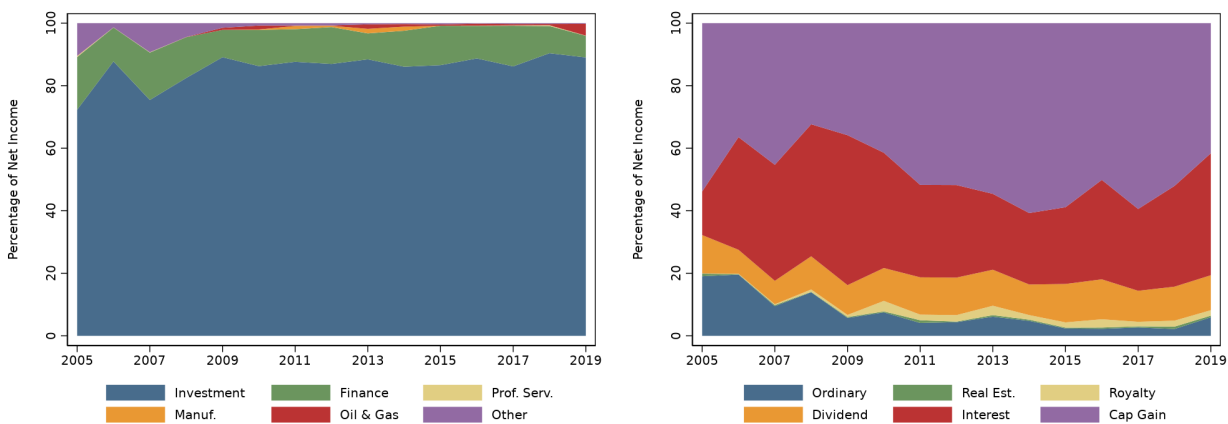


Notes: Income is net income received by owners (i.e. excluding higher-tier partnerships). Industries are grouped using NAICS codes. Investment is 5239. The rest are organized by 2-digit NAICS codes. Finance is 52 (finance and insurance, excluding investment), 53 (real estate and leasing) and 55 (management of companies and enterprises). Professional services is 54. Manufacturing is 31, 32, and 33. A substantial portion of the manufacturing income is attributable to pharmaceutical and petroleum production.

Figure 2.12: Variation in Composition Over time: Cayman Owners

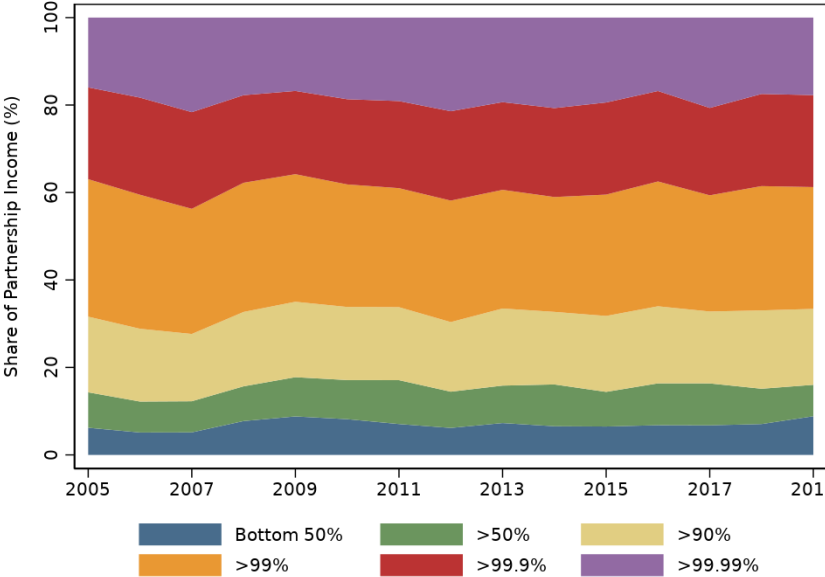
(a) Income to Cayman Owners, by Industry

(b) Income to Cayman Owners, by Character



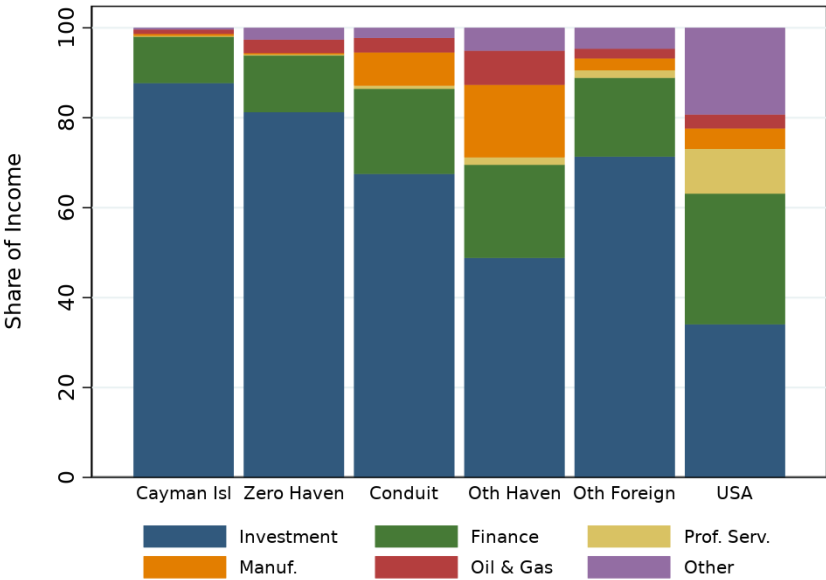
Notes: Income is net income received by owners (i.e. excluding higher-tier partnerships). Industries are grouped using NAICS codes. Investment is 5239. The rest are organized by 2-digit NAICS codes. Finance is 52 (finance and insurance, excluding investment), 53 (real estate and leasing) and 55 (management of companies and enterprises). Professional services is 54. Manufacturing is 31, 32, and 33. A substantial portion of the manufacturing income is attributable to pharmaceutical and petroleum production.

Figure 2.13: Share of Partnership Income to US Households by AGI Percentile, 2011-2019



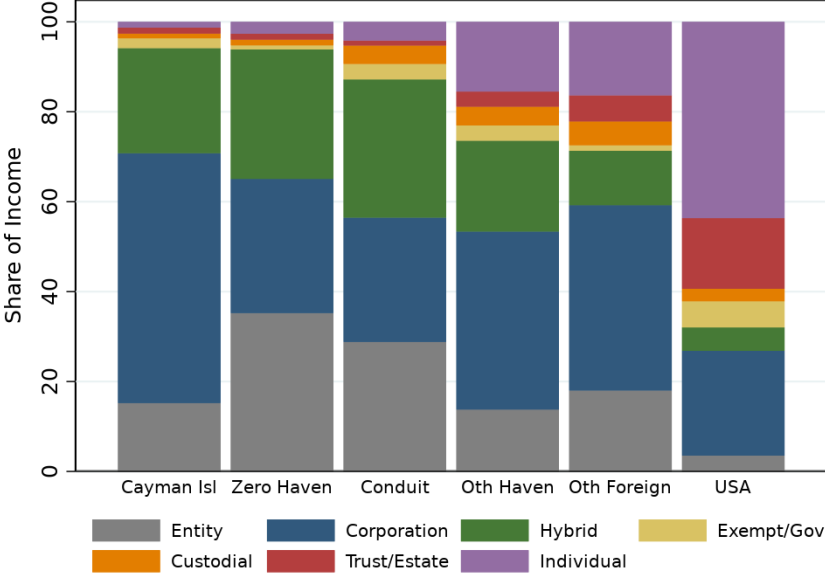
Notes: To calculate these trends, I match the K-1 payees to form 1040 individual returns, and determine where each individual recipient falls within the US income distribution by comparing adjusted gross income reported on the form 1040 to the distribution calculated using data from the IRS Statistics of Income.

Figure 2.14: Share of Partnership Income by Industry, by Destination, 2011-2019



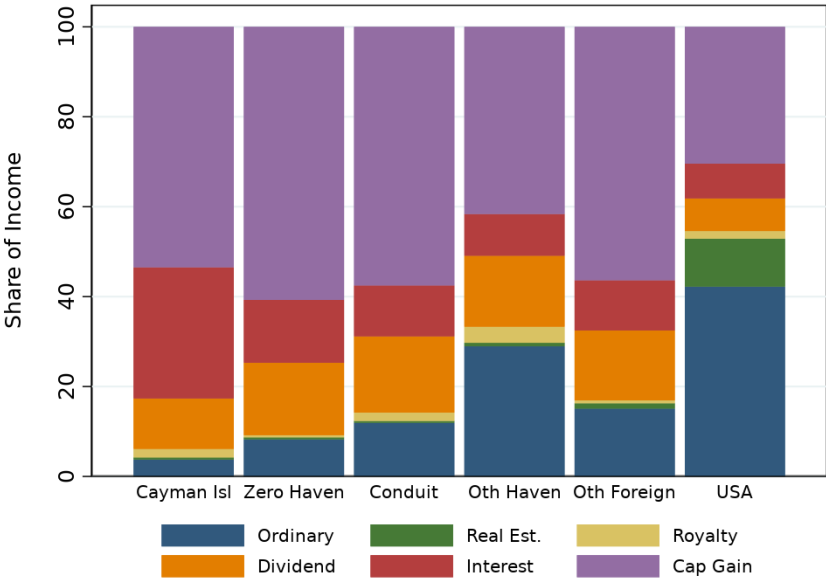
Notes: Income is net income received by owners (i.e. excluding higher-tier partnerships). Industries are grouped using NAICS codes. Investment is 5239. The rest are organized by 2-digit NAICS codes. Finance is 52 (finance and insurance, excluding investment), 53 (real estate and leasing) and 55 (management of companies and enterprises). Professional services is 54. Manufacturing is 31, 32, and 33. A substantial portion of the manufacturing income is attributable to pharmaceutical and petroleum production. Countries are grouped according to Table 2.1.

Figure 2.15: Share of Partnership Income by Type of Partner, by Destination, 2011-2019



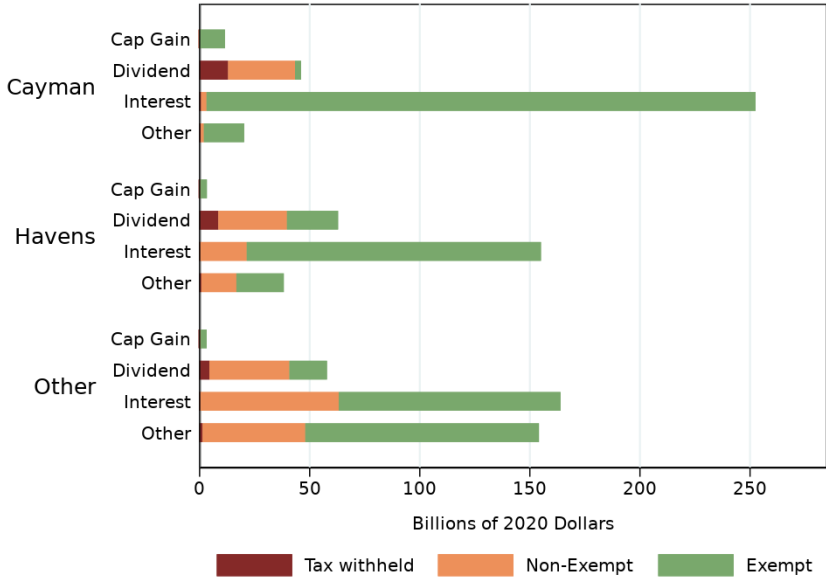
Notes: Income is net income received by owners (i.e. excluding higher-tier partnerships). Types of partners are categorized as in Table 2.2. Countries are grouped according to Table 2.1.

Figure 2.16: Share of Partnership Income by Character, by Destination, 2011-2019



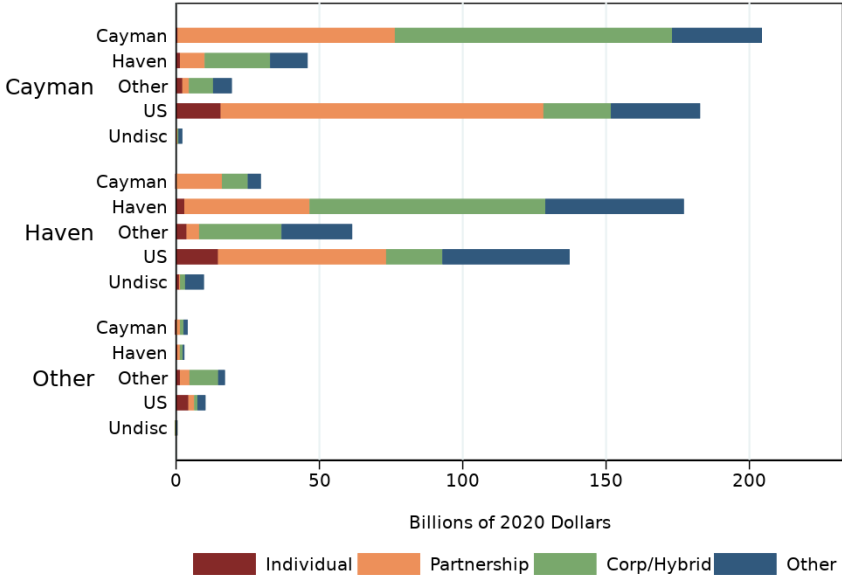
Notes: Income is net income received by owners (i.e. excluding higher-tier partnerships). Countries are grouped according to Table 2.1.

Figure 2.17: Withholding Reported on Forms 1042-S, by Destination, 2011-2018



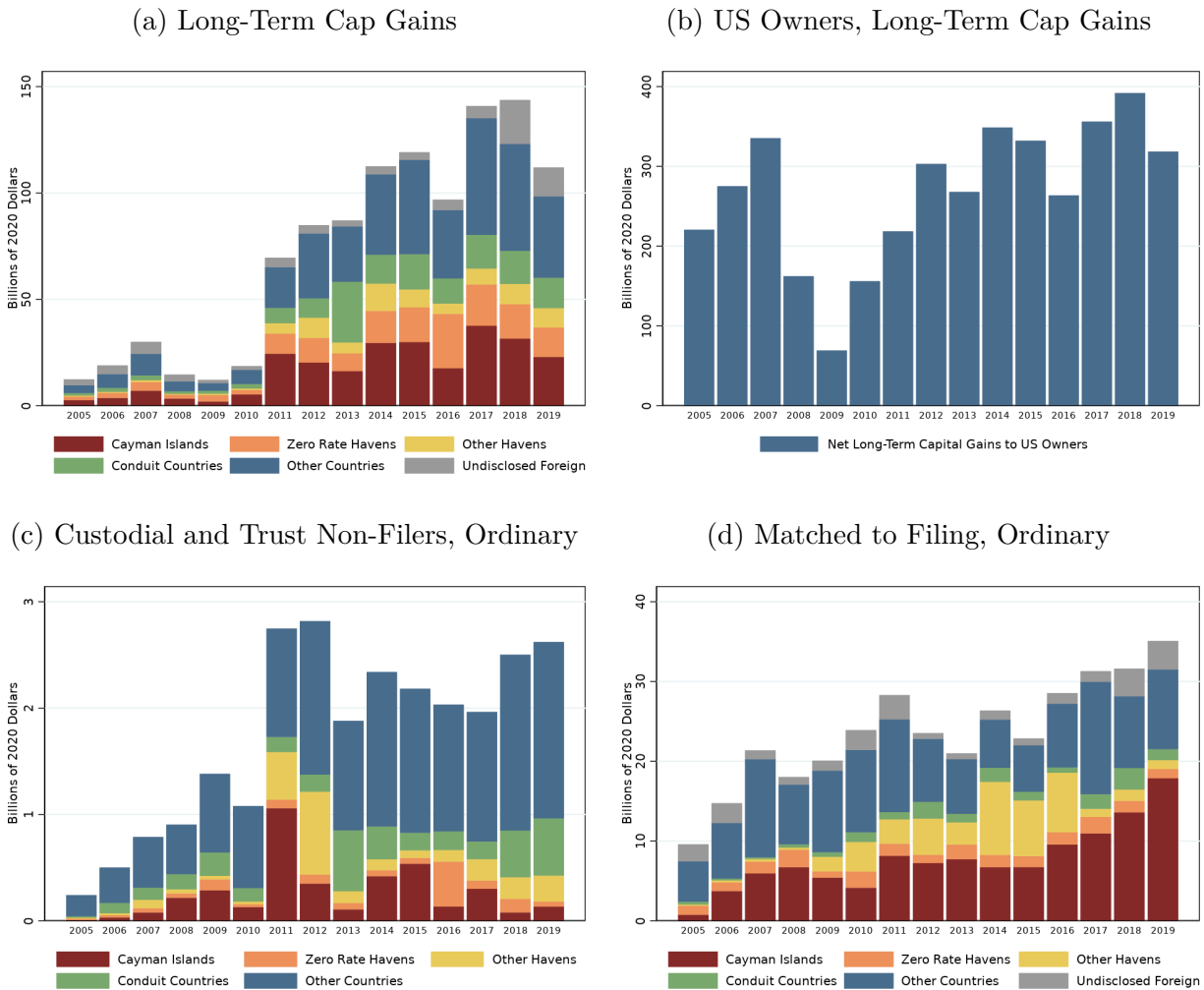
Notes: Data collected from Forms 1042-S, aggregated across years 2011-2018. Cayman refers to income reported to Cayman Islands recipients. Havens refers to other havens. Other refers to non-haven foreign recipients. Each bar presents amounts reported by type of income. “Other” income is largely royalties and notional principal contracts (swaps), which comprise a substantial portion of income flowing to non-haven jurisdictions. Note that this income includes payments to non-partners as well as to partners (e.g. interest payments to foreign lenders). The green portion of each bar is the amount reported as covered by some exemption, under US tax law or a treaty. The orange portion is the amount which is not exempt, but may be subject to reduced rate under a treaty. Orange also includes income that may be withheld by a different agent or that may be subject to taxation under the effectively connected income rules. Finally, the red is the actual amount of tax collected, as reported on the forms. See Appendix B.2 for discussion of data from Form 1042-S.

Figure 2.18: Income From Foreign Partnerships, by Origin and Recipient, 2011-2019



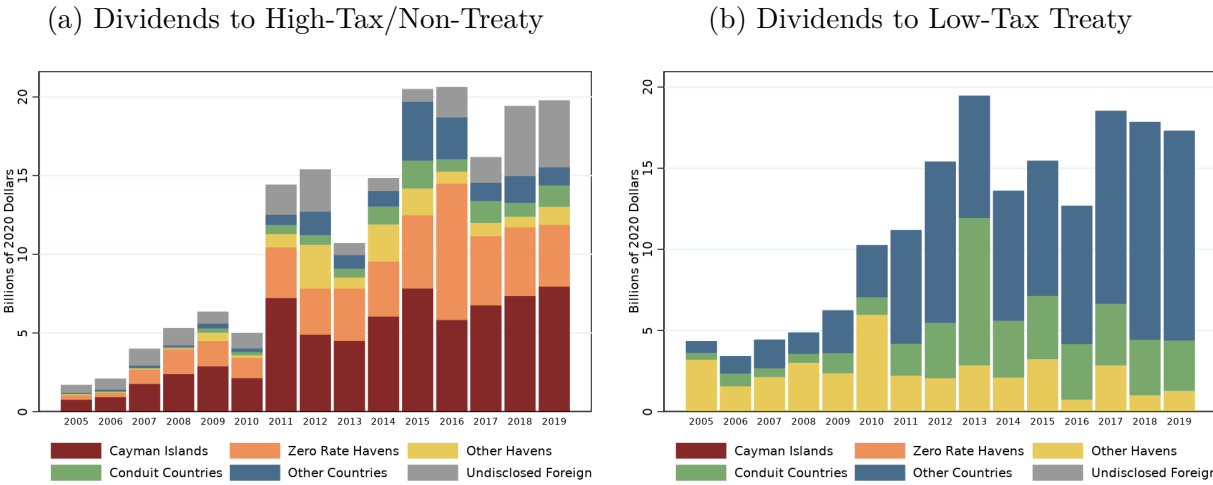
Notes: This chart presents the flows of net income from partnerships organized in foreign jurisdictions, broken down by jurisdiction of origin, jurisdiction of destination, and type of partner receiving the income. Large font categories on the left refer to the origin, where the partnerships are organized. Smaller font subcategories refer to the destination jurisdiction of the partner. “Haven” refers to non-Cayman havens. “Undisc” refers to foreign undisclosed jurisdiction. The income is further broken down by the type of recipient in each jurisdiction: individuals, partnerships, corporations/hybrids, and other (e.g. tax-exempts, trusts and estates, etc.). The categories correspond to those in Table 2.2.

Figure 2.19: More Income Reported After FATCA in 2010?



Notes: Panel (a) shows the net positive long term capital gains reported on K-1s to all foreign owners. Panel (b) reports the sum of net positive ordinary business income, real estate income, royalties, and interest income to foreign owners who cannot be matched with an annual tax return. Panel (c) reports the same income to owners that are custodial accounts and trusts. Finally, panel (d) reports the same income to foreign owners that can be matched with an annual tax return. Undisclosed foreign jurisdictions are excluded from panel (c) due to a small number of large flows in certain years creating volatility.

Figure 2.20: More Reported Dividends After Taxing Dividend Equivalents in 2010



Notes: Panel (a) shows dividends reported on K-1s to owners in countries that are either non-treaty countries (subject to 30% reporting) or are treaty countries but with high tax rates (greater than 15%). Panel (b) shows dividends to owners in low-tax treaty countries (at most 15%).

Chapter 3

Tax Avoidance through Corporate Accounting

This chapter is coauthored with Jacob Mortenson and Eric Heiser at the Joint Committee on Taxation.

3.1 Introduction

Tax liabilities of corporations are determined not only by their real activities, but also by how those activities are reported to tax authorities. Put another way, a policy change intended to broaden the corporate tax base may have limited (if any) effects on either real behavior or revenue raised if corporations can simply avoid the tax by choosing to report their activities in a way that escapes the new broader base.

This observation, although simple, raises an important empirical question: how easily can corporations change their tax accounting and reporting, without changing their real behavior, when doing so enables them to avoid taxes? This question is relevant for understanding the real and reporting responses of corporations to tax changes, especially for policymakers and tax authorities designing, scoring, and enforcing reforms to corporate tax bases.¹

We investigate this question by exploiting a unique corporate tax reform in Texas. In 2006, Texas replaced its 4.5% tax on corporate profits (largely analogous to the US federal corporate income tax) with a much broader 1% tax on gross revenue that eliminated almost all deductions. More precisely, the new tax base was complex: corporations were generally assessed a flat tax on their “total revenue” (a measure close to gross revenue), but were able to take a single deduction of their choosing, among three options: deduct only the cost of

¹To be clear, our focus is on firm responses in terms of tax accounting and reporting, as opposed to firms’ financial accounting and audited financial statements. The former are governed by applicable tax laws, while the latter are not, which can create differences in the timing and quantity of income and expenses between the two. A comprehensive discussion of these differences is beyond the scope of this paper, but we add some additional insight on this point in Section 3.2.

goods sold (COGS), deduct only compensation expenses, or take a flat deduction equal to 30% of reported total revenue. This overhaul of the tax base thus created incentives for most corporations to either change their mix of inputs (as only certain inputs remained eligible for deduction) or to simply reclassify their expenses for tax accounting and reporting purposes to fit into a remaining deductible category.

We evaluate how corporations responded to these incentives using a subset of the population of US federal corporate income tax returns. We conduct a differences-in-differences analysis comparing affected firms in Texas against similar firms in neighboring states.²

We find a large avoidance response through the reclassification of otherwise ineligible expenses—but, most importantly, the strength of the response varies highly across different contexts. For firms deducting COGS, we estimate that they reclassified roughly 5% of their ineligible expenses into COGS to qualify for the deduction, likewise reducing the tax base by about 5%. This is a large response to a small tax, as we calculate a tax base elasticity of -5 ± 1 under our preferred specification. Further, evidence from W-2 filings on wages and employees supports that this shift of expenses is almost entirely a reclassification reporting response, rather than a real response where firms changed inputs.³ Our findings are also highly robust to additional controls and alternative specifications.

But not all reclassification responses are so strong. The firms deducting total compensation expenses under the new regime (*i.e.*, rather than COGS expenses) appear to exhibit essentially no response. Even though these firms faced the same incentives for shifting and reclassification as the COGS firms—but simply across a different dimension—we nevertheless estimate (very noisily) that they reclassified only a small amount of ineligible expenses into compensation, likely less than 1%.

How can this discrepancy be reconciled? The two categories have very different qualities that affect their amenability to reclassification. Accounting research has well established the substantial flexibility and manipulable nature of COGS reporting (Fan and Liu, 2017; McVay, 2006; Poonawala and Nagar, 2019). COGS is a broad category that admits a range of different expenses, has scattered third-party reporting,⁴ and ultimately relies heavily on the discretion and judgment of taxpayers and their accountants. In contrast, the worker

²Specifically, New Mexico, Oklahoma, and Arkansas. We exclude Louisiana as a conservative measure: Hurricane Katrina hit on the eve of the reform and caused distortions in production inputs that could potentially bias our estimates. We do find that when including Louisiana our estimates are even larger for COGS margin firms and smaller for compensation margin firms. As robustness checks, we include Louisiana as well as alternative sets of control states. Generally, our results are similar across specifications.

³For example, we find that a large portion of the shifted expenses into COGS are from a salary line item on the corporate tax return, but yet we find no change in W-2 wages for the affected firms (which are reported separately and have no effect on the COGS deduction) and no change in the number employees. Although it is indeed possible that a large number of employees were “swapped” from administrative tasks to production tasks, such a large change in response to such a small tax without showing up on W-2 reporting or in employee counts seems highly unlikely. Also, even though we see a large shift from salaries into COGS, we do not see a similar shift in officer compensation, which is ineligible under Texas law to be classified as COGS.

⁴There is no information reporting specifically for COGS expenses, which instead would be captured both over- and under-inclusively on a combination of Form 1099s and W-2s.

compensation category under Texas law is a much more restrictive category, is governed by more bright-line rules with less reliance on judgment, is subject to routine third-party information reporting, and as a result involves less taxpayer discretion and can be scrutinized more easily by tax authorities.⁵ In short, the breadth of the COGS categorize is more amenable to flexible categorizations of expenses.

We find evidence that supports these mechanisms. First, we estimate that roughly half of the reallocated expenses into COGS are from the nebulous catch-all “other deductions” category on the federal tax return, rather than from narrower line-items. Second, we also observe that firms under examination by the IRS or involved in litigation with the IRS engage in substantially less reallocation. We also find that smaller firms, which tend to face less stringent oversight, controls, and reporting requirements respond much more strongly than medium or large firms.

Our findings have several important economic implications. First, the magnitude of the COGS reclassification is striking. Our estimated elasticity (-5) is larger than the majority of shifting and avoidance elasticities in the public finance literature, which often have magnitudes in the 0-2 range.⁶ The closest elasticities are those on the upper end of the profit shifting literature, on the use of tax havens by multinational corporations.⁷ We suspect the large magnitude is because we are observing an accounting and reporting response, whereas other avoidance responses involve more substantive legal recharacterizations or have larger economic collateral effects for taxpayers (such as choosing one form of legal entity over another, taking one character of compensation over another, or re-timing the receipt of a payment into a lower-tax year).

Second, the breadth of the effects are large as well. We estimate that corporations on the COGS margin represented 85% of total revenue reported by Texas corporations after the reform, and their large reporting responses had a correspondingly large impact on public finances. These conclusions are confirmed by a report to the Texas legislature in 2014 that describes how an unexpectedly large number firms claimed COGS deductions after the reform, contributing to notable shortfalls in state revenue.⁸

Despite the large magnitudes, we nevertheless suspect that our estimates likely understate actual responses, due to inherent data limitations. We use federal tax data so that we both (a) can identify the effect by using cross-state variation and (b) have consistent measures of expenses across time, but there are some discrepancies between federal and state reporting that likely attenuate our results. Namely, we cannot observe state “apportionment” factors,

⁵For a more thorough discussion of these points, see Section 3.8.

⁶For instance, intertemporal shifting strategies have generally produced elasticities of roughly 1 to 2 (Goolsbee, 2000; Kreiner et al., 2016; Saez, 2017) and shifting between forms of entity generally 0 to 1 (Carroll and Joulfaian, 1997; Saez et al., 2012).

⁷Although some estimates in this literature are close to 0 (*see* Collins et al., 1998; Beer et al., 2020) there are some estimates of profit shifting responses in the neighborhood of 5 (*see* Hines Jr and Rice, 1994; Clausing, 2016; Dowd et al., 2017). Even so, our estimate is an average response by Texas firms, and can likely be thought of as a lower bound, as discussed below.

⁸See Section 3.2 for additional discussion.

which summarize the share of a multi-state firm’s revenue that is subject to the Texas tax. Because of this, there are likely some Texas firms included in our treatment group that are *not* subject to the Texas tax and some non-Texas firms in our control group that *are* subject to the Texas tax. There are also definitional differences between COGS reported on state and federal returns, which will similarly lead us to underestimate effects. This is because both (a) it is the state reporting, not federal, that is determinative of tax liability, and (b) taxpayers have an incentive to minimize federal tax accounting changes to avoid federal audit or trigger federal reporting about accounting method changes.

We also provide insights about which firms are most responsive. We find that smaller, unprofitable firms in low-margin industries (such as restaurants, agriculture, and construction) tend to exhibit the strongest responses. This is reasonable: not only do unprofitable firms have a larger tax incentive to reclassify expenses due to the interaction between federal and state taxes,⁹ the switch to a revenue tax from a profits tax placed extra cash flow stress on these low-margin, unprofitable, smaller firms, intensifying the incentive for reclassification. With regard to larger firms, there are likely several reasons we see a smaller response. First, larger firms likely face heightened accounting scrutiny and controls, consistent with the discussion about the importance of flexibility and discretion above. Second, because the Texas tax is calculated in a way that considers revenue and COGS across *all* states, a larger multi-state firm would likely require more substantial effort to reclassify expenses. Third, larger multi-state firms have only a portion of their revenue in Texas, attenuating the incentives created by the reform.

Our findings make several contributions to existing research on corporate tax bases. Most directly, our research sheds new light on how firms’ avoidance responses affect the corporate tax base (*e.g.*, Clausing, 2016; Dowd et al., 2017; Klassen and Laplante, 2012; De Simone et al., 2019; Giroud and Rauh, 2019; Slemrod, 1995) and on the elasticity of the corporate tax base (Devereux et al., 2014; Gruber and Rauh, 2007; Dwenger and Steiner, 2012). In particular, our paper extends this literature by identifying a strong avoidance response along a dimension that has received scant attention by economists: accounting reclassification. Thus, our findings unite the public economics literature, which has largely focused on reporting responses by individual taxpayers, with a vast body research by accountants and finance economists on the pliability of corporate tax accounting (*e.g.*, Schipper, 1989; Stolowy and Breton, 2004; McVay, 2006; Healy and Wahlen, 1999). As a specific contribution to the finance and accounting literature, our work offers new insights about firm behavior and the choices of management, estimating elasticities that quantify reclassification responses using a unique natural experiment.

Our findings also lay bare the importance of distinguishing between real economic responses and reporting responses. Although there is a rich literature about ways taxpayers avoid tax by “shifting” between tax bases, structuring their activities differently but achiev-

⁹Because unprofitable firms generally face no federal tax liability, they are not able to deduct the state gross revenue tax, whereas profitable firms can. The ability to deduct the state tax diminishes the incentive to avoid the state tax. See section Section 3.2 for additional discussion.

ing similar economic outcomes (Carroll and Joulfaian, 1997; Slemrod, 1998; Gordon and Slemrod, 2000; Goolsbee, 2000; Maki, 2001; Saez et al., 2012; Kreiner et al., 2016; Harju and Matikka, 2016; Tazhitdinova, 2020), our work identifies what is arguably an even easier and more direct form of avoidance: doing the same real activity as before, but simply accounting for it differently and reporting it differently on the tax filing. Our work thus also provides a cautionary example for researchers attempting to estimate and understand real responses: in this instance it would have been easy to mistakenly estimate a real change in production inputs (notably a reduction in labor), when in fact that did not occur. We also contribute to a growing literature, especially useful for policymakers and revenue estimators, that uses the states as laboratories to understand firm behavior and responses to tax policy generally (DeBacker et al., 2019; Suárez Serrato and Zidar, 2018).

Our findings are especially relevant in light of widespread discussions in recent years about broadening corporate tax bases in efforts to curb base erosion and avoidance. These include the Organization for Economic Cooperation and Development’s (OECD) base erosion and profit shifting (BEPS) framework and Pillar II, as well as recent US policy changes, including the corporate book minimum tax and the base erosion and anti-abuse tax (BEAT). Although these proposed and enacted base-broadening policies are quite different from the design of the Texas margin tax, there is still a relevant fundamental similarity among all base-broadening proposals: they involve new line-drawing across categorizations of income and deduction, delineating what is and is not taxed, creating boundaries over which corporations have incentives to reclassify their activities, and mixing tax law and accounting definitions. In light of these points, our findings highlight the importance of considering reclassification when designing and enforcing those delineations. Moreover, in terms of relevance beyond our setting, there is overlap between the Texas margin tax and these other reforms in that the BEAT presented similar incentives to alter financial accounting toward COGS (Laplante et al., 2021).

Finally, our research is particularly relevant for state public finances. Nine states currently employ some form of a gross receipts tax, involving various deductions and exclusions.¹⁰ Some are quite similar in structure to Texas: for instance, Oregon enacted a gross revenue tax offering the same COGS or compensation deduction in 2019. Collectively, corporations headquartered in these nine states represent 24% of the total receipts reported by all US corporations.¹¹ Bills to enact similar taxes were proposed recently in three other states. Our discussion is thus both timely and informative for policy discussions about similar tax

¹⁰The states with gross receipts style taxes are Delaware, Michigan, New Mexico, Ohio, Oregon, Nevada, Tennessee, Texas, Washington. Bills were proposed in the legislatures of West Virginia, Louisiana, and Oklahoma in 2017. See SB 484 in West Virginia (http://www.wvlegislature.gov/Billstatus/bills_history.cfm?INPUT=484year=2017sessiontype=RS), HB 628 in Louisiana (<http://www.legis.la.gov/legis/ViewDocument.aspx?d=1033256>), and HB 1664 in Oklahoma (<http://www.oklegislature.gov/BillInfo.aspx?Bill=HB1664Session=1700>).

¹¹This estimate uses 2019 US federal tax return data, winsorized at 99.9%. Note that state of headquarter is often distinct from the state of incorporation, so that Delaware only represents a tiny portion of this estimate. See a longer discussion in Section 3.8.

architectures or reforms to existing tax bases.

But while our findings have important economic implications, readers should be aware of the limits of what is shown. First, although we believe the underlying principle that reclassification responses can be quite large is one that applies broadly, our exact estimates are context-specific. Rules creating distortions along other dimensions in other settings may generate larger or smaller responses. Second, note that we estimate responses to a reform that created a distortion where there was none previously. In contrast, a change in an existing distortion may result in different intensive margin responses. Third, note that we are fundamentally observing and describing the *tax reporting* classifications of expenses, not the financial accounting by these firms. The classification responses may differ between the two, and we cannot observe the latter. As a result, our findings apply directly to tax reporting contexts, but only have indirect implications for manipulation of financial statements. Fourth, as stated previously, we are using federal rather than state data. Although we show that our data aligns well with state descriptive statistics, our results are likely attenuated for various reasons. But even with these caveats in mind, our findings nevertheless strongly suggest that policymakers, tax administrators, and revenue estimators should remain cognizant of the incentives created by tax base changes that create reclassification incentives.

3.2 Background & Theoretical Framework

The Texas Franchise Tax Reform

In 2006 there was a substantial reform of the Texas tax on business income, *i.e.* the Texas “franchise tax.” The reform was prompted by a Texas State Supreme Court ruling that found the school finance system, which was predominantly reliant on property taxes, was unconstitutional.¹² In an effort to raise revenue elsewhere, a gubernatorial-appointed commission recommended broadening the base of the franchise tax. The existing franchise tax was a 4.5% tax on corporate profits similar to the federal corporate income tax, but suffered severely from well-known loopholes that permitted avoidance through creative entity structuring (Outenreath, 2015). The commission recommendation thus aimed to solve two problems in one stroke: raising revenue for the school system while also reforming the franchise tax to eliminate loopholes and broaden the tax base.¹³

In 2006 the Texas legislature followed the suggestions of the commission. The existing state tax on corporate profits was replaced entirely with a much broader tax on business gross revenue. The new tax base, although broader, was quite complex. It eliminated almost all deductions, but allowed taxpayers to choose a single deduction out of three options: COGS, total compensation, or a flat 30% deduction from total revenue. Because taxpayers could select which “taxable margin” they would like to be taxed upon—revenue minus COGS,

¹²Neely v. West Orange-Cove Consol. Indep. Sch. Dist., 176 S.W. 3d 746, 751 (Tex. 2005). See Outenreath (2015); Vanderhider (2007); Olenforst (2006) for a more thorough discussion.

¹³See the Sharp Commission Report (Sharp et al., 2006).

revenue minus total compensation, or the revenue minus the flat deduction—the new tax was dubbed the “margin tax.” The reform was effective for tax years beginning in 2007.¹⁴

Details about the pre-reform tax. Prior to the reform, the franchise tax applied to incorporated entities including not only C-corporations, but also S-corporations (S-Corps) and limited liability companies (LLCs). The formula for determining tax liability is summarized in equation 3.1, where L is total tax liability, Y is taxable income, K is “taxable capital” (*i.e.* total assets of the business net of liabilities), and F is an apportionment factor.

$$L = \max(0.045 \cdot Y, 0.025 \cdot K) \cdot F \quad (3.1)$$

In words, the franchise tax liability for incorporated business entities was equal to the product of (a) the greater of (1) 4.5% of taxable income or (2) 0.25% of taxable capital, multiplied by (b) an apportionment factor reflecting the gross receipts from Texas over total gross receipts. Taxable income was defined substantially the same as federal taxable income.¹⁵

Details about the new Margin Tax. The 2006 reform replaced this system with a complex new tax on limited liability entities (newly including partnerships). The most substantial change was to the tax base, which was broadened to generally reflect total revenue rather than profits, thus significantly narrowing the ability to deduct expenses. The new franchise tax liability is summarized in equation 3.2, where τ is the tax rate, R is total revenue, c is COGS, and w is total compensation.

$$L = \tau \cdot (R - \max(c, w, 0.3 \cdot R)) \cdot F \quad (3.2)$$

The post-reform tax base was thus defined as total revenue (R) net of the maximum of COGS (c), total compensation (w), or 30% of total revenue. Note, importantly, that some labor expenses will count as both COGS and compensation, but they cannot be “double-deducted” because each firm can only choose one option for the deduction.

What is included in each of these variables? Total revenue largely tracks federal total income, with the important exception that COGS is not excluded. COGS includes the costs of material inputs, costs of and depreciation associated with equipment used for the production of goods, and research and design costs.¹⁶ Importantly, COGS also includes wages, payroll taxes and benefits, and other labor costs associated with the production of goods, but excludes officer compensation and most sales and advertising expenses. Compensation, the second deduction option, includes the sum of (a) federally-defined medicare wages, stock options or awards, and distributive shares of passthrough income capped at \$300,000 per employee, plus (b) employee benefits, including retirement and pensions benefits. Thus,

¹⁴The reform technically applied to tax returns due on or after January 1, 2008, thus covering the 2007 tax year.

¹⁵One notable modification was that, for purposes of the Texas franchise tax, C-corporations and LLCs with more than 35 shareholders or members could not deduct officer compensation.

¹⁶The law defines “goods” as “real or tangible personal property” and explicitly includes software and virtual and print media.

many expenses counting for COGS and for the compensation categories are not mutually exclusive. The third option is simply a deduction equal to 30 percent of total revenue.

With the new broader base, the rate was also lowered from 4.5% to $\tau = 1\%$. A special rate of 0.5% is available for qualifying wholesalers and retailers. The law also permitted firms with less than \$10m in total revenue to elect an EZ computation that offers a 0.575% rate, but doing so disallows any deduction (so that the tax base is simply total revenue (R), regardless of COGS or compensation). There is also a small businesses exception that effectively exempts firms with revenues below \$450,000, which was subsequently increased to \$1,080,000 in 2010.

The Business Tax Advisory Committee Report

The Texas state legislature established a committee to report on the outcomes of the reform.¹⁷ The final report in 2013 found that even though the margin tax raised additional revenue, the amount was far less than anticipated: \$1.4 billion short (24%) of the \$5.9 billion predicted.¹⁸ The report identified a number of behaviors contributing to the shortfall, including (a) firms improperly identifying as a retail or wholesale firm to enjoy the reduced tax rate, (b) firms improperly claiming the E-Z rate of 0.575% when the firm was actually ineligible, and (c) an unexpectedly large number of firms claiming a credit for pre-reform losses. But by far the most important contributor was the unexpected uptake of the COGS deduction. The pre-reform estimates ended up being low on both the number of firms that ended up claiming the COGS deduction (80% projected vs. 85% in actuality) and on the amount of revenue firms would be able to deduct using the COGS deduction (68% projected vs. 82% in actuality). As a result, even though firms electing the COGS deduction accounted for 80% of receipts, they only accounted for 60% of revenue.¹⁹

These findings are *prima facie* evidence that firms did respond to incentives created by the reform, which helps motivate our theoretical and empirical approaches below.

Theoretical Framework and Predicted Responses

We develop a simple model of firm profit maximization decisions to generate predictions about the behavior of firms in response to the reform and to rationalize the observations from the commission report above. In this model, the firm may either make real adjustments to production inputs or may reclassify real inputs between categories of expenses for reporting purposes (with some adjustment cost). Note that because most firms opted for the COGS

¹⁷“*The Business Tax Advisory Committee Report to the 83rd Legislature.*” *Texas Comptroller of Public Accounts Electronic*. available at https://texashistory.unt.edu/ark:/67531/metaph578485/m2/1/high_res_d/txcs-1008.pdf.

¹⁸Revenue rose from \$3.1 billion in 2006 (the last year before the reform) to \$4.5 billion in 2007, but this figure was well below the \$5.9 billion official revenue estimate.

¹⁹The revenue estimate also underestimated the amount of revenue that would be deducted by firms claiming the compensation deduction, predicting 45% against the 55% in actuality.

deduction under the new regime, and because the reclassification to COGS is the primary response of interest in this investigation, we begin with the case where the firm takes the COGS deduction.

Consider the following firm that uses two categories of inputs in a setting without taxes:

$$\pi = R(c, n) - c - n \quad (3.3)$$

The firm generates profit (π) by generating revenue (R) from its production, using labor inputs for which the expense is classified for accounting purposes as either COGS (c) or non-COGS expenses (n).

Pre-reform tax. Applying the pre-reform franchise tax system to this theoretical framework, the profit function is now given by:

$$\pi = (1 - \tau_0)(R(c, n) - c - n) \quad (3.4)$$

That is, the firm must pay a corporate profits tax of $\tau_0 = 4.5\%$. Note that the pre-reform setting was more complex than this in practice, but our simplifications do not alter the incentives of firms.²⁰

Now assume that the firm can choose to reclassify some amount of its expenses from COGS to non-COGS for tax-reporting purposes, but at some additional cost. The modified profit function becomes:

$$\pi = (1 - \tau_0)R(c, n) - c - n + \tau_0([c + a] + [n - a]) - A(a) \quad (3.5)$$

Here a is the amount of labor expense that is reclassified from non-COGS to COGS. Note that the real inputs are not themselves affected by this nominal reclassification: c and n are meant to reflect “actual” COGS and non-COGS (*i.e.*, notionally the amounts that would be reported in each category without any distinction in tax treatment between the two inputs), and thus total revenue $R(c, n)$ is not affected either. The reclassification may be legal avoidance or illegal evasion, but carrying out any reclassification brings an additional cost $A(a)$, reflecting both transaction costs and the risks of audit or penalties in the case of more aggressive reclassification. We thus assume $A(0) = 0$ and that $A(a)$ is convex and increasing in a .²¹

Taking the first order conditions with respect to a , c , and n respectively yields:

$$\frac{\partial A}{\partial a} = 0 \quad \frac{\partial R}{\partial c} = 1 \quad \frac{\partial R}{\partial n} = 1 \quad (3.6)$$

²⁰For example, the pre-reform franchise tax also included a potential tax on “taxable capital” (discussed above), but because “taxable capital” is not directly affected by input choices and thus does not alter the incentive analysis below, we exclude it for simplicity. We similarly exclude the apportionment factor and federal taxes for simplicity: although they are present in both the pre- and post-reform frameworks, they do not affect the analysis below.

²¹Note that this cost function may include some initial fixed cost in moving away from $a = 0$, for example reflecting the costs of discussing with accountants or reviewing potentially low-hanging fruit for reclassification.

The first condition asserts that the optimal choice of reclassification a under the pre-reform setting is the one that minimizes the cost of shifting, which we have defined as $a = 0$. In short, there was no tax incentive to engage in shifting before the reform. The second and third conditions reflect the full deductibility of both COGS and non-COGS expenses, so that firms will expend in each category until it is no longer the case that \$1 of expenses produces at least \$1 in pre-tax revenue.

Post-reform tax. Recall that we assume our example firm has high COGS expenses, so that the COGS deduction is the most appealing option. Also, because there is now an interaction with federal taxes, we include the federal corporate income tax rate as f . The profit function under the post-reform franchise tax framework is thus given by Equation 3.7:

$$\pi = (1 - \tau_1)(1 - f)R(c, n) - (1 - f)[(1 - \tau_1)(c + a) + (n - a)] - A(a) \quad (3.7)$$

Beyond the inclusion of federal taxation, there are two changes from the pre-reform setting. First, there is a new statutory rate $\tau_1 = 1\%$, rather than $\tau_0 = 4.5\%$. Second, there is a new base where firms cannot fully deduct both c and n from the state tax, but instead may only deduct the maximum of three options (reported COGS, reported compensation, or 30% of total revenue). Again, because we assume the firm is a high-COGS firm, it takes the first deduction and thus can no longer deduct n . Taking the first order conditions with respect to a , c , and n respectively yields:

$$\frac{\partial A}{\partial a} = (1 - f)\tau_1 \quad \frac{\partial R}{\partial c} = 1 \quad \frac{\partial R}{\partial n} = \frac{1}{1 - \tau_1} \quad (3.8)$$

The post-reform optimality condition for a now predicts a positive amount amount of reclassification by firms that are on the COGS margin of the deduction: firms will reclassify labor expenses into COGS until the marginal cost of reclassification is equal to the tax benefit they receive from doing so. Note that this benefit will depend on whether the firm is profitable: if the firm is profitable, the incentive to reclassify will be smaller (*i.e.*, until the marginal cost is equal to $(1 - f)\tau_1$ because state taxes are deductible for federal tax purposes), whereas if the firm is unprofitable the incentive to reclassify is larger (*i.e.*, until the marginal cost is equal to τ_1 because there is no federal deduction to offset the state tax). Thus, one prediction of our model is that unprofitable firms have a larger incentive to reclassify expenses than profitable firms.

The predictions for real values of COGS c and compensation n , however, are more complex. In addition to the changing relative prices of the inputs as a result of the new tax system, there is also a revenue effect because the tax rate on revenue has changed from τ_0 to τ_1 . Thus, without making additional assumptions, the change in c and n could be positive, negative, or zero. This insight raises an important point: any empirical design to test predictions about reclassification of expenses must be able to distinguish between real and reclassification responses, to ensure that any changes observed in reported compensation or COGS are not misdiagnosed as reclassification when they are actually a real change. Fortunately there are several approaches to do this, discussed in Section 3.4.

Firms on the compensation margin. Now consider a firm on the compensation margin. Note that the pre-reform setting is unchanged from the COGS example above, so we only consider the post-reform setting here. We can represent the firm's profit function as analogous to that of the COGS firm in Equation 3.7. Inputs are decomposed into labor compensation expenses w and other expenses x , with some adjustment b and adjustment cost $B(b)$ with similar properties to $A(a)$ discussed above. The profit function is thus:

$$\pi = (1 - \tau_1)(1 - f)R(w, x) - (1 - f)[(1 - \tau_1)(w + b) + (x - b)] - B(b) \quad (3.9)$$

Note that the incentives faced by a firm on the compensation margin are the same as by the firm on the COGS margin, but just over a different dimension: rather than reclassification of non-COGS expenses into COGS, there is an incentive to reclassify non-labor expenses into the compensation category. But note that the degree to which this is feasible in practice is a separate question, since the firm must generally be able to classify non-labor expenses as a W-2 wage, a stock option, distributed income to an owner, or health or retirement benefits.

Firms on the revenue margin and EZ filers. consider a firm with insufficient COGS or compensation to make those options worthwhile, so that it chooses to take the deduction equal to 30% of total revenue. The firm's profit function is given by:

$$\pi = (1 - \tau_1)(1 - f)R(c, n) - (1 - f)(c + n) + \tau_1 \cdot (0.3R) - A(a) \quad (3.10)$$

Here there is no benefit to reclassification, because a only enters as a cost. Note that we could obtain the same result for b on reclassification into compensation.

Finally, consider the case of EZ filers. As a reminder, these firms qualify by having less than \$10 million in total revenue, making them eligible to pay a flat 0.575% rate on total revenue but with no deduction available:

$$\pi = (1 - \tau_{EZ})(1 - f)R(c, n) - (1 - f)(c + n) - A(a) \quad (3.11)$$

Again, there is no incentive for reclassification. In each of the above two cases, we have that $\partial A/\partial a = 0$. Again, we could obtain the same result for b .

Summary of predictions. The model above thus yields several key predictions, which vary depending on which deduction is available for the firm. First, firms on the COGS margin now have an incentive to reclassify deductible expenses to COGS. Second, firms on the compensation margin also have an incentive to reclassify non-labor expenses into qualifying labor compensation costs. As a subset of these first two predictions, the interaction with federal tax rules implies that unprofitable firms will face a stronger incentive than profitable firms. Third, the firms on the revenue margin and EZ filers face no reclassification incentive.

A Note on Tax Accounting

As a last piece of background, we must be clear that what we are describing, observing and estimating are responses in *tax accounting and reporting*, not firms' financial accounting

and audited financial statements. The former is governed by applicable tax laws at the state and federal level for the purpose of collecting revenue, while the latter is governed by established accounting standards for the purpose of maintaining similarity across the financial reporting of firms. This difference in rules results in certain discrepancies in what is reported between the two. For instance, section 263A of the Internal Revenue Code requires that certain indirect costs contributing to the production of tangible goods be capitalized into inventories for tax purposes (thus increasing COGS for tax reporting purposes) that may not be capitalized as inventories for financial accounting purposes. Another key difference concerns firm size. During our period of investigation, federal tax law provided certain exemptions for small firms regarding the use of inventories. More precisely, corporations under \$5 million of gross receipts could use cash method accounting, and firms under \$1 million were not required to use inventories, which could contribute to timing discrepancies.²² A comprehensive treatment of book-tax discrepancies is beyond the scope of this work.

3.3 Data: Corporate Income Tax Returns and W-2s

For our empirical analysis, we use a sample drawn from the universe of C-corporation federal income tax returns filed with the Internal Revenue Service (IRS). Specifically, we use data from Form 1120 (US Corporate Income Tax Return) and Form W-2 (Wage and Tax Statement).

These data are the best data for conducting this analysis, for several reasons. First, these data contain firms from all states with consistent variables across time, making it possible to construct a difference-in-differences estimator using firms in Texas and outside of Texas.²³ Additionally, because Form 1120 is standard within a given year across states, we do not have to harmonize variable definitions across states. Using these data also allows us to link other administrative data, most notably Form W-2 filings which allow us to more credibly differentiate between a reporting response and a change in underlying economic activity. It is also useful that there is a vibrant research community studying the federal tax data we leverage.

Data limitations and attenuation of estimates. Despite the advantages listed above, there are some ways that federal tax data are not perfect that can lead to attenuation of estimates. These shortcomings mainly have to do with ways that state and federal definitions differ.

First, COGS is defined slightly differently in Texas versus federally. Texas provides an explicit definition of COGS while the federal tax code is less explicit. Similarly, the compensation deduction does not have a perfect parallel in federal reporting, requiring us to approximate the amounts as best as possible. By only observing the federal reporting, we will likely not observe the full response of firms. After all, it is Texas reporting that determines tax liability, not federal. Any reclassification that affects Texas COGS but not

²²Rev. Proc. 2002-28, 2002-18 IRB 815; Rev. Proc. 2001-10, 2001-2 IRB 272.

²³Texas returns prior to the reform did not include a line item for COGS.

federal COGS will not be captured in our analysis. Moreover, firms have an incentive to keep federal returns as consistent as possible to avoid triggering federal audit or requiring the firm to file a change in the method of accounting.

But we believe these distinctions in definitions are not a threat to our results, for two reasons. First, firms do not face an incentive to increase COGS or wages federally, and thus any change at the federal level is likely to exist at the state level as well. Second, we are able to replicate descriptive statistics reported from Texas. For example, a 2014 report found that 85% of total revenue reported by corporations in the post-reform period was attributable to COGS margin firms. The federal data we use produce the same estimate.

A second difficulty of using federal data that can lead to attenuation is that income and expenses are not broken out on a state-by-state basis. The Texas tax is scaled by an apportionment factor, equal to the ratio of sales in Texas over total sales.²⁴ We cannot observe the apportionment factor directly, and so must use an approximation based on W-2 wages, discussed below. This limitation attenuates results because it biases down the estimated response of our treatment group while biasing up the COGS of our control group. Texas firms with low apportionment factors will have less incentive to reclassify COGS, but we are not able to distinguish this diminished incentive. Likewise, non-Texas firms with sales in Texas will face an incentive to reclassify. These two effects will dampen our estimates by lowering the Texas response and raising the control response.

Beyond these attenuating effects, there are also more general difficulties inherent in the federal data. The first is that we do not observe the portion of COGS that are labor expenses ("Cost of Labor" on the federal tax return) in our data. It is reported on Form 1125-A, an attachment to business returns and is only available to us for electronically filed returns, which were uncommon at the time of the reform. Although not critical, this variable would be useful in more directly documenting shifting which we instead accomplish using links to filed W-2s and comparisons to the EZ file population. We also face the standard issues created by the complex corporate structures of firms with many subsidiaries and by changes in corporate structure including mergers and acquisitions. This is especially relevant as the 2006 reform also allowed combined reporting for the first time in Texas.

Additional details. We limit our analysis to C-corporations for a number of reasons. First, partnerships and sole-proprietorships were not subject to any tax before the reform. The transition from "no state entity-level taxes" to "entity-level taxes" involves a different set of incentive changes than a reform to an existing system. Second, because they were not subject to tax, there was an awareness of firms reclassifying as partnerships to avoid taxes (*see* p. 38 of Egan, 2007). Third, any partnership defined as "passive" is not subject to the franchise tax, and this is not observable in the federal tax data we can access. Finally, in the case of S-corporations, the Texas reform interacted not only with the choice of reporting COGS versus non-COGS expenses, but also with the choice by owners of whether to take

²⁴Note, importantly, that the apportionment factor is only applied as a scalar coefficient *after* calculating the taxable margin from total revenue, COGS, and compensation. The geographic location of the revenue, COGS, or compensation does not matter.

more or less salary. This second interaction would confound and bias our results, but is a potentially fruitful avenue for future research.

The data we use includes many variables on the front page of the 1120. We use gross receipts (line 1 on the 1120), COGS (line 2), total income (line 11), compensation of officers (line 12), salaries and wages (line 13), taxes and licenses (line 17), pension and profit sharing plans (line 23), employee benefit programs (line 24), total deductions (line 27) and taxable income (line 30) in our analysis. We also use the two digit NAICS industry code from schedule K (line 2).

In addition to variables from the 1120, we include information from Form W-2 aggregated to the firm-level, such as total employees and total wages paid. We match W-2s to a firm filing an 1120 through a bridge that matches employer identification numbers (EINs) from information returns to their “parent” EINs used to file entity-level tax returns. This bridge is important to get a more accurate measure of total W-2 wages, especially for large firms. The construction of the bridge is described in Joint Committee on Taxation (2022).²⁵

We proxy for Texas’ apportionment factor by calculating the fraction of W-2 wages a firm (in a given year) pays to residents of each state. This measure is imperfect, as apportionment is determined by the place of sale or delivery and not production. Our measure would include wages paid to factory workers in Texas manufacturing a product that is sold and shipped to another state whereas the apportionment factor would exclude this revenue, but would include the reverse.

3.4 Empirical Framework and Descriptive Statistics

We conduct a difference-in-differences event study comparing the behavior of firms in Texas against firms in control states. The identifying assumption is that the two groups would trend parallel were it not for the Texas tax reform. The design allows us to control for national shocks, which is especially important given our period of observation includes the Great Recession. Our preferred specification is:

$$y_{it} = \gamma + \sum_{\mathcal{T} \neq 2005} \beta_{\mathcal{T}} \mathbb{1}[t = \mathcal{T}] \cdot Texas_i + \theta Texas_i + \delta_{it} + \eta_i + X_{it} + \varepsilon_{it} \quad (3.12)$$

²⁵A single corporate filer may use multiple EINs to issue W-2s for reasons that include legacy W-2s from mergers and acquisitions and more simple organizational purposes. Some of these are easily observable in the tax data while others are not. First, C-corporations often report parent-child relationships annually on Form 851, but can also report them on schedule K of Form 1120. Even still, this reporting is often incomplete as an EIN need not belong to a distinct subsidiary. We therefore, also impute forward any parent-child relationships we observe in the past, but do allow them to break if a child files its own tax return. Next, we perform a statistical match using addresses that matches firms that file from the same address when that address is sufficiently rare. Lastly, we perform some manual matches to properly assign some of the largest wage payers to a recognizable entity. We use the matches to produce a measure of total Medicare wages (Box 5) and total number of employees and add these to our data.

where i and t index firm and year respectively, y_{it} is the outcome variable, γ is a constant, $Texas_i$ is an indicator for being located in Texas, δ_{it} is a vector of industry-by-year fixed effects, η_i is a vector of firm fixed effects, X_{it} is a vector of additional firm-by-year controls that include order-of-magnitude dummies of lagged total revenue and lagged total assets. We weight our regressions by total revenue (total income plus COGS, lines 11 and 2), so that our estimates reflect the economic magnitude of the findings. The β s are the coefficients of interest, and can be interpreted as a difference-in-differences estimate of the revenue-weighted average difference in the outcome variable in a given year between treated and control firms.

We also estimate a reduced form of Equation 3.12 given by:

$$y_{it} = \gamma + \beta Post_t \cdot Texas_i + \theta Texas_i + \delta_{it} + \eta_i + X_{it} + \varepsilon_{it} \quad (3.13)$$

where $Post_t$ is a binary variable identifying tax years after the enactment of the reform. In general, unless specified, we exclude year 2006 from the regression because this is a year that solely reflects anticipatory changes rather than the full effect of the reform.

As discussed in Section 3.2, there are two critical considerations to keep in mind: (1) the incentive faced by any given firm will depend on which deduction margin the firm is on (COGS, compensation, or revenue) and whether the firm is a normal or EZ filer, and (2) real responses may confound estimation of any reclassification response. In light of these points, we choose both several outcome variables and several distinct subsets of firms to isolate the intended responses.

Key Outcome Variables

We consider a number of outcome variables for the above regressions, but our two primary outcome variables measure (1) the degree of shifting from ineligible to eligible expenses, and (2) the change in the tax base. We discuss each of these in turn.

A measure of shifting. First, to measure the degree of shifting from ineligible to eligible expenses, we define a ratio of eligible expenses to “total expenses,” measured as COGS (line 2) plus total deductions (line 27). Integrating this concept with the theoretical framework laid out in Section 3.2, the variable can be written for firms on the COGS margin as:

$$y_{it} = \frac{COGS_{it}}{total\ expenses_{it}} = \frac{c_{it} + a_{it}}{total\ expenses_{it}} \quad (3.14)$$

This formulation recognizes that reported COGS after the reform will reflect not only c but also any reclassification a . When put into a regression framework, the variable produces a simple and convenient interpretation of the β s in our regressions specification above, assuming two key assumptions hold. As long as both (a) the ratio of the real variable c to total expenses remains stable and (b) the parallel trends assumption holds, then β s can be interpreted as representing the average value of a (the reclassification amount) as a share of total expenses. The estimation for compensation margin firms is analogous, where β s will estimate reclassification b as a share of expenditures.

A measure of the tax base. While the above measure provides a sense of the portion of total expenses shifted, our primary interest is the effect on the corporate tax base. To measure the percent change in the tax base, we take the log of the firm's tax base as a share of the firm's total revenue:

$$y_{it} = \ln (Base_{it}/TotalRevenue_{it}) \quad (3.15)$$

We calculate an estimated value of the tax base ($Base_{it}$) for each firm using the rules under post-reform tax-regime. We also left-censor the fraction at 0.01 so that observations with 0 tax base are not undefined, and (as a conservative measure) so that small moves near the extensive margin are not overly influential. Total revenue is constructed to approximate the definition under Texas rules post-reform.

This variable offers a nice intuition within a regression framework. By taking the natural log of the base-to-total-revenue ratio, the β s can be interpreted as the average percentage change in the tax base of the affected Texas firms versus the control firms in other states.

Choosing Firms to Identify Effects

Different firms will face different reclassification incentives depending on which margin applies, or on whether they file standard or EZ returns. Therefore, for every regression, we try to isolate only the affected set of firms, with a comparison group composed of firms meeting the same requirements but in control states.

We program a simulated Texas tax liability calculator to identify which category minimizes liability for each firm: COGS, compensation, revenue, or EZ filing (if eligible).²⁶ We then perform the same calculation for non-Texas firms, under the hypothetical that the same rules applied to them. This allows us to compare Texas and control firms on the same margin in our regression analyses. Put another way, if we want to test the responses of firms on the COGS margin, we use our calculator to identify both (1) the firms in Texas that would be best off under the COGS margin, and (2) the firms in other states that would similarly best off under the COGS margin had their state imposed the same tax rules as Texas.

Variable Calculations

For most variables, we can take the value directly from the Form 1120. COGS is line 2. Total revenue is COGS plus total income (line 11). Total expenses is COGS plus total deductions (line 27). For industry determinations we use NAICS codes reported on Form 1120 (applicable for wholesalers and retailers).

However, there is no direct measure of the Texas total compensation measure on the Form 1120. In the context of c-corporations, the Texas definition of deductible compensation expenses is the sum of (a) Medicare wages reported on Form W-2 plus stock options and

²⁶This is done for firms with negative liability as well: the largest (in absolute value) negative liability margin is chosen.

awards, the sum capped at \$300,000 per employee, plus (b) employee benefits, including health and retirement benefits. We approximate total compensation by taking the sum of (a) medicare wages and tips reported on W-2s matched to the firm (which should include stock options and awards), capped at \$300,000 each, plus (b) pension plans (line 23), plus (c) employee benefits (line 24).

Apportionment Factor and Attenuation Bias

As discussed in Section 3.2, the ultimate tax liability for any firm is multiplied by an “apportionment factor” equal to the percentage of gross receipts that are from sales in Texas as opposed to sales in other states. We cannot observe the apportionment factor because we do not have data on the breakdown of gross receipts by state. We do observe the state of the headquarters of the ultimate parent. This creates an attenuation bias: if we categorize firms by headquarters (which is binary for presence in Texas), firms headquartered outside of Texas (the control firms) with sales in Texas will be biased up, while firms headquartered in Texas (the treatment firms) with sales outside of Texas will be biased down. This is conceptually similar to an intent to treat variable where there are both entities assigned treatment who do not completely take up the treatment and entities who are not assigned treatment, but nonetheless are treated in some capacity.

To mitigate this issue, we use W-2 data, and restrict our treatment and control groups to firms that have at least 75% of their employees in the same state as the ultimate parent address. But even with this restriction, the attenuation bias exists. As a result, our estimates should be considered conservative estimates of any firm responses. We discuss our measure of the apportionment factor in greater detail in Appendix C.1.

Selection of Control States

We take several approaches to selecting control states. Our main specification uses geographic proximity. That is, we use states adjacent to Texas as controls. Geographic proximity offers several benefits. First, to the extent there are natural similarities in economic activity that bleed across state borders, this approach triangulates the state regionally so as to automatically capture such similarities. Second, the approach provides a defensible rule with clear boundaries, which helps “tie the hands” of the researcher. If a researcher uses other methods to identify control states, this introduces judgement into the selection process. Third, there are likely unobservables that make neighboring states similar in a way that non-neighboring states are not. Put another way, if a researcher tries to identify controls based upon a set of observables, this risks overemphasizing the observables and likely missing unobserved similarities that make the neighboring states compelling controls.

Specifically, we use Arkansas, New Mexico, and Oklahoma as controls in our primary specification. We exclude Louisiana because Hurricane Katrina hit on the eve of the reform in fall 2005. To the extent the hurricane impacted the average composition of firm inputs, our results could be biased. We see evidence this was indeed the case. We observe that W-2

wages as a share of total firm expenses dropped 6% in 2005 in Louisiana, while remaining essentially stable in other states. As a robustness test, we include Louisiana in the appendix, and find that our estimated effect sizes are larger. So our choice to exclude it is a conservative measure.

Although there are benefits to the neighboring state approach, there are also weaknesses. First, because the Texas reform affects all corporations with sales in Texas, there will be attenuation bias as corporations in neighboring states are likely more affected than corporations in distant states. (Indeed, our alternative sets of controls tend to produce larger point estimates of the responses to the reform). Second, there could be underlying regional effects correlated with the timing of the treatment that attenuate the results. Third, there is no guarantee that geographic proximity produces a similarity of economic setting relevant to the treatment.

In light of these concerns, beyond our primary specification we use the synthetic controls method described in Abadie et al. (2010) and Abadie (2021). We match controls based on industry composition (the respective revenue shares of agriculture, manufacturing, wholesale and retail trade, and professional services) and on size composition (the revenue shares of firms with greater than \$25 million in assets and revenue). For our COGS margin comparison, our control states include Arizona, Kentucky, Maryland, Mississippi, Oklahoma, Tennessee, and West Virginia. For our compensation margin comparison, our control states include Arizona, California, Idaho, Mississippi, New Mexico, Utah, and West Virginia.

Descriptive Statistics and Balance

We provide some descriptive statistics and compare the population of firms in Texas and firms in its neighboring states in 2005 in order to provide support for the validity of our choice of neighboring states as our primary comparison group. First, Figure 3.2 shows the total reported revenue for firms in Texas and neighboring states broken down by our assignment of margin. It shows that the vast majority of revenue is reported by firms we predict to be on the COGS margin. This fact is important in and of itself when considering the possible implications of the shifting behavior our theoretical model produces. We provide estimates for both the full population and for the restricted population of firms we use in our analysis, which excludes firms with more than \$100 million in total revenue and firms with apportionment factors inconsistent with their states of residence, as described in Section 3.4 Note that when removing these firms from the analysis, the percent of revenue accounted for by firms deducting COGS is lower both in Texas and its neighboring states, but also more balanced.

The commissioned report reviewing the Texas franchise tax reform (Combs, 2013) indicates that 85% of revenue was reported by firms who opted for the COGS deduction in 2008. We are able to reproduce that statistic for the years 2007-2013 (the time period under review in the report), reaffirming the reliability of our data and analysis.

We find that firms in Texas are highly comparable to firms in its neighboring states. Table 3.1 provides summary statistics of variables of interest for the COGS margin firms

in our analysis, comparing Texas and our control states in 2005. The means are revenue-weighted. Both firms in Texas and firms in control states are skewed right in terms of each of these variables. COGS firms tend to be slightly larger than other firms. A similar table for firms on the compensation margin is available in the appendix, but the key is that there is comparable similarity between Texas and control firms.

3.5 Results

Consistent with our predictions in Section 3.2, we find a substantial reclassification response by firms on the COGS margin. We provide supporting evidence that the response is a reporting response and not a real response. But in contrast with COGS firms, we find only a small and noisy response by firms on the compensation margin.

Reclassification Response

Figure 3.3 presents our main estimate of the shifting of expenses by firms on both the COGS and compensation margins. It uses our primary specification in Equation 3.12. Each panel plots two regressions. For the left panel, the dependent variables are COGS and non-COGS expenses as a share of total expenses; for the right panel, the dependent variables are compensation and non-compensation expenses as a share of total expenses. The β s thus represent the extra COGS, non-COGS, compensation, or non-compensation expenses as a share of total firm expenses by Texas relative to control firms over time.

For COGS margin firms, we see steady pre-trends leading up to the reform, followed by a sharp divergence. After the reform, Texas firms reported more COGS as a share of their total expenses, approximately 1.1% more. Likewise, non-COGS expenses symmetrically dropped as a share of total expenses.

The amount shifted from non-COGS expenses to COGS expenses is substantial economically. In the post-reform period, for these firms COGS accounted for over 77% of total expenses. Thus, even though a 1.1% increase may seem small absolutely, it represents a 5% decline in the non-COGS deductible expenses relative to COGS expenses. And given that we estimate 85% of total revenue reported by Texas firms is from COGS firms, this shift is significant.

There is a very different story for firms on the compensation margin. Most importantly, there are no strong patterns of divergence after the reform. Although it is the case that on the whole there appears to be slightly more compensation expenses by Texas firms after the reform, as reported in Figure 3.3, the results are noisy and the magnitude is small. A null result is a reasonable possibility in each year after the reform. Note that part of this noise is driven by the fact that there are fewer firms on compensation margin than the COGS margin, as seen in Table 3.1.

What categories of expenditure are the source of this shifting? We decompose the shift out of non-COGS expenses to show that most is coming from a combination of wages and salaries

reported on the Form 1120 (line 13) and the broad category of “other deductions” (line 26). The biggest single contributor is the other deductions category. Other deductions make up 30% of total deductions, but account for 50% of the shift into COGS. Other deductions fall 8% as a share of total expenses after the reform. Wages and salaries contribute a smaller but sizeable portion of the shift: they make up 29% of total deductions, contribute about 32% of the shift, and fall by 5% as a share of total expenses after the reform.

Is this shifting from other categories into COGS a real or reclassification response? We investigate this question from several angles. First, we consider W-2 wages reported by firms. Unlike salaries and wages reported on Form 1120, W-2 wages are not exclusive of COGS. That is, the W-2 wage could go to a COGS worker or a non-COGS worker. If there is a real change in worker compensation, we would expect to see a response in W-2 wages paid by the firm. Figure 3.5 reveals that is not the case. Although pre-trends are not as clean as in other settings, the implications are still clear: there is no noticeable drop in W-2 wages paid by affected Texas firms, suggesting that the reclassification from salary to COGS on Form 1120 is not a real decrease in the wages and salaries paid by these firms. We also consider the change in the number of employees measured by the number of W-2s issued by the firm, and similarly find no evidence of a drop after the reform.

Third, we consider a reporting category that is explicitly excluded from the definition of COGS by the Texas tax law: officer compensation. The rules make clear that officer compensation may only count toward the compensation margin, not the COGS margin. It is also a category that is fairly narrow and explicit (*e.g.*, wages, bonuses, or stock options). Although not pictured here (see the appendix), there is no response in officer compensation, further suggesting that the observed responses are reclassification rather than real responses.

We also investigate our hypothesis that unprofitable firms will have a stronger incentive to reclassify expenses due to the interaction of the federal and state tax rules, as discussed in Section 3.2. We confirm that indeed this is the case. We estimate that unprofitable firms reclassified expenses at a much higher rate of profitable firms—a 6.0% decrease in non-COGS expenses relative to COGS expenses for the unprofitable firms, versus a 4.4% decrease for the profitable firms. A figure presenting the extra reclassification by unprofitable firms are available in the appendix.

Robustness

We find that our results for the observed shifting in COGS is highly robust to a number of changes to either controls or specification. Note that our primary specification above already includes a number of stringent controls: firm fixed effects, industry-by-year fixed effects, as well as quintile dummies for lagged total assets and lagged total income. See Section 3.4 for additional discussion. To ensure robustness, we also take additional measures, which are presented in the appendix.

First our results are robust to the inclusion of a variety of additional economic controls. We add quadratic, cubed, and quartic controls of the firm’s profit margin, sales growth, and sales-to-assets ratio. Our results are unaffected.

We next run our primary specification above as a balanced panel between a narrower set of years, 2001 and 2010. We define inclusion in the regression and a firm's treatment status based upon its status in 2005. We estimate similar results here as we do in our primary specification.

Our results are also robust to a number of additional specification changes. These include: changing the threshold of—or dropping altogether—our apportionment factor restriction; dropping our size threshold to a lower total revenue; imposing a minimum total revenue threshold (*i.e.*, dropping small firms); basing eligibility for the margins on the prior tax year rather than the current tax year; and changing our definition of the measure of total compensation for the compensation margin.

In addition to the above robustness tests, we also change the set of control states, with all corresponding figures in the appendix. First, we include Louisiana, which actually increases the magnitude of the COGS reclassification response. In addition, we run a synthetic control regression using the methodology described in Abadie et al. (2010) and Abadie (2021), described in section 3.4. We estimate comparable results with a similar magnitude. We also then take the states selected in the synthetic control analysis and re-run our micro analysis above using these states as controls. The magnitudes of the results under this alternative specification of controls again is comparable to our main results presented above.

Revenue Margin and EZ Filers

We consider whether the reform affected the reporting of firms on the revenue margin or filing EZ returns. As explained in Section 3.2, although these firms faced the same reform, they did not have a reclassification incentive because there was no single expense eligible for deduction. As a confirmation of the validity of the COGS response reported above, we test whether there was COGS shifting among these firms. We find that there was no reclassification response, consistent with our predictions.

3.6 Economic Significance

In this section we give a sense of scale of the reclassification response documented above. Whereas the previous section estimated the magnitude of the reclassification itself, in this section we estimate changes to the tax base and the elasticity in light of the avoidance response.

As noted above, the 1.1% of total expenses shifted by firms on the COGS margin may seem small, but it's important to remember three things about the magnitude. First, COGS margin firms have relatively few expenses outside of COGS. The revenue weighted share of COGS for these firms is 77% of their total expenses. The main firms affected are sellers of tangible goods—namely businesses in retail and manufacturing. The vast majority of their expenditure is already devoted to COGS, and an additional 1 p.p. shift is quite substantial. Second, the tax base for the new tax regime is total revenue net of the chosen deduction. In the case of COGS firms, the chosen deduction is COGS. On average, reported COGS for

these firms represents 80% of their total revenue. So even a small shift makes a substantial change to the tax base. Third, this shift is in response to a small tax. The new tax is a 1% tax for most firms, and a 0.5% tax for retailers and wholesalers. This means that a shift in reporting only saves a small amount of tax per dollar shifted. Yet we see roughly 5% of the ineligible expenses shifted for these firms. That is a large response to a tiny tax change.

To put the scale of the response in economically meaningful terms, we take two measures. First, we estimate the percent change in the tax base as a result of the avoidance response. We run our standard regression, but where the dependent variable is the log of the firm's tax base as a share of the firm's total revenue defined in Equation 3.15. To produce accurate estimates, we use weights that reflect the tax base in the absence of the reform (although our estimates are robust to a variety of reasonable weights).²⁷ Our point estimates can thus be interpreted as the weighted average percentage change in the tax base of the affected Texas firms versus the control firms in other states.

Our results are presented in Figure 3.1 and reported in Table 3.3. We estimate that the tax base for the affected firms on the COGS margin is 4.1% ($\pm 1.1\%$) smaller than it would have been without the reclassification response. This finding squares with the magnitudes of the weighted averages discussed above.

Second, we estimate the elasticity of the tax base with respect to the net-of-tax rate of the deduction available for reclassification. To understand this elasticity, consider a corporation that faces a 25% federal tax rate on taxable income and is considering making an expenditure for a business input. In the post-reform world, that business also faces a 1% state tax on its total revenue. Assume further that the corporation is a COGS filer. Thus, if the additional expenditure qualifies for COGS treatment, the after-tax benefit is given by:

$$\frac{1}{(1 - \tau_{Fed})(1 - \tau_{TX})} \quad (3.16)$$

Whereas if the expense does not qualify for the COGS deduction, the after-tax benefit is given by only:

$$\frac{1}{(1 - \tau_{Fed})} \quad (3.17)$$

²⁷ The intuition is best provided by an example. The goal is to weight by the tax base to arrive at an accurate aggregate measure of the percent change in the tax base. But consider a firm that, as a result of the reform, reclassified a sufficient amount of expenses so that its tax base is reduced to zero. The observed tax base is zero, but it would not be in the absence of the reform. Thus, if weighting is done solely by the observed tax base, this 100% decline in the tax base for this firm would be given zero weight. To address this concern, our preferred specification adds to the tax base of Texas firms post-reform an amount equal to the estimated average shift of expenses produced by Figure 3.3, on a year-by-year basis. Thus, if the estimate from Figure 3.3 in a given year suggests that on average 1.2% of total expenses are shifted into COGS, we take the observed tax base for affected Texas firms in that year and add an amount equal to 1.2% of total expenses. As robustness checks, we also test other weights. Specifically, we use the base without adjustment, and also total revenue (as in other regressions). Our results are not especially sensitive to these changes, producing estimates of roughly 4% to 5% base reduction in each instance, consistent with our preferred specification.

We use two-stage least squares regression to estimate the elasticity of the tax base with respect to the change in the available deduction. Our first and second stages are given by:

$$\Delta \ln \left(\frac{1}{1-\tau} \right) \cdot Post_t = \gamma + \beta Post_t \cdot Texas_i + \theta Texas_i + \delta_{it} + \eta_i + X_{it} + \varepsilon_{it} \quad (3.18)$$

$$Y_{it} = \gamma + \epsilon \Delta \ln \left(\frac{1}{1-\tau} \right) \cdot Post_t + \theta Texas_i + \delta_{it} + \eta_i + X_{it} + \varepsilon_{it} \quad (3.19)$$

where ϵ estimates the elasticity and τ represents to total rate of deduction for a given expenditure (depending on whether it is classified as COGS or non-COGS), and so the $\Delta \ln(\frac{1}{1-\tau})$ term represents the percent difference in the rate of deduction for COGS versus non-COGS expenditures. Intuitively, we instrument for the firm's available deduction using their status as a Texas or non-Texas corporation. The standard identifying assumptions apply: exogeneity, relevance, monotonicity, and exclusion.

Our estimate of the elasticity is presented in Table 3.3. The responsiveness of the firms, although somewhat noisy, is quite large: we estimate an elasticity of the tax base of -5.5 (± 1.5). Intuitively, for every 1% additional deduction available by reclassifying an expense to COGS, we estimate that firms reclassify a sufficient amount of expenses to reduce the tax base by roughly $5\% \pm 1\%$. And as discussed above in Section 3.5, our results are robust to numerous specification changes.

In contrast with our estimates for COGS margin firms, we find little response for compensation margin firms. Although our point estimates in Table 3.3 suggest a roughly 1% base reduction, they are very noisy, with standard errors about as large as the point estimate. Further evidence about the small magnitude and noisiness is available from our robustness checks that use synthetic controls and other states, producing near-zero or even sometimes positive changes in the tax base.

Although we report the elasticity for firms on the COGS margin, we do so with two grains of salt. First, because the tax reform created the incentive for shifting that previously did not exist, our estimate may be capturing a threshold response, and may not be applicable to a reform that only changes the intensity of the treatment. It may be the case, for instance, that a 2% tax would have generated a similar total response as a 1% tax. It is difficult to say without more variation in the policy. Second, we report the measure as an elasticity (a percent response to a percent change), but it may be economically worthwhile to think of the response as a semi-elasticity (a percent response to a percentage-point change). Again, the underlying uncertainty is given by the fact that there is now a distortion where non existed before, meaning that the experiment lacks variation to inform us more about intensive margin responses. Regardless, this degree of responsiveness is meaningful in terms of tax revenues, as corporations on the COGS margin represented 85% of total revenue reported by Texas corporations between 2006 and 2014.

3.7 Heterogeneity

We next consider which types of firms appear to have exhibited the strongest responses to the reform. To do this, we estimate the percentage change in the tax base as in Figure 3.3, but we narrow the population of firms in each regression. Rather than using the broad set of firms on the COGS margin as we have in previous regressions, we isolate subsets of firms within the group.

Our results are presented in Figure 3.7. A few points stand out. Notably, the reclassification response is not solely exhibited by a small set of firms, but rather is quite widespread across groups. All categories of firms have positive point estimates except for those in the finance, real estate, and insurance industries (which have often have no, or very little, COGS). Also the base reduction is consistent for most groups around 3% to 5%.

But there are some qualities that tend to be more associated with stronger or weaker responses. First, smaller firms are associated with a stronger response, as approximated by total assets or revenue. In contrast, larger firms by total revenue and total assets (above \$25 million) tend to exhibit much weaker responses. We suspect there are several reasons for this. One, smaller firms often face less information disclosure and oversight, and represent settings with higher degrees of information asymmetry, facilitating manipulation. Two, because the Texas tax is calculated in a way that considers revenue and COGS across all states, and because larger firms are more likely to have operations in multiple states, larger firms would likely face much higher costs to reclassify expenses for a smaller reward (as they owe taxes in not just Texas, but other states too). Third, larger multi-state firms have only a portion of their revenue in Texas, attenuating the incentives created by the reform on account of the Texas apportionment factor.

Second, we also find that unprofitable firms tend to have a much stronger reclassification responses, as predicted by our theory in Section 3.2. Unprofitable firms, because they have no federal taxable income, are unable to deduct their Texas taxes. This heightens the reclassification incentive compared to profitable firms.

Third, we find that certain industries tend to be very responsive. These notably include agriculture, food & accommodation (*e.g.*, restaurants, and similar establishments), and construction. The strong response in these industries is reasonable: they tend to be industries with low margins and high input costs with a lot of COGS. But one industry that exhibits a large response is perhaps less anticipated: professional and scientific services. One might not have expected that professional service industries even had COGS. But for tax reporting purposes, service businesses that charge customers for costs of materials regularly used in the business report these costs as COGS. We suspect that the strong response by this industry is driven by the fact that for most of these firms keeping track of COGS is not a primary concern, and prior to the reform there was zero incentive to classify an expense as COGS if it was possible to do so. But after the reform, doing so became a salient issue with clear impacts on the firm's bottom line.

3.8 Discussion

COGS versus Compensation

We observe starkly different behavior in the reclassification response between firms on the COGS margin and firms on the compensation margin. We suspect this divergence is driven by how the two deductions are defined under Texas and federal law. There is already a body of accounting research detailing how COGS is a category that is vulnerable to reclassification (*see* McVay, 2006; Fan and Liu, 2017; Poonawala and Nagar, 2019), but we detail some specific features that contribute to that quality here.

First, while COGS is a broad category that admits a range different expenses, compensation is much more narrowly tailored with less flexible delineations. On the one hand, compensation for C-corporations includes only three types of expenses: (1) medicare wages reported on W-2s, (2) stocks and options, and (3) employee benefits, including health and retirement benefits. In contrast, COGS broadly includes all direct costs in acquiring or producing goods. While the federal tax measure of COGS is less explicit (arrived at through a net change in inventories), items in the Texas definition include employee wages, employee benefits, contractor payments, storage, handling, depreciation, rental costs, maintenance and repairs, R&D, maintenance and repair, spoilage and loss, utilities, insurance, and taxes, among others. It is no doubt easier to make the case that an ancillary expense can be classified as COGS than be classified as compensation.

Second, COGS has scattered information reporting that is harder for tax authorities to review. Wages, the bulk of the compensation deduction, is reported directly on Form W-2s to tax authorities. Stock options and awards are also reported on W-2s. In contrast, expenses that are classified as COGS will be reported on a myriad of information returns, from W-2s to 1099s. It is impossible to tell from the information return alone whether the item is a COGS or non-COGS expense.

Third, there is more potential variability in timing for COGS than for compensation, making it more difficult for authorities to scrutinize reporting. Wage and salary costs are generally reported in the period when paid or when service is performed. But costs to produce goods that are ultimately categorized as COGS are generally capitalized into inventory and may be reported in a tax period different than when the economic cost was paid by the firm.

Fourth, because the determination of what expenses count as COGS is governed by rules that are less bright-line than for compensation, there is more reliance on the judgement and good faith of managers and accountants. Does a particular rental of equipment count as being used for the production of goods or not? Does a particular employee or contractor's work count? In the case of compensation, the categorization is more standardized and less flexible: is the payment a wage to the employee reported as a medicare wage on Form W-2?

Understanding Mechanisms

We find evidence suggesting that firms take advantage of the broad nature of COGS described above. First, as noted previously, half of the COGS reclassification response comes from the broad “other deductions” category on the Form 1120—a reclassification from one broad category of expenses into another. Second, we also investigate the responses of corporations that are under additional scrutiny by the IRS versus those that are not. Specifically, as shown in Figure 3.8 we isolate corporations that either received notice in 2005 that they are under examination by the IRS or that began litigation in 2005 with the IRS (red), versus those that did not (blue). We find that the firms under additional scrutiny reported much weaker COGS reclassification responses on average. This relatively weaker response is consistent with ?. They also reported essentially no reclassification from the “other deductions” category. Third, as reported previously, our findings that smaller and unprofitable firms account for the stronger responses is in line with accounting literature that finds similar results in the context of manipulation of financial reporting due to generally lower disclosure requirements, less stringent controls, and increased asymmetric information (Bhattacharya, 2001; Bisogno and De Luca, 2015).

3.9 Conclusion

We exploit a natural experiment created by a unique tax reform in Texas to test the degree to which firms can reclassify expenses to avoid taxes. In an effort to raise revenue, in 2006 Texas replaced its 4.5% corporate profits (largely analogous to the US federal corporate income tax) tax with a much broader 1% gross revenue tax that eliminated almost all deductions. However, the new regime still allowed corporations to choose to deduct a single expense, either COGS or total worker compensation, thus creating an incentive for these firms to either adjust inputs or to reclassify expenses to take advantage of the limited deductions. We use a subset of the population of US corporate tax returns to conduct a differences-in-differences analysis between affected Texas firms (*i.e.*, firms we calculate to have likely faced the incentives described here) and similar firms in neighboring states.

We find a large avoidance response—but not a real response—among the affected Texas firms that are best off taking the COGS deduction. We estimate that affected corporations shifted 1.1% of their total expenses from ineligible expenses into COGS. This corresponded to a large share of non-COGS expenses, roughly 5 percent, as on average COGS represented roughly 77 percent of the firms’ total deductions. We confirm using ancillary tests that this response is a reporting reclassification response and not a real response. We further estimate that this reduced the new tax base for these firms by about 4%, reflecting an elasticity of the tax base with respect to this particular deduction of roughly -5 ± 1 . Given that roughly 85% of the total revenue reported by taxpaying firms in Texas was reported by firms affected by this incentive, the reduction in the tax base is a substantial amount.

But we find little response by the firms for whom compensation is the best deduction. We

estimate a very noisy response that includes zero response, with point estimates suggesting likely at most a 1% shift in expenses.

What can reconcile the stark difference in response between the two sets of firms? Evidence suggests this is driven by the breadth of the COGS category (compared to the narrower definition of compensation expenses). We find most of the shifting into COGS comes from the nebulous catch-all “other deductions” on the corporate tax return, and that the largest responses are by smaller firms, who generally have higher asymmetric information and often face less strict reporting and disclosure requirements in practice. We also find that firms under examination or in litigation with the IRS exhibit a much smaller response.

Our results reveal that reclassification responses to tax reforms of corporate tax bases can be very large, but they are also highly context dependent. How easy is it to reclassify expenses into a new category to take advantage of such an arbitrage opportunity? When the categories are broad and oversight is more difficult, the avoidance response can be striking. But when it is challenging to reclassify without making real changes in inputs, the response is muted.

Our results have important implications for researchers, policymakers, tax administrators, and revenue estimators. The Texas reform was intended to raise revenue by broadening the base, but this unique design of the available deductions undercut that goal by presenting an avenue for avoidance. Corporate taxes are an important source of revenue for many governments, and there is a widespread policy discussion about broadening tax bases to curb avoidance. Given that doing so necessarily involves drawing new lines delineating which income or deductions are included or not, our findings highlight the importance of taking care to not create opportunities for taxpayers to reclassify their income or deductions to avoid the broader base.

These results shed new light on public economic research on corporate taxation, and present opportunities for future research. Our findings highlight a potential avenue of behavioral response that was well known in the accounting and finance literature, but that has yet received scant attention by public economists: classification of accounting items. The reason we were able to uncover this phenomenon is because a natural experiment existed that enabled a relatively clean identification of the response. But that does not mean this is the only setting particularly amenable to reclassification—it is simply one we could cleanly test. What other categories of income or deduction present similar opportunities? How easy or difficult would it be for taxpayers to avail themselves of those opportunities? Our findings and the follow-on questions they present suggest a rich avenue for future research that finds complementarities between finance and accounting research and public economics research.

Tables

Table 3.1: Descriptive Statistics for Firms on the COGS Margin (2005)

	10th		Median		90th		Mean	
	Texas	Control	Texas	Control	Texas	Control	Texas	Control
Gross Revenue (\$1k)	95	91	932	935	7,125	7,446	22,437	22,906
Total Income (\$1k)	18	22	255	275	1,698	1,762	4,759	4,513
COGS (\$1k)	63	58	626	628	5,463	5,679	18,128	18,861
Wages (\$1k)	24	25	177	187	1,246	1,229	2,637	2,659
Tot Comp (\$1k)	0	0	90	115	945	1,023	2,259	2,514
Tot Deductions (\$1k)	27	30	253	267	1,578	1,610	4,157	3,963
Tot Assets (\$1k)	7	10	236	287	2,461	2,613	10,432	11,724
Employees (num)	1	2	7	8	38	42	76	86
Profit Margin (%)	-55	-44	2	3	26	26	-17	-11
Sales Growth (%)	-31	-30	8	7	91	69	27	23

Notes: This table reports the 10th percentile, median, 90th and mean for a selection of variables for firms on the COGS margin in Texas and in the controls states (Arkansas, Oklahoma and New Mexico) in 2005. The means are weighted by total revenue. These variables are gross revenue (form 1120 line 1a), total income (line 11), COGS (line 2), W-2 medicare wages, total compensation under the Texas definition, total deductions (line 27), total assets (line D), total employees (from W-2s), profit margin (profit as a percentage of total income) and year over year growth in gross sales.

Table 3.2: Changes in Reporting as a Share of Total Expenses

	COGS	Non-Cogs	Compensation	Non-Compensation
Texas x Post	1.14 (0.13)	-1.14 (0.13)	0.35 (0.64)	-0.45 (0.67)
Obs.	721,750	721,750	332,469	362,402
R-squared	0.88	0.88	0.80	0.79
Clusters (Firms)	110,950	110,950	59,061	61,809

Notes: This table corresponds to Figure 3.3. It reports the estimated percentage point changes in the share of total expenses represented by COGS, non-COGS, compensation, and non-Compensation expenses for COGS margin firms and compensation margin firms in Texas vs. firms in control states. Point estimates are from the difference-in-differences specification given by Equation 3.12 with dependent variables defined as in Equation 3.14. Clustered standard errors in parentheses. We exclude year 2006, which only reflects anticipatory changes and thus biases down the estimate. The sample is limited to firms we define to be on the COGS and compensation margins as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

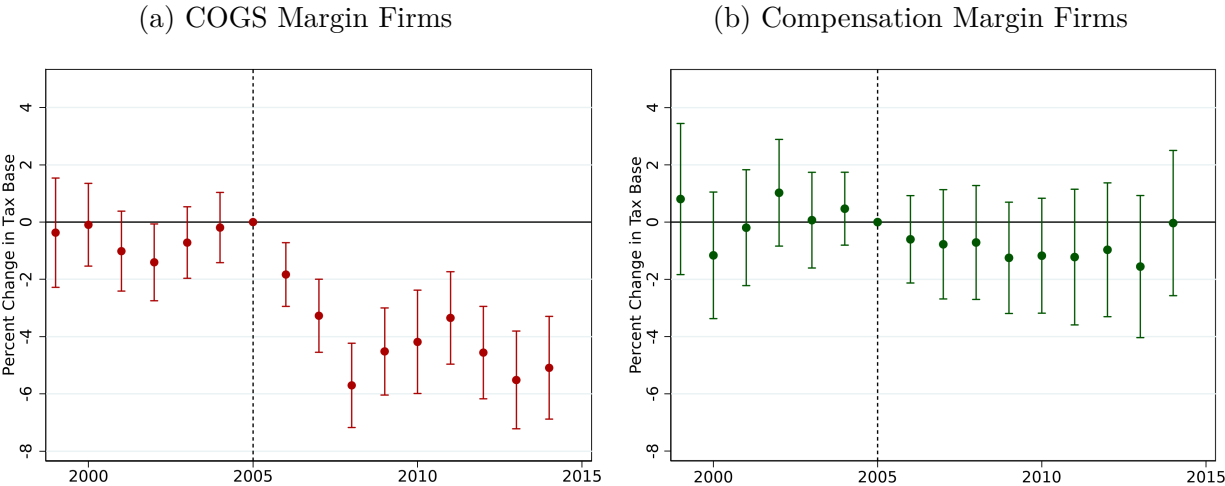
Table 3.3: Change in Tax Base and Elasticity of Tax Base

	COGS Margin		Compensation Margin	
	$\ln(\text{Base}/\text{Revenue})$	2SLS $\ln(\text{Base}/\text{Revenue})$	$\ln(\text{Base}/\text{Revenue})$	2SLS $\ln(\text{Base}/\text{Revenue})$
Texas x Post	-4.06 (0.57)		-1.28 (1.05)	
$\Delta \ln(1/(1-\tau))$ x Post		-5.46 (0.76)		-1.42 (1.17)
Obs.	705,868	705,868	331,890	331,890
R-squared	0.85	n.a.	0.74	n.a.
Clusters (Firms)	108,563	108,563	56,354	56,354

Notes: This table corresponds to Figure 3.1. It reports the estimated percent changes in the corporate tax base for COGS margin firms and compensation margin firms in Texas vs. firms in control states. Point estimates are from the difference-in-differences specification given by Equation 3.13 with dependent variables defined as in Equation 3.15. Clustered standard errors in parentheses. We exclude year 2006, which only reflects anticipatory changes and thus biases down the estimate. The sample is limited to firms we define to be on the COGS and compensation margins as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted using an approximation of the tax base as it would be in the absence of the reform, that is we weight by the approximated tax base plus an amount equal to the estimated shifting by affected firms. For a more thorough discussion of weighting in this regression, see footnote 27.

Figures

Figure 3.1: Percent Change in Corporate Tax Base



Notes: These figures display the estimated percent changes in the corporate tax base for COGS margin firms and compensation margin firms in Texas vs. firms in control states. Point estimates and ninety-five percent confidence intervals are estimated using a difference-in-differences specification given by Equation 3.12 with dependent variable defined by Equation 3.15. The sample is limited to firms we define to be on the COGS and compensation margins as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

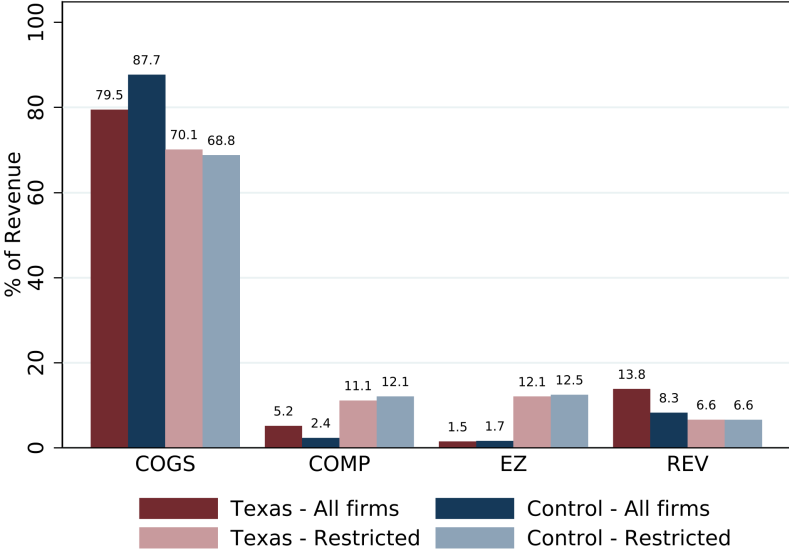
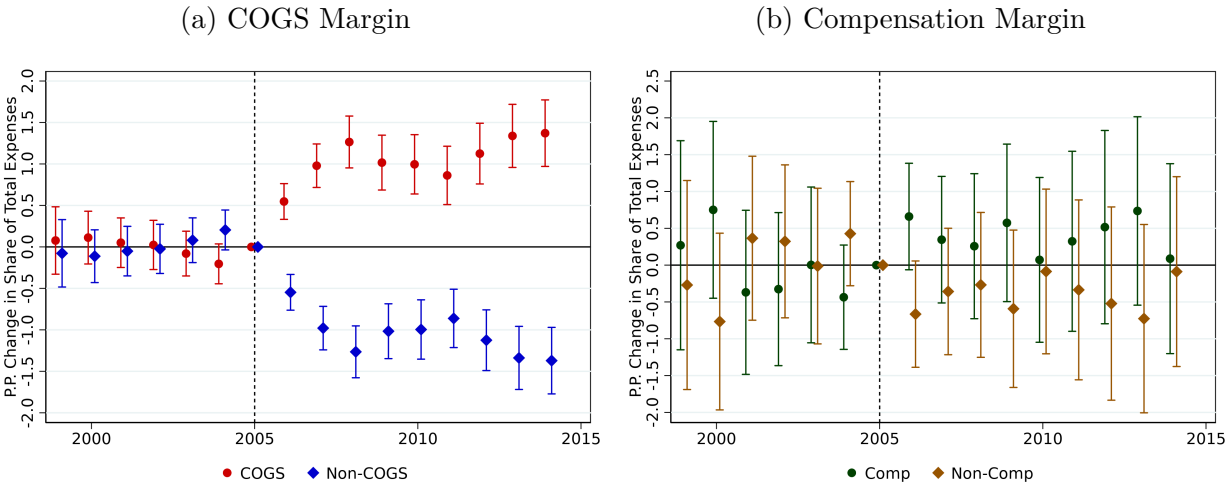


Figure 3.2: Predicted Percentage of Revenue Reported by Firms by Deduction (2005)

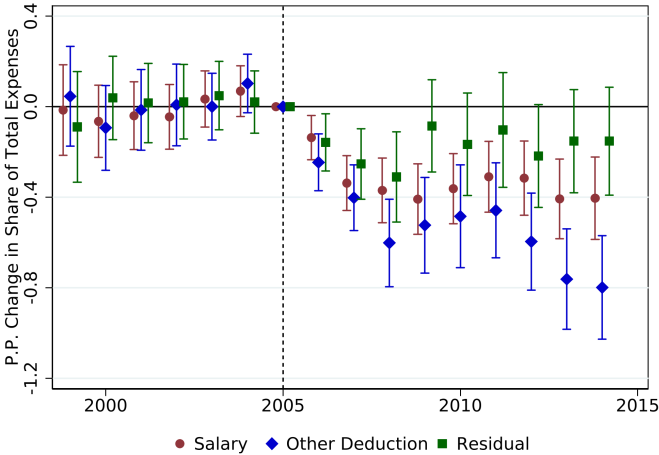
Notes: This figure displays the percentage of total revenue (total income + COGS) in 2005 reported by firms, which we categorized into different margins as described in Section 3.4. We break down firms between whether they are Texas firms or in control states. We report results both for all firms (darker blue and red) as well as for the narrower restriction we use for our statistical analysis. For the narrower restriction, we limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We also exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure 3.3: Change in COGS and Compensation as a Share of Total Expenses



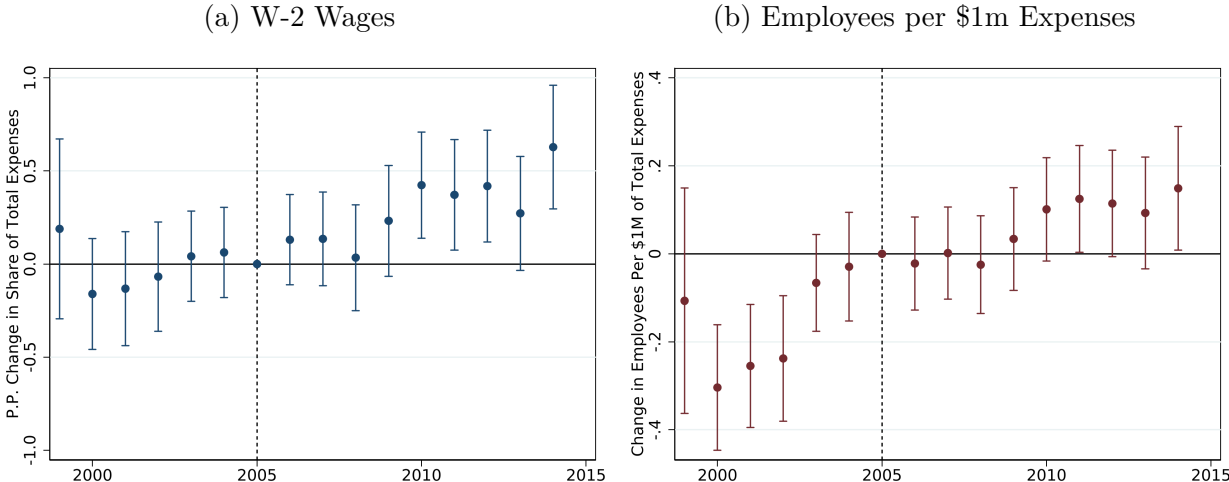
Notes: These figures display the estimated percentage point changes in the share of total expenses represented by COGS, non-COGS, compensation, and non-Compensation expenses for COGS margin firms and compensation margin firms in Texas vs. firms in control states. Point estimates and ninety-five percent confidence intervals are estimated using a difference-in-differences specification given by Equation 3.12 with dependent variables defined as in Equation 3.14. The sample is limited to firms we define to be on the COGS and compensation margins as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure 3.4: Changes in Certain Deductions as a Share of Total Expenses



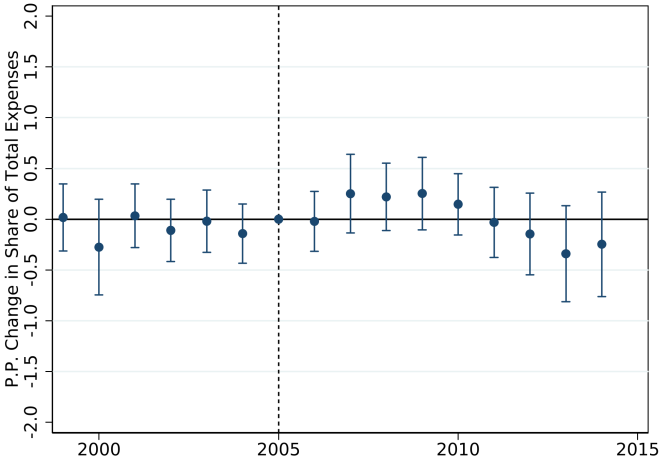
Notes: These figures display the estimated percentage point changes in the share of total expenses represented by salary and wages (line 13), other deductions (line 26), and the residual of total deductions. Point estimates and ninety-five percent confidence intervals are estimated using a difference-in-differences specification given by Equation 3.12 with dependent variables defined as in Equation 3.14. The sample is limited to firms we define to be on the COGS margin as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure 3.5: Change in W-2 Wages and Employee Counts



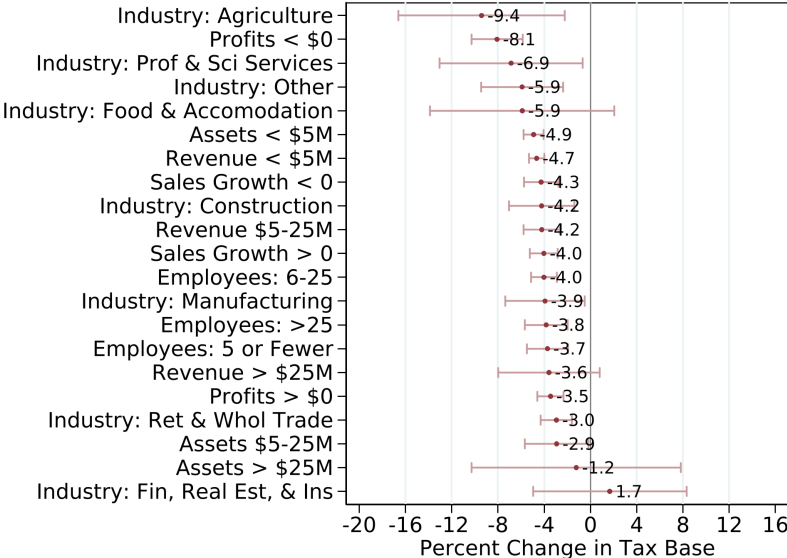
Notes: The left panel displays the estimated percentage point change in the share of total expenses represented by W-2 wages for COGS margin firms. The dependent variable is defined as in as in Equation 3.14. The right panel measures the change in employees per \$1m of total expenses, counted by issued W-2s. To prevent skew from outliers, the ratio is capped at 100 employees per \$1m of expenses. Point estimates and ninety-five percent confidence intervals are estimated using a difference-in-differences specification given by Equation 3.12. The sample is limited to firms we define to be on the COGS and compensation margins as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure 3.6: Changes in Reporting as a Share of Total Expenses, Revenue and EZ Filers



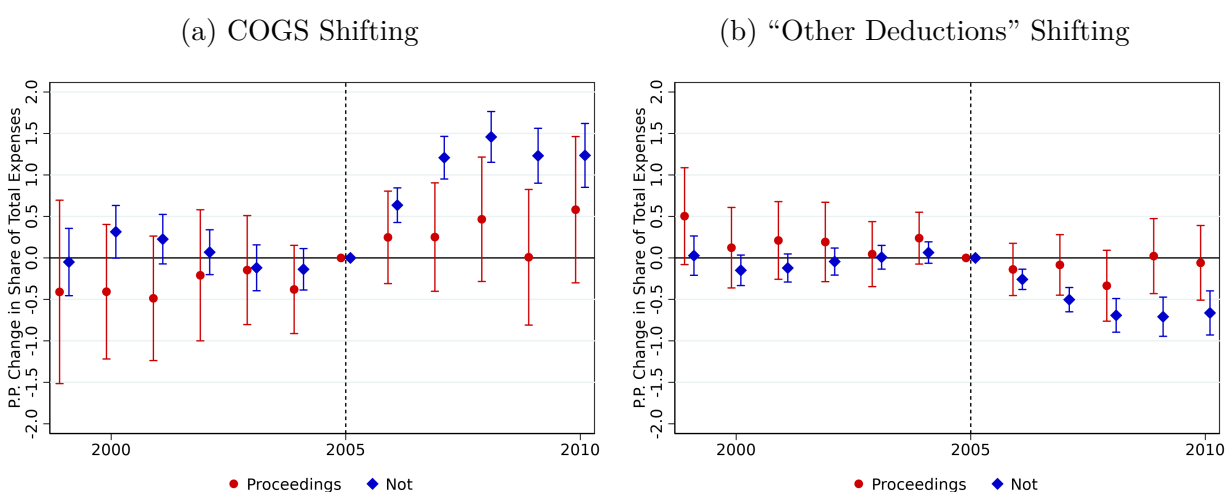
Notes: This figure displays the estimated percentage point change in the share of total expenses represented by COGS for revenue margin firms and EZ filers in Texas vs. firms in control states. Point estimates and ninety-five percent confidence intervals are estimated using a difference-in-differences specification given by Equation 3.12 with dependent variables defined as in Equation 3.14. The sample is limited to firms we define to be on the revenue margin or EZ filers as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure 3.7: Percent Change in Tax Base, Heterogeneity Across Firms



Notes: This figure displays the estimated percent change in the corporate tax base among COGS margin firms, broken down by various characteristics of the firm. Point estimates and ninety-five percent confidence intervals are estimated using a difference-in-differences specification given by Equation 3.13 with dependent variables defined as in Equation 3.15. The sample is limited to firms we define to be on the COGS margin as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure 3.8: Shifting Responses by Firms Under IRS Examination or in Litigation



Notes: These figures display differences in the responses by firms under IRS examination or in litigation (red) versus those not (blue). Firms are categorized in the former if in 2005 they either received notice of an IRS examination or began litigation proceedings with the IRS. Firms are categorized in the latter if they existed in 2005 and neither of these occurred. The left panel reports the the COGS reclassification response, analogous to Figure 3.3. The right panel reports the “other deduction” reclassification response, analogous to Figure 3.4. Point estimates and ninety-five percent confidence intervals are estimated using a difference-in-differences specification given by Equation 3.12 with dependent variables defined as in Equation 3.14. The sample is limited to firms we define to be on the COGS margins as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

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Appendix A

Appendix for Chapter 1

A.1 Effects on Equity Financing: A Stylized Numerical Example

If this model of dividend taxation in section 1.3 is accurate, how much extra equity issuance could we expect from a tax cut the size of the JGTRRA 2003 cut? As the discussion of the model is rather abstract, I consider a numerical example of a hypothetical firm with an investment opportunity to demonstrate how a tax cut can prompt a great deal of equity issuance or none at all, depending on the firm's investment opportunities and financial circumstances.

Assume that a firm discovers an especially lucrative investment opportunity, with expected profit equal to the square root of the capital invested \sqrt{I} , but with a minimum required investment of \$20. The firm has \$100 of retained earnings and \$100 of paid-in capital. Assume a dividend tax rate $\tau_d = 0.447$, and an opportunity cost of capital $\rho = 0.05$. Thus the firm is trading with a market cap of \$165.¹ The firm can sell additional equity for financing if needed.

I consider several cases. First, assume that the firm's paid-in capital and retained earnings are already invested, so that the firm has zero cash reserves. Under the tax rate $\tau_d = 0.447$, the firm will optimize at an interior solution by issuing \$30 of new equity to finance the investment. But if the tax is cut to $\tau'_d = 0.208$, the firm will now optimize by issuing \$62 of new equity, a 107% increase. With the burden of the dividend tax now reduced, the firm has moved from one interior optimum to another.

Second, consider a firm that suffers from asymmetric information, so that investors require double the opportunity cost of capital in expectation (10%). In this scenario, no equity will be issued under the tax rate $\tau_d = 0.447$: to satisfy the price required by investors, the owners are not able to raise \$20 without diluting their shares sufficiently to make the project unprofitable for them. But under the lower tax rate $\tau'_d = 0.208$, the firm would optimally

¹The return of paid-in capital is not subject to dividend taxation.

issue \$28 in new equity to finance the project. In this case, equity is issued where it was not possible under the higher tax rate.

Note that these first two examples correspond to different situations covered by the Traditional View. In the first example, the firm reaches an interior optimum prior to the tax cut, and then moves to a preferred interior optimum after the cut. In the second example, the firm is pushed to a corner solution due to the financing constraints. The dividend tax cut enables the firm to reach an interior solution.

Third, consider a firm with large cash reserves. Assume the firm now has \$150 of retained earnings, all of which are held in cash. In this case, the firm will not issue any new equity under either tax regime, because the retained earnings are more than enough to finance the optimal choice of investment. Note that this example reflects the logic of the New View as modeled in section 1.3.

Finally, consider a firm with no cash reserves but with a less appealing investment opportunity. This opportunity returns only $\frac{\sqrt{I}}{2}$. In this case, the firm will not undertake the investment under either tax regime, because the return is simply not high enough. This firm reflects how important the function governing the return on investment is: a firm with sufficiently low $\frac{\partial \pi(E)}{\partial E}$ will not respond to the dividend tax cut by issuing more equity, regardless of cash reserves.

These four cases demonstrate just how powerfully a dividend tax cut can affect financing and investment decisions for some firms, while having no effect on others. In particular, it highlights how important it is to isolate firms with high marginal values of extra cash to identify the effects of the tax cut.

A.2 Additional Tables and Figures

Regression Estimates

Table A.1: Equity Issuance Responses

Specification	Main	Balanced	Controls	Sales-Weighted
	(1)	(2)	(3)	(4)
Post x Cash Short	134.50	126.60	105.50	78.49
	(8.90)	(9.45)	(7.81)	(17.81)
Firm Fixed Effects?	Yes	Yes	Yes	Yes
Industry × Quarter Fixed Effects?	Yes	Yes	Yes	Yes
Observations	230,890	161,908	216,340	194,547
Clusters (Firms)	10,251	3,018	9,780	9,122
R-squared	0.388	0.331	0.426	0.304

Notes: Regressions specification is given by Equation 1.6. Clustered standard errors in parentheses. Post-reform observations are nonparametrically weighted across 600 bins to match the distribution of firms in the 2 years prior to the tax cut in terms of sales and industry composition. Observations are scaled by pre-reform means of their respective groups, so that the point estimates can be interpreted as the p.p. increase of Cash Short firms over High M&A Issuers relative to their pre-reform means. For Controls regression, controls include quartics of lags of: the sales-to-assets ratio, sales growth over the previous year, book leverage ratio, and Tobin's Q. For Sales-Weighted regression, large firms with greater than median lagged sales (roughly \$150 million) are excluded as a conservative measure and also to minimize the influence of very large but less sensitive firms.

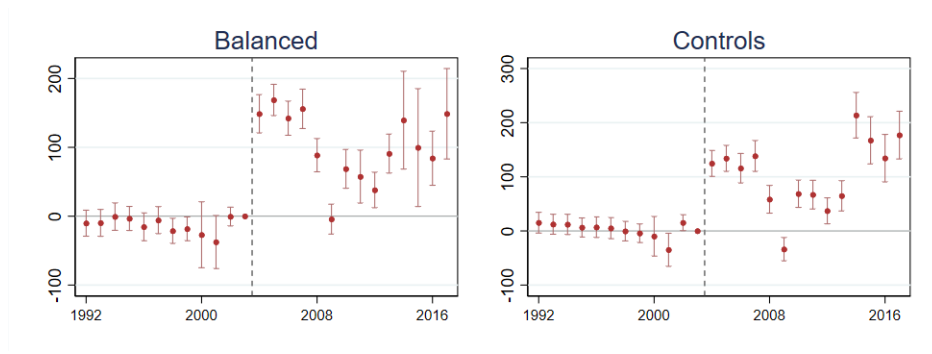
Table A.2: Expenditure Responses by Cash Short Firms

Specification	R&D	Operating (ex R&D)	Financing	CapEx	Other Invest.	Cash Holding
	(1)	(2)	(3)	(4)	(4)	(4)
Post x Cash Short	1.01 (0.13)	1.38 (0.12)	-3.83 (0.31)	0.03 (0.02)	0.06 (0.02)	0.08 (0.02)
Firm Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes
Industry × Quarter Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	123,448	199,566	191,325	194,724	194,611	199,641
Clusters (Firms)	5,460	8,799	8,674	8,694	8,690	8,802
R-squared	0.789	0.752	0.728	0.697	0.347	0.266

Notes: Table corresponds to Figure 1.8. Regressions specification is given by Equation 1.6, except that dependent variable is the next eight quarters of expenditure in the given category. The dependent variables are not scaled by pre-reform means, so the point estimates can be interpreted as extra dollars of expenditure by Cash Short firms per dollar of lagged sales over the previous two years.

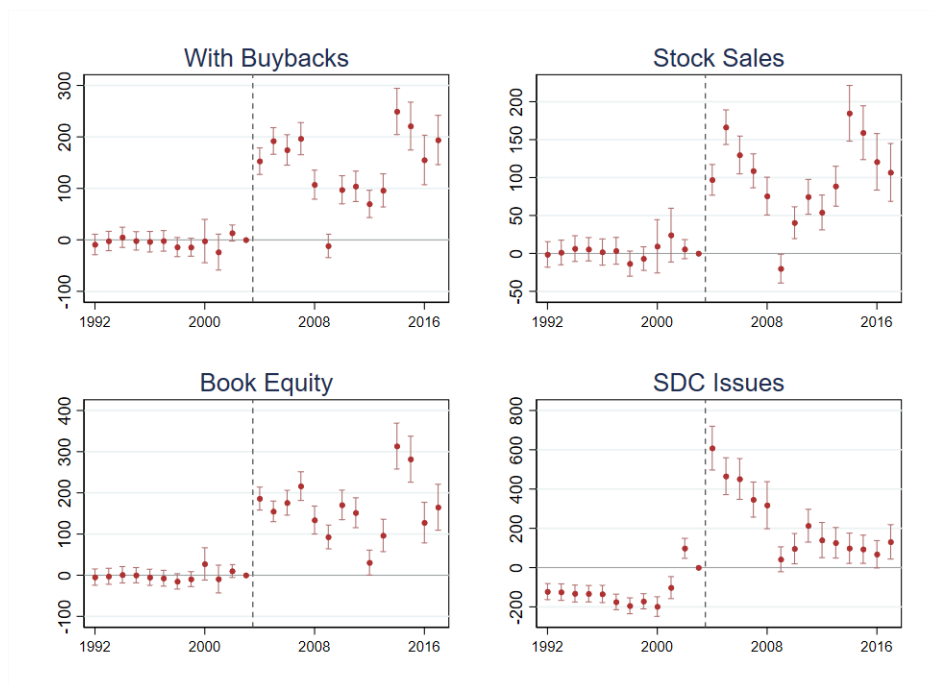
Additional Figures

Figure A.1: Robustness



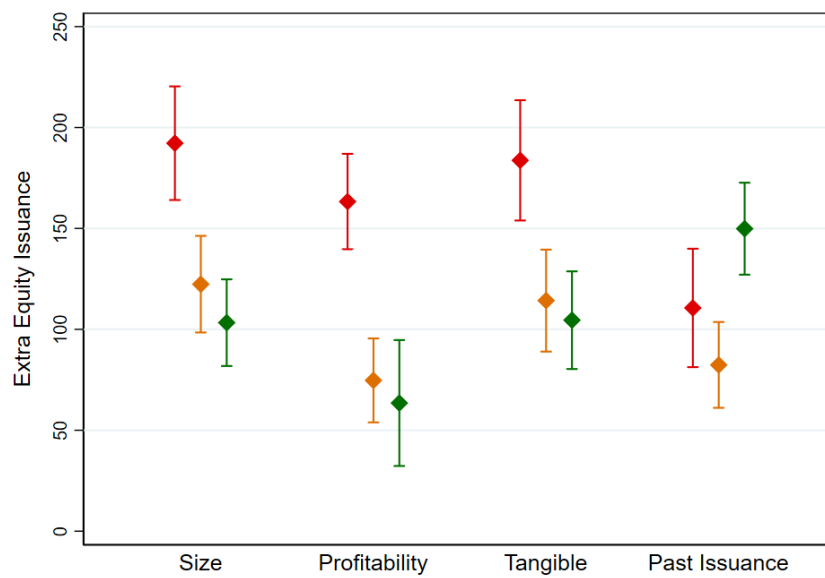
Notes: For balanced panel, the group assignment is defined at the time of the reform. For controlled regression, controls include quartics of of lags of: the sales-to-assets ratio, sales growth over the previous year, book leverage ratio, and Tobin's Q. Other details are the same as Figure 1.3.

Figure A.2: Different Measures of Equity Issuance



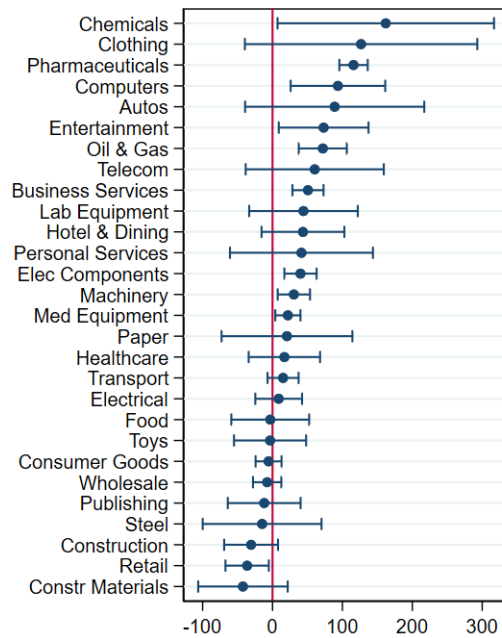
Notes: In each panel, a different measure of equity issuance is used for the Cash Short firms: the preferred measure but without netting out buybacks, the cash flow from stock sales, the change in book value of equity, and SDC equity issuance announcements. Other details are the same as Figure 1.3.

Figure A.3: Decomposition of Cash Short Firms



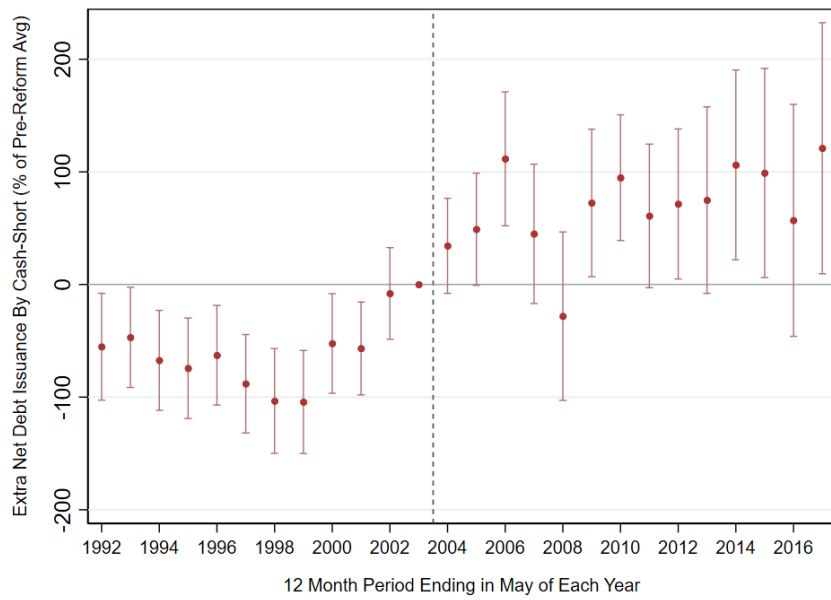
Notes: These reflect point estimates and confidence intervals for regressions as specified in Equation 1.6, but where separate regressions are run for each decomposition of the Cash Short group. The red corresponds to the bottom third of the Cash Short group by the given metric, the yellow the middle third, and the green the top third. Observations are scaled by pre-reform means of their respective groups, so that the point estimates can be interpreted as the p.p. increase of Cash Short firms over High M&A Issuers relative to their pre-reform means.

Figure A.4: Responses Across Industries



Notes: Data points correspond to the point estimates for Equation 1.6, where the regression is run separately by industry for the Cash Short firms (the High M&A Issuers are kept as a group in each regression). Error bands are 95% confidence intervals with standard errors clustered by firm.

Figure A.5: Net Debt Changes by Cash Short Firms



Notes: Changes in net debt are defined as long term issuance net of long term reductions, plus short term changes in net debt, all scaled by the previous two years of sales. Other details are the same as Figure 1.3.

Appendix B

Appendix for Chapter 2

B.1 Measures to ensure data accuracy

Matching K-1s to additional tax records

As discussed in Section 2.3, I match partners receiving K-1s to additional records beyond those matched by Cooper et al. (2016). For payees that are not matched to an annual return from Table 2.2 in the same tax year, I attempt to match these payees to annual returns in other years since 2000. After that, I attempt to match to other tax records: filed forms SS-4 (applications by entities for EINs), W-2 (reporting wages paid by employers to employees), W-7 (application for Individual Taxpayer Identification Number), 5471 (return of US citizens and residents regarding foreign corporations), 1041-A (return regarding trust charitable accumulation amounts), and 851 (corporate affiliations schedule). Although these forms do not provide the same detailed information available on the annual returns listed in Table 2.2, they do provide at least some insight about the type of payee, the payee's domestic or foreign status, and country. Finally, for payees not otherwise matched, I attempt to match the masked TINs to a database of citizens and aliens from the Social Security Administration to determine whether the payee is an individual as opposed to an entity, and to give insight as to whether that individual is US or foreign.

Accuracy control in matching returns

There are two important data issues unique to partnerships that are not discussed in Cooper et al. (2016). First, it is frequently the case that a single masked TIN of a K-1 recipient will match to many different types of annual tax returns. For example, a single masked TIN on a K-1 might match to a form 1040, 990, and 1041. This may be a data error, or it may be the case that a single taxpayer filed an individual tax return, set up a nonprofit, and established a trust without accurately reporting the TIN on at least one of these forms. How can the researcher know which of these entities is the actual recipient of the K-1?

Second, it is often the case that many different K-1 recipients are represented by the same masked TIN. For example, there may be thousands of distinct payees within the same partnership with the same reported masked TIN. Thus, if this single masked TIN were matched to a form 1040, but these payees are all different individuals, then the income flowing to this single matched 1040 is vastly overstated. Worse yet, if the distinct payees actually include entities as well as individuals, then the income categorized as flowing to individuals will be overstated, and the income flowing to entities understated. Given that the masked TIN is the key identifier used to match the partner to other information, can we glean anything about this large set of mis-identified partners?

In both of these cases, I rely on the algorithm discussed in Section 2.3 to offer some additional insight about the type of partner, drawing upon ancillary non-identifying information reported on the K-1. In the first case described above, I match the K-1 to the return that aligns with the inference from the algorithm. So, in the example given, if the algorithm suggests the recipient is a trust, I match the K-1 to the 1041 rather than the 1040 or the 990.

In the second case, the masked TIN is simply not reliable for matching these K-1 recipients to returns. Any match, therefore, is likely spurious. In light of this, in cases where there are many distinct partners recorded with the same masked TIN, I rely solely on the algorithm to infer the type of entity.

Were it not for these adjustments, I estimate that as much as 21% of income could be inaccurately matched (i.e. about 18% of income flows to partners can be matched to multiple annual returns, and about 6% of income flows to masked TINs can be matched to many distinct taxpayers, with about 3% overlap in these groups).

Procedure for describing partners

There are often conflicting sources of information about the type of entity, domestic or foreign status, and country of the payee. To resolve these conflicts, I follow basic guidelines described below.

For determining entity types:

- If it is possible to match a K-1 recipient to an annual return in the same year using the payee's masked TIN, that match takes precedence over other sources of information. If the recipient is matched to only one annual return in the same tax year, the K-1 is deemed to be resolved. If the recipient is matched to multiple returns in the same tax year, I use the inference from the algorithm (as described in Section 2.3) to guide which match is best. If the recipient shares the same masked TIN as other distinct recipients in the same partnership, I do not match the payee to any return, and rely instead on the inference from the algorithm to categorize the entity type.
- If the payee is still not resolved, I attempt to match the payee to annual returns filed in different years. I follow the same rules as above: if the payee matches to only one

type of return, the payee is deemed to be resolved. If the payee matches to multiple returns, I use the inferential algorithm to guide the best match.

- If the payee is still unresolved, I attempt to match the payee to the additional tax records described above in Appendix B.1. If the payee matches to conflicting tax records, I use the inferential algorithm to guide the best match.
- If the payee is still unresolved, I rely on the categorization from the inferential algorithm.

For determining country of address:

- I rely on the country of address inferred from the algorithm described in Section 2.3.
- If the payee is still unresolved, I rely on the country reported on any returns to which it is matched, following the order of precedence above for determining entity types.

For determining the domestic or foreign status:

- I first rely on matches to annual returns. If the payee is matched to an annual return that can only be filed by a US taxpayer, or only by a foreign person, the status is resolved. Partnership returns (form 1065) include an indicator of domestic or foreign status. I use the country reported on the return of the foreign person as the best approximation of the country of citizenship or organization.
- If the payee cannot be matched to an annual return, I use the information reported in the additional tax records.
- If the payee is still unresolved, I use the country of address as the best approximation of domestic or foreign status.

Procedure for attributing flows to countries

There is sometimes conflicting information reported about the country of a foreign entity. For example, one country may be reported on the tax return to which the partner can be matched, while another country is reported on the K-1 received by that partner. To which country should this income be allocated?

I use the following method for prioritizing the attribution of flows to each country once the partner is determined to be a foreign (and not a US) person:

- For foreign corporations, I give first priority to the country reported on form 5471, if applicable, as this reflects the country of organization.
- If the payee is unresolved, I use the country reported on the annual return to which the payee is matched (e.g. form 1120-F or 1065).

- If the payee is still unresolved, I use the country reported on other returns (such as forms 8805, 1042-S, or W-7).
- If the payee is still unresolved, I use the country of address, as determined above in Appendix B.1.

Extreme values

Because the data for this paper are unedited tax returns, occasionally there are extreme values that may not be accurate. Cooper et al. (2016) address this problem by dropping any return that reports in excess of \$1 billion gain or loss in any field. Upon reviewing the data, it appears this practice drops many accurate returns that provide meaningful information. As a result, I adopt the following procedure, which still aims to be conservative in the manner of Cooper et al. (2016), but yet keeps many more returns when the information available is more complete.

I divide all K-1s into two categories: those for whom the recipient type can be clearly identified (e.g. corporation, trust, estate, individual), and those that cannot (i.e. unspecified “entity” or unknown). In the first group I drop any K-1 reporting in excess of \$10 billion gain or loss in any field. In the second group, I drop any K-1 reporting in excess of \$1 billion gain or loss in any field.

B.2 Withholding Data, and Income from the United States

Withholding data

Withholding data is collected from forms 8805 (reporting income effectively connected with a US trade or business), 1042-S (reporting US source income) and 8288-A (reporting income from dispositions of US real property interests).

Form 8805 – Effectively Connected Income. A partner will be treated as engaged in a US trade or business by virtue of the partnership being engaged in a US trade or business, and thus a partnership must withhold on any income effectively connected with such trade or business allocated to foreign partners, reported on form 8805. IRS official statistics provide an annual decomposition by country of effectively connected income and tax withheld as reported on form 8805, so I use this data.¹

Form 1042-S – US Source Income. Form 1042-S is used to report the US source income subject to withholding paid to foreign persons. Unfortunately, the official publicly available IRS statistics do not isolate payments by partnerships, and so cannot be used. I thus use data reported on the filed form 1042-S that can be matched to partnerships.

¹See Table 1: US Income and Tax Withheld as Reported on Form 8805, by Country of Residence, available at <https://www.irs.gov/statistics/soi-tax-stats-foreign-recipients-of-us-partnership-income-statistics>.

Unfortunately, many forms do not report the (masked) TINs of the payee, and thus a perfect match to K-1 recipients is not possible. To arrive at the estimates reported in Figure 2.5 and Figure 2.17, I aggregate all unique 1042-S forms that either (a) report a partnership as a payer or (b) are filed by another payer reporting a partnership as a “nonqualified intermediary” (meaning that the withholding is completed by this payer rather than by the partnership). Unfortunately, this measure is conservative because it will overstate the income and withholding to partners, as these forms will also capture payments to third parties. As a result, the reported amounts can be taken as a conservatively high measure of the withholding reported on income to foreign partners.

Form 8288-A. Form 8288-A is used to report payments to foreign persons selling US real property interests. Similar to form 1042-S, I aggregate amounts reported to foreign partnerships or partners. Although this likely overstates the withholding on partnership income (because the foreign partner may sell the property directly, rather than through the partnership), the form 8288-A withholding constitutes such a small portion of the total amounts withheld to partners that any such overstatement is not particularly consequential.

Identifying income arising from the United States

An important economic question (as opposed to a legal question) is what portion of the income reported on K-1s flowing to tax havens arises from economic sources within the United States, as opposed to a foreign country. For example, is the reported income generated by investment in a US company or in assets in the United States? Or in a foreign country? Although largely an academic exercise for reasons described below, the answer is perhaps relevant for both interpretation of the findings in this paper and policy considerations—after all, if the vast majority of the flows to tax havens turned out to be income from investments in foreign countries with little connection to the United States, the implications of this paper for any policy discussion may take on a different tone.

A primary challenge in even approaching this question, however, is that the law does not align with an economic intuition for source, and therefore the information actually reported on tax returns cannot answer the economic question.²

In an effort to roughly approximate this concept of economic source, I attempt to measure US source income, plus effectively connected income, plus capital gains attributable to assets generating US source income. I do this in three steps. First, I estimate the share of K-1 dividend income that is US source income. I can use this as a proxy for the shares of other income from US sources.³ Second, I add in income reported on forms 8805 and 8288-A. Third,

²For example, gain on the sale of stock of a US company on a US exchange is still legally foreign source income if it is received by a nonresident alien. See IRC §865(a).

³I use dividends as a proxy for several reasons. First, they are subject to withholding and do not benefit from exclusions or exceptions from tax as do capital gains or interest income, meaning they are less likely to be mistakenly underreported. Second, while payments of interest or royalties may go to non-partners, payments of dividends should be allocations to partners. Third, dividends also constitute a sizeable share of the income flowing to havens, much larger than royalties or real estate income.

I compute a broad range estimating the portion of income from interest and capital gains that arise economically from US sources, since these are largely exempted from taxation.

For the first step (dividends), I use the data from filed forms 1042-S to estimate the share of dividend income that is reported on K-1s flowing to tax havens that is actually US source income. Although this varies by destination, I estimate that about 71% of the dividend income reported on K-1s is likely US source income. The Cayman Islands appears to have a particularly high share, at 86%.

Second, I add in the estimated income that is effectively connected with US trade or businesses as reported on forms 8805 and income reported from US real property interests on form 8288-A. These amounts are much smaller, roughly 3% of all K-1 income.

To estimate a likely lower bound on the share of income arising from US economic sources, I apply the dividend shares calculated above to all remaining income. This measure provides a lower bound because dividends should have a lower share of US source income than other types of income such as capital gains or interest, as investors have a strong incentive to avoid US source dividends but less reason to avoid interest or capital gains arising from within the United States. To get a likely upper bound, I instead assume capital gains and interest are 100% arising economically from sources within the United States. It is unlikely that all interest and capital gains are from US sources, but it is also unlikely that other income has as low a US source rate as dividends, due to the high withholding rates. As a result, this should produce a reasonable range.

Using this methodology, I estimate that between 73% and 94% of the K-1 income flowing to tax havens arises from economic sources within the United States. The estimates vary by destination, where the share for the Cayman Islands may be as high as 98%.

I do a robustness check by performing an alternative calculation using officially reported aggregate statistics from the IRS Statistics of Income. Using the data published from forms 1042-S between 2011 and 2018, I calculate the ratio of tax withheld to reported US source income by destination. I then apply this ratio to my own calculations for taxes withheld. This allows me to deduce the approximate share of US source income out of reported K-1 income. (For example, if the official statistics 1042-S statistics suggest that tax is withheld at a 3% effective rate on US source income, and I observe from my compiled 1042-S data that about \$25 billion is withheld, I can deduce that about \$830 billion is US source income). After adding in income on forms 8805 and 8288-A, this method suggests that about 82% of the income flowing to tax havens arises from sources within the United States, squarely within the range above.

Appendix C

Appendix for Chapter 3

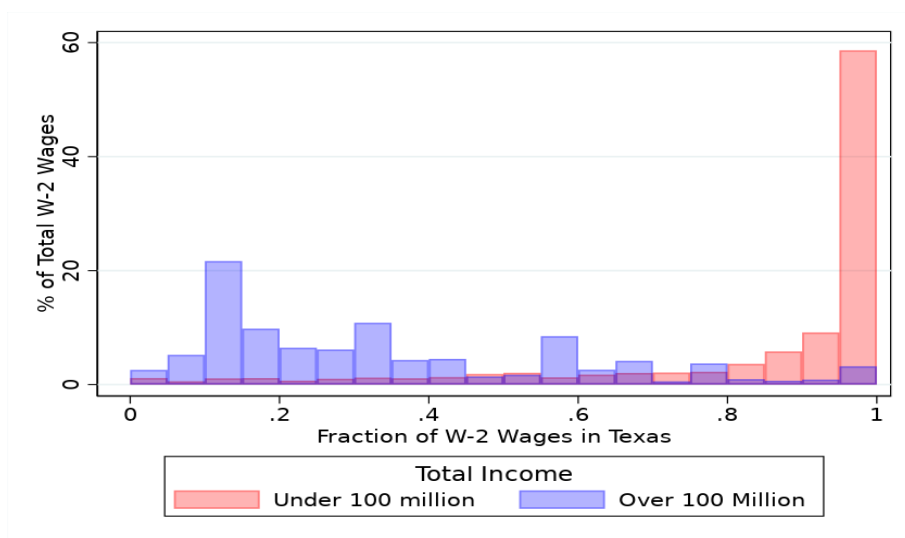
C.1 Appendix A: Apportionment Factor

Figure C.1 provides distributions of our apportionment factor proxy in 2005 for two groups of firms whose address on their federal income tax return is in Texas: those with total incomes between \$50,000 and \$100 million and those with total income over \$100 million. This figure shows that most wages paid by firms with under \$100 million in revenue are paid to workers with addresses in Texas. Conversely, most wages paid by firms with over \$100 million in revenue are paid to workers with addresses outside of Texas. This suggests that firms that file federal tax returns in Texas with under \$100 million in revenue were likely highly-exposed to the franchise tax, whereas Texas's largest firms were less exposed.

Figure C.2 provides a more complete picture of the potential attenuation bias of our estimates. It shows that there is likely more error for firms filing from Texas than from firms filing in neighboring states. In subsequent analyses, we use this proxy as a continuous measure of treatment. At the same time, this proxy is also subject to measurement error, but is not necessarily unidirectional. Generally, it seems likely that this measure will be biased similarly to the binary variable, but likely to a lesser degree as we expect firms to have more sales outside of their primary state than wages paid outside of their primary state. This is under an assumption that production is more geographically concentrated than sales.

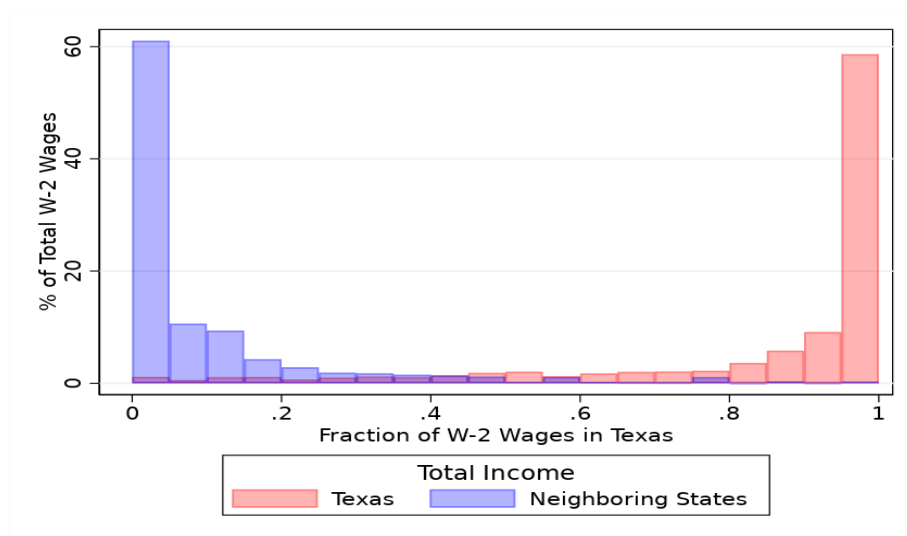
It is important to note that the apportionment factor is important only in determining the marginal benefit of shifting and not the latitude a firm has to shift. This is because firms are taxed based on the revenue they receive in Texas, but they determine their deductions using their revenue and expenses from both within and without Texas. For example, a firm with an apportionment factor of 0.2 has two-tenths of a cent incentive to engage in shifting instead of a one cent incentive (were the apportionment factor 1). This makes the possible attenuation bias of Texas-based firms less severe, but possibly more severe for firms in neighboring states. It is also important to note that the apportionment factor is endogenous in that a firm's production and sales decisions will change the apportionment factor.

Figure C.1: Distribution of Apportionment Proxy in 2005



Notes: This figure provides a histogram of the apportionment factor proxy we construct using the percentage of W-2s issued to individuals in Texas. This figure is limited to firms headquartered in Texas and compares the distribution of firms reporting over \$100 million in wages and those reporting less than \$100 million in wages. Firms that report less than \$50,000 in revenue were excluded from this figure.

Figure C.2: Distribution of Apportionment Proxy in 2005 for Firms in Texas and Neighboring States



Notes: This figure provides a histogram of the apportionment factor proxy we construct using the percentage of W-2s issued to individuals in Texas. This figure is limited to firms reporting less than \$100 million in W-2 wages and compares the distribution of firms headquartered in Texas and firms headquartered in neighboring states. Firms that report less than \$50,000 in revenue were excluded from this figure.

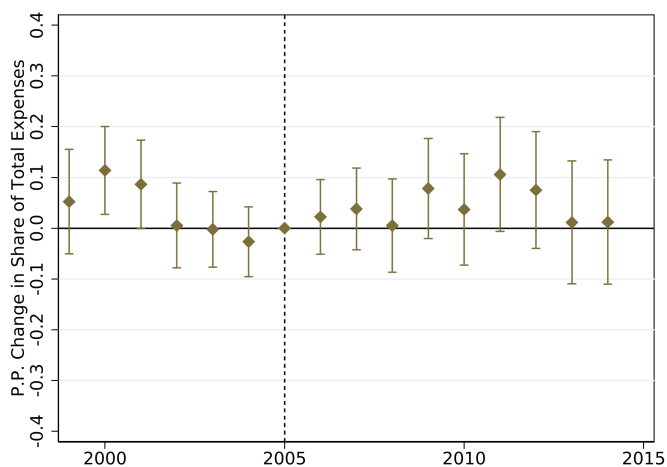
C.2 Appendix B: Additional Tables and Figures

Table C.1: Descriptive Statistics for Firms on the Compensation Margin (2005)

	10th		Median		90th		Mean	
	Texas	Control	Texas	Control	Texas	Control	Texas	Control
Gross Revenue (\$1k)	0	0	264	268	1,720	1,890	12,282	11,728
Total Income (\$1k)	8	9	289	292	1,690	1,864	13,257	13,280
COGS (\$1k)	0	0	0	0	124	122	930	784
Wages (\$1k)	29	26	207	200	1,249	1,300	7,968	7,818
Tot Comp (\$1k)	28	26	214	207	1,214	1,277	7,633	7,516
Tot Deductions (\$1k)	23	18	307	302	1,787	1,898	13,588	13,163
Tot Assets (\$1k)	0	0	64	81	717	784	33,207	31,774
Employees (num)	1	1	5	5	29	32	165	175
Profit Margin (%)	-49	-34	0	0	9	9	-9	-2
Sales Growth (%)	-100	-100	-3	-4	41	27	7	1

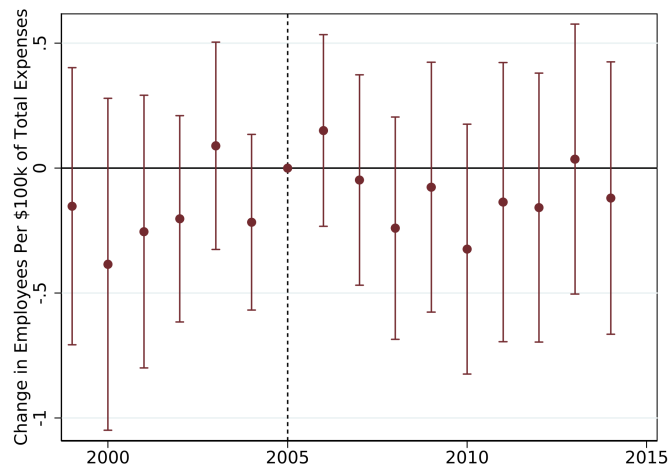
Notes: This table reports the 10th percentile, median, 90th and mean for a selection of variables for firms on the compensation margin in Texas and in the controls states (Arkansas, Oklahoma and New Mexico) in 2005. The means are weighted by total revenue. These variables are gross revenue (form 1120 line 1a), total income (line 11), COGS (line 2), W-2 medicare wages, total compensation under the Texas definition, total deductions (line 27), total assets (line D), total employees (from W-2s), profit margin (profit as a percentage of total income) and year over year growth in gross sales.

Figure C.3: Changes in Officer Compensation as a Share of Total Expense



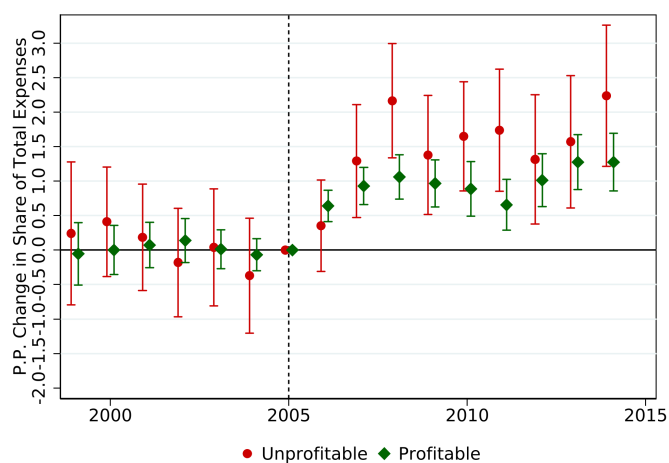
Notes: This figure displays the estimated percentage point changes in the share of total expenses represented by officer compensation among COGS margin firms. Point estimates and ninety-five percent confidence intervals are the estimates from a difference-in-differences specification given by Equation 3.12 with dependent variables defined as in Equation 3.14. The sample is limited to firms we define to be on the COGS margin as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure C.4: Change in Employees per \$1m Expenses



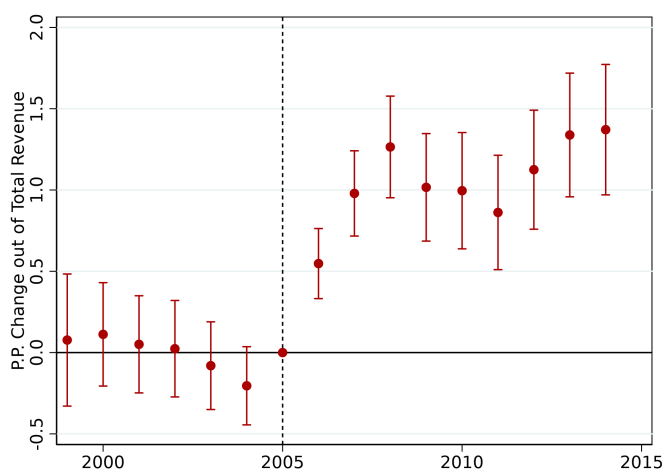
Notes: This figure displays the change in employees per \$1m of total expenses for compensation margin firms, counted by issued W-2s. To prevent skew from outliers, the ratio is capped at 100 employees per \$1m of expenses. Point estimates and ninety-five percent confidence intervals are the estimates from a difference-in-differences specification given by Equation 3.12. The sample is limited to firms we define to be on the compensation margin as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure C.5: Change in COGS, Profitable vs. Unprofitable Firms



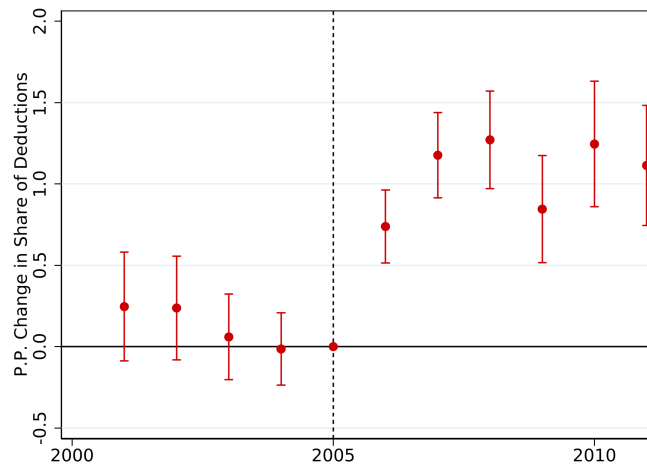
Notes: This figure displays the estimated percentage point change in the share of total expenses represented by COGS for COGS margin firms, broken down by profitable vs. unprofitable status. Point estimates and ninety-five percent confidence intervals are the estimates from a difference-in-differences specification given by Equation 3.12. The sample is limited to firms we define to be on the COGS margin as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure C.6: Change in COGS, Extra Controls



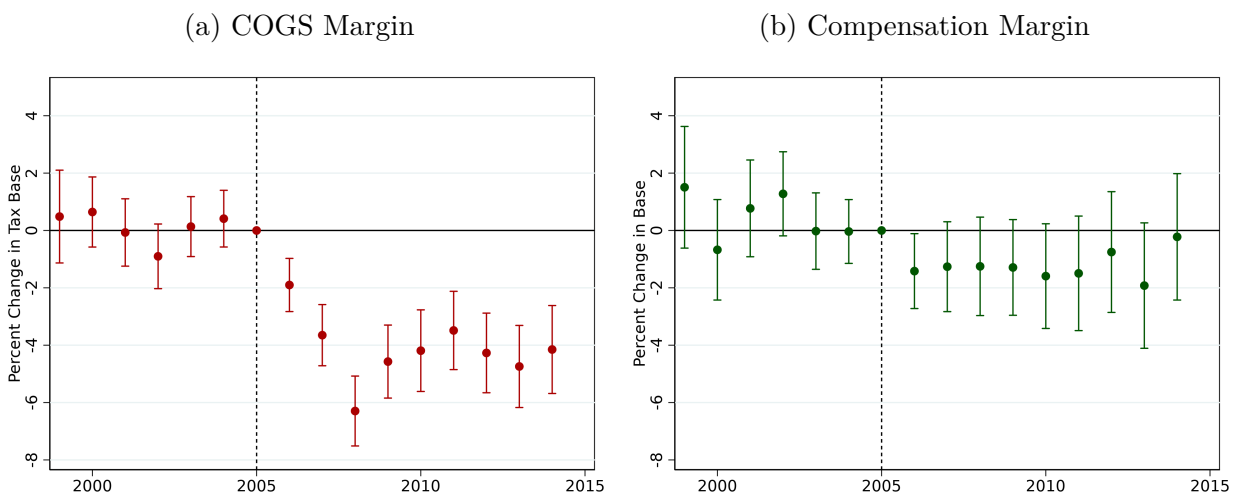
Notes: This figure displays the estimated percentage point change in the share of total expenses represented by COGS for COGS margin firms, analogous to Figure 3.3, but with additional controls. Controls include quadratic, cubed, and quartic controls of the firm's profit margin (profit as a percentage of total income), sales growth year over year, and sales-to-assets ratio. Point estimates and ninety-five percent confidence intervals are the estimates from a difference-in-differences specification given by Equation 3.12. The sample is limited to firms we define to be on the COGS margin as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure C.7: Change in COGS, Balanced Panel



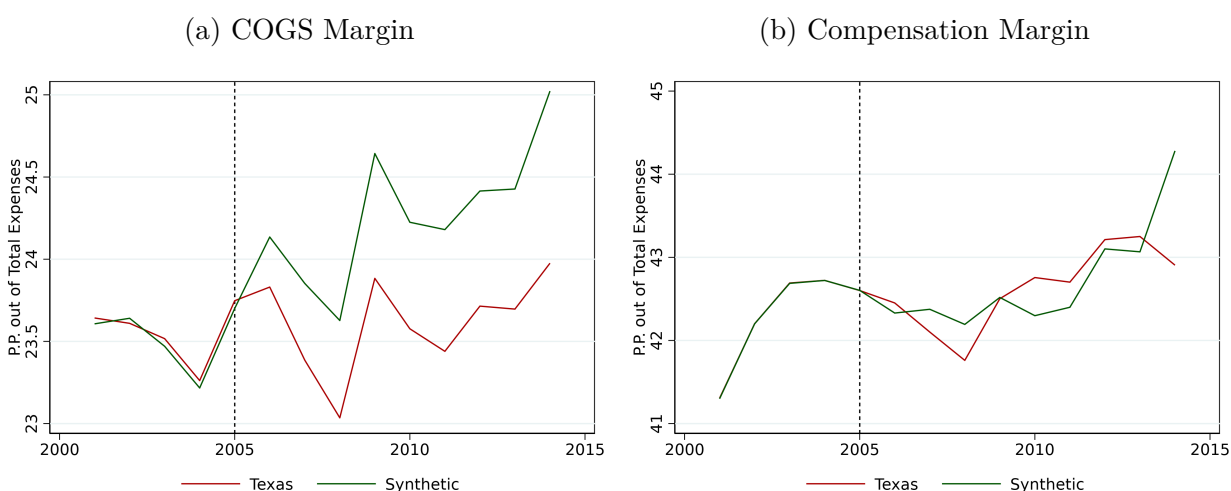
Notes: This figure displays the estimated percentage point change in the share of total expenses represented by COGS for COGS margin firms, analogous to Figure 3.3, but as a balanced panel. Treatment and control status is determined by the firm's status in 2005, and the firms are all present for the entire observation period. Point estimates and ninety-five percent confidence intervals are the estimates from a difference-in-differences specification given by Equation 3.12. The sample is limited to firms we define to be on the COGS margin as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure C.8: Percent Change in Corporate Tax Base, with Louisiana



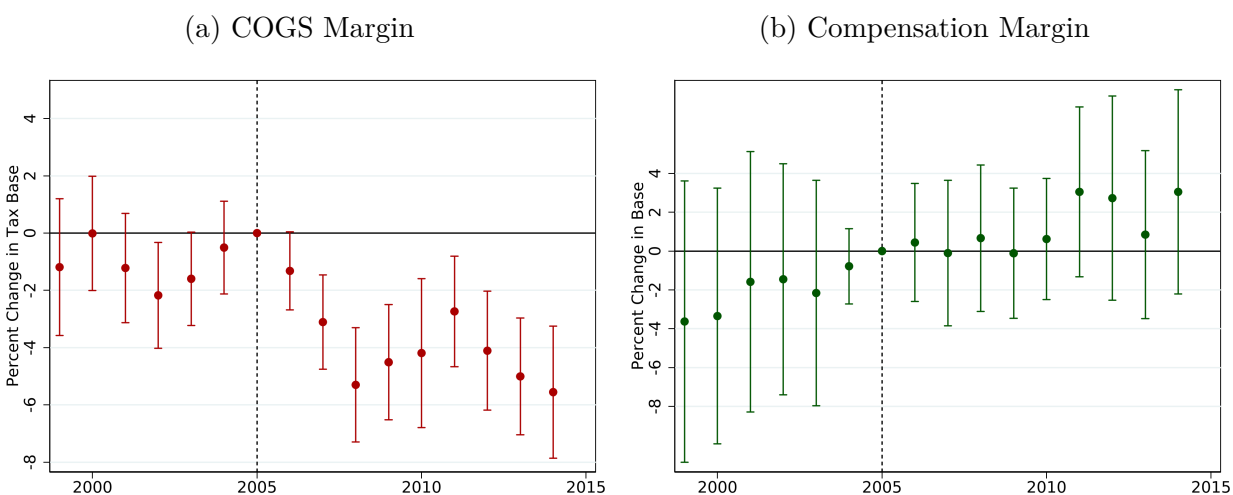
Notes: These figures display the estimated percent changes in the corporate tax base for COGS margin firms and compensation margin firms in Texas vs. firms in control states, analogous to Figure 3.1, but with the inclusion of Louisiana in the control states. Point estimates and ninety-five percent confidence intervals are the estimates from a difference-in-differences specification given by Equation 3.12 with dependent variable defined by Equation 3.15. The sample is limited to firms we define to be on the COGS margin as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.

Figure C.9: Synthetic Controls: Change in Tax Base as a Share of Total Revenue



Notes: These figures display the results of the synthetic control method to estimate the change in tax base. Our dependent variable is defined as the estimated taxable base as a share of total revenue. For COGS margin firms, the synthetic controls include Arizona, Kentucky, Maryland, Mississippi, Oklahoma, Tennessee, and West Virginia. For our compensation margin comparison, our control states include Arizona, California, Idaho, Mississippi, New Mexico, Utah, and West Virginia. We match controls based on industry composition (the respective revenue shares of agriculture, manufacturing, wholesale and retail trade, and professional services) and on size composition (the revenue shares of firms with greater than \$25 million in assets and revenue). The sample is limited to firms we define to be on the COGS and compensation margins as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Means for predictor variables calculated by state are weighted by total revenue.

Figure C.10: Percent Change in Corporate Tax Base, Other States



Notes: These figures display the estimated percent changes in the corporate tax base for COGS margin firms and compensation margin firms in Texas vs. firms in control states, analogous to Figure 3.1, but using the states identified as synthetic controls rather than adjacent states. More precisely, we use states that received a weight of at least 5% under the synthetic controls method. For COGS margin firms, the synthetic controls include Arizona, Kentucky, Maryland, Mississippi, Oklahoma, Tennessee, and West Virginia. For our compensation margin comparison, our control states include California, Idaho, New Mexico, Utah, and West Virginia. Point estimates and ninety-five percent confidence intervals are the estimates from a difference-in-differences specification given by Equation 3.12 with dependent variable defined by Equation 3.15. The sample is limited to firms we define to be on the COGS and compensation margins as described in Section 3.4. We further limit the population to Texas firms with at least 75% of W-2 wages paid in Texas, non-Texas firms with no more than 25% of wages paid in Texas, or firms with no W-2 matching. We exclude firms with more than \$100 million in total revenue (total income + COGS) in a given year. Estimates are weighted by total revenue.