

Firms' Real and Reporting Responses to Taxation: A Review*

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Abstract

Taxation is a central tool of economic policy; in recent years, governments use tax policy to stimulate local economic growth, regulate multinational firms, and mitigate climate change. We review the empirical literature that studies the effect of tax policies on firms' real outcomes. Building on the neoclassical theory of corporate taxes and tangible investment, we propose an organizing framework for our review that captures the wide set of tax policies and firm responses examined in accounting research. We use this framework to review the literature and focus on five key dimensions along which accounting scholars have contributed to the literature: i) documenting the role of reporting incentives as a moderating factor, ii) studying firms' reporting versus real responses, iii) quantifying real effects of tax disclosure regulations, iv) identifying new tax settings that yield novel empirical insights, and v) measuring real responses to tax incentives. We also discuss emerging topics such as the interrelation between firms' tax avoidance and real outcomes, advances in research design, and environmental-related tax policies. We propose several open questions for future research that we believe have first-order economic and political relevance based on emerging tax policies at the local, federal, and international levels.

Keywords: Tax policy; business taxation; real effects; tax disclosure; literature review

JEL classifications: H20; H23; H25; H26; H71

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1 Introduction

Taxation is a first-order policy tool to raise revenue for government spending, redistribute wealth, and change the behavior of individuals and firms. Given the economic implications of firms' decision-making for investors, regulators, and society, a large and growing body of research across accounting, economics, finance, and law studies the relationship between taxation and firm outcomes. We review the recent empirical literature with a focus on accounting research that studies firms' real and reporting responses to tax incentives. Understanding both the real and the reporting effects of taxation is important because these effects collectively determine the effectiveness of tax policies in inducing the intended economic response.

The main goals of our review are to i) synthesize the growing body of accounting research to highlight key findings and policy implications, ii) suggest open areas for future work that have the potential to impact policy and practice (Clemons & Shevlin 2016, Mills 2019), and iii) describe advances in research design and data availability that permit scholars to address these open questions. For the purpose of our review, we follow the definition of "real effects" used by Leuz & Wysocki (2016), who describe real effects as any changes in firms' behavior affecting transactions in the real economy. Practically, this means that we review work that includes investment- and employment-related measures as direct responses to taxation, as these have been the predominant "real" outcomes studied by tax accounting scholars. In terms of "reporting" responses, we consider studies that directly examine firms' financial or tax reporting responses in settings where tax policies were mainly expected to induce real effects.¹ We exclude work that does not examine real outcomes as the primary variable of interest and instead refer readers to other tax literature reviews.² To identify the papers included in the review, we considered all tax papers published in leading academic accounting journals since Hanlon

¹In identifying reporting responses, we also follow Hanlon & Heitzman (2010), who distinguish between "real" and "reporting" effects. We acknowledge that it is hard to define real effects and to clearly distinguish between real and reporting responses. This is because firm decisions can have a wide range of effects on stakeholders, and reporting responses often have follow-on real effects, e.g., through capital market feedback or managerial learning, (Bond et al. 2012, Roychowdhury et al. 2019)). Examples of reporting responses to taxation include firms re-classifying an expense as R&D to claim the R&D tax credit, even though the underlying economic transaction did not change, as well as firms responding to tax incentives with cross-border income shifting in lieu of real investment spending.

²For example, we exclude work solely focusing on the determinants of firms' tax avoidance (Wilde & Wilson (2018)), profit shifting (Heckemeyer & Overesch (2017) and Dharmapala (2019)), accounting for income taxes and associated capital market outcomes (Graham, Raedy & Shackelford (2012)), debt financing (Hanlon & Heitzman (2022)), and effects of tax disclosure regimes (Müller et al. (2020) and Hoopes, Robinson & Slemrod (2022)).

& Heitzman (2010)'s call for more research on the real effects of taxation. We also conducted a targeted search for studies on firms' real responses to tax policy in leading finance and economics journals.³ By reviewing papers that examine broader tax features and a host of real outcomes, as well as papers at the intersection of real and reporting responses, we augment the literature in the outstanding review by Jacob (2022).

We organize our review based on the set of firm outcomes that tax accounting research has studied. Beyond domestic tangible investment and employment (which are the most studied types of real effects), our review also covers other related outcomes, such as the geographic allocation of investment (i.e., foreign direct investment) and the variance of investment (i.e., risk-taking). Our review also includes research that evaluates a range of tax policies, including traditional settings such as changes in corporate income tax rates, as well as targeted incentives (i.e., R&D credits), changes in tax enforcement, and disclosure mandates. When discussing the relationships between tax incentives and firms' responses, we relate the reviewed research to the canonical theory in Hall & Jorgenson (1967). Their neoclassical model predicts a negative effect of corporate income taxes on firms' marginal investment in tangible assets through changes in the firm's cost of capital. Where appropriate, we discuss how researchers can relate this work to this theory in broader settings. Further, we discuss other established theories when settings require significant departures from the standard setting in Hall & Jorgenson (1967).

Our discussion of the literature identifies five key contributions that tax accounting scholars make to research on real effects. We briefly summarize these contributions here, citing representative examples of work in each area. First, accounting research documents that real responses vary based on financial reporting incentives and other firm-level sources of heterogeneity (e.g., Williams & Williams 2021, Goldman et al. 2023). Second, accounting scholars

³Specifically, we went through all issues and searched for studies on taxation based on the titles, keywords, and abstracts in the following journals: *Journal of Accounting and Economics*, *Journal of Accounting Research*, *The Accounting Review*, *Management Science*, *Contemporary Accounting Research*, and *the Review of Accounting Studies*. We also systematically searched for papers in the following leading finance and economics journals, as well as other field journals in public economics and accounting: *The Journal of Finance*, *Journal of Financial Economics*, *The Review of Financial Studies*, *American Economic Review*, *Quarterly Journal of Economics*, *Journal of Political Economy*, *Review of Economic Studies*, *Econometrica*, *Accounting*, *Organizations and Society*, *European Accounting Review*, *Journal of the American Taxation Association*, *Journal of Public Economics*, *National Tax Journal*, *American Economic Journal: Economic Policy*, and *the Journal of International Economics*. Where appropriate, our review also mentions work published in accounting journals before 2010 or unpublished working papers that have the potential to make significant contributions to the literature.

show that firms engage in reporting responses instead of real spending in response to tax rate changes or targeted tax incentives (e.g., [Coles, Patel, Seegert & Smith 2022](#)). Third, accounting research studies real effects of mandatory disclosure regimes, documenting often unintended real responses (e.g., [Rauter 2020, Jacob, Wentland & Wentland 2022](#)). Fourth, accounting scholars regularly identify new settings or nuanced part of tax laws, such as those related to state “add-back” rules ([Li, Ma & Shevlin 2021](#)) and executives’ tax treatment of real outcomes (e.g., [Yost 2018](#)). Fifth, accounting research advances measurement of firms’ tax status (e.g., [Bethmann, Jacob & Muller 2018](#)) and of real and reporting outcomes ([Dyreng & Lindsey 2009, De Simone, Klassen & Seidman 2022, Olbert & Severin 2023](#)).

Throughout our review, we identify several open research questions and discuss these within each sub-section pertaining to a particular real outcome, as well as in dedicated “synthesis” sections. As one example, we highlight several instances in which the literature offers seemingly contradictory findings.⁴ As another example, we raise questions about whether the measurement and quantification of real effects enables an assessment of whether policies motivate new, incremental investment spending or instead only subsidize investment that would have occurred regardless of the incentive. As a third example, when discussing the literature at the intersection of tax planning (income tax-motivated cross-border profit shifting specifically) and real activity, we identify a “chicken-egg” problem: i) Do firms first shift income and then substantiate that activity with the increased investment and employment in a low-tax jurisdiction, ii) do firms first invest in a low-tax jurisdiction and then exploit income shifting strategies on top, or iii) do firms engage in these activities together (simultaneous tax planning and real response)? Understanding this issue is very challenging but also necessary to more clearly quantify the role taxes play in location and investment decisions. Furthermore, research that helps to disentangle these responses directly informs policies targeted at reducing tax avoidance and cross-border tax competition. We also discuss specific ways in which accounting researchers can deliver ev-

⁴For example, several papers suggest a substantial capital expenditure (capex) investment response to tax loss carryback rules (e.g., [Dobridge \(2021\), Bethmann et al. \(2018\)](#)), but other work shows a limited capex response by loss firms (e.g., [Edgerton \(2010\)](#)). As another example related to foreign direct investment, prior work finds less investment abroad in response to a change to a territorial tax regime from a worldwide tax regime ([Arena & Kutner 2015, Amberger et al. 2021](#)), but in the same setting, [Liu \(2020\)](#) finds increased foreign investment. Focusing on country-by-country disclosure by European firms, [De Simone & Olbert \(2022\)](#) find that firms alter their foreign investment abroad, but other work finds little to no effect among U.S. companies (e.g., [Nessa et al. 2023](#)).

idence on firms' real and reporting responses to environmental taxes and the role of tax policy in driving sustainable outcomes more broadly, which are two highly relevant, emerging, and thus far understudied areas.

Beyond these types of open questions, which we articulate within each section of the review, we also highlight three broader opportunities for future research. These opportunities span several different types of firm responses. First, accounting scholars have the opportunity to bring together insights from disclosure theory with work on the real effects of taxation. Empirical work thus far lacks an overarching theory that incorporates insights from both public economics theory (on the relation between investment and taxation) and accounting disclosure theory (on the role of disclosure in firm real effects, e.g., [Kanodia 2007](#), [Kanodia & Sapiro 2016](#)). Filling this gap is important because disclosure can have both direct and indirect effects, but disentangling these effects and evaluating the relative costs and benefits in empirical studies can be difficult.⁵ Disclosure theory also provides insights about the impact of regulatory regimes on earnings quality. Tax-induced reporting changes can alter the quality of firms' reporting information, but little is known about the effects of these changes for other investment, governance, and capital market outcomes. Understanding these effects is urgent given the ongoing and increasingly heated debate about whether to tie firms' tax treatment to their financial reporting outcomes ([Graham, Hanlon, Shevlin & Shroff 2014](#), [Hanlon 2021](#), [Gaertner, Hoopes, Laplante & Pflitsch 2022](#)).

Second, we see opportunities for future research that establishes strong links to work in other disciplines, including other areas of accounting as well as in finance and economics. The literature has not yet fully embraced the interdisciplinary nature of tax research, despite earlier discussions that stress this point ([Maydew 2001](#), [Hanlon & Heitzman 2010](#)). We recommend not only thoroughly referencing work in other disciplines but also building on theories, directly discussing and relating empirical results to economic magnitudes in other fields, borrowing settings and data, and following best practices in empirical research design.

As a recent example, consider research on the effects of the U.S. Tax Cuts and Jobs Act

⁵For example, the direct effect of a disclosure regime such as country-by-country reporting is to provide more information to tax authorities. One indirect effect is to nudge firms to change their real investment and employment by raising the cost of existing location decisions (i.e., in havens) through the reporting mechanism.

(TCJA). Accounting researchers were among the first to empirically examine firms' exposure to the law, investor responses, and the financial statement and reporting implications (e.g., [Gaertner et al. 2020](#), [Dyrenge, Gaertner, Hoopes & Vernon 2023](#), [Lynch et al. 2023](#), [Kelley et al. 2023](#)). More recent work in accounting and economics further examines the tax law, documenting that real responses arise along many margins and vary based on the underlying technical tax rule. Because conclusive and collective evidence on a big and policy-relevant topic like the TCJA typically emerges from a collection of academic studies, studies examining unique margins or specific components of a tax law can contribute to the literature. However, making such a contribution requires a deep understanding of existing and concurrent work across fields. Therefore, future accounting research should not only build on existing work in our field, but also on studies like [Chodorow-Reich et al. \(2023\)](#) by (for example), qualitatively and quantitatively comparing findings and discussing how studies across fields relate to each other. We believe accounting researchers can leverage, for instance, firms' disclosures or cross-sectional variation in firm-specific frictions and incentives, to document important sources of heterogeneity. Furthermore, such work can add much-needed evidence on specific provisions, such as innovation spending in response to the foreign-derived intangible income (FDII) rule and changes in international investment due to the global intangible low-taxed income (GILTI) rule and the base erosion and anti-abuse tax (BEAT).

Third, several other dynamic policy developments beyond the TCJA lend themselves as laboratories for accounting research to address first-order economic questions. The potential contributions of these settings relate to novel policy designs that may potentially induce substantial responses by the corporate sector. Examples include the U.S. Corporate Alternative Minimum Tax (CAMT), global minimum tax rates, destination-based taxes, private and public disclosure mandates on tax and sustainability (e.g., Country by Country Reporting (CbCR) or the European Union's Corporate Sustainability Reporting Directive (EU CSRD)), and environmental taxes or incentives for green investment. Pursuing an interdisciplinary approach to study firms' responses to these developments will further increase the relevance of tax accounting research to policymakers as well as researchers in other fields.

We conclude by noting that studying real effects is a promising path for accounting scholars.

We are hopeful that tax accounting researchers will increasingly focus on examining some of the many open questions that we identify in this review related to firms' real responses to taxation. Accounting researchers are uniquely positioned to contribute to this policy-relevant knowledge about the intersection of real and reporting responses along the five dimensions outlined above, particularly along the first two dimensions for which there has been relatively little work to date (understanding the role of reporting incentives in altering the real response and studying how firms respond with reporting outcomes in lieu of the real response). We look forward to future work that advances our understanding of these real effects and the role in which accounting information, firm reporting, and disclosure play in these outcomes.

We organize the rest of our review as follows. In Section 2, we discuss the theoretical foundations for why taxation should affect real business outcomes and we propose the organizing framework for the manuscript. Sections 3 and 4 review the empirical work on real and reporting responses. Each subsection covers a particular type of real outcome; for example, Sections 3.1 and 3.2 discuss the two traditional measures of real activity, investment and employment, respectively, whereas Sections 4.1 and 4.2 focus on outcomes studied in more recent work, such as risk-taking and responses to environmental taxes, respectively. Section 5 discusses emerging topics that relate to several aspects of the work reviewed in Sections 3 and 4.

2 Theory and Conceptual Framework

2.1 Overview and Basic Neoclassical Theory of Taxes and Corporate Investment

The goal of this section is to give readers an overview of the theoretical underpinnings regarding firms' real responses to taxation based on the neoclassical investment model in Hall & Jorgenson (1967) and to provide an organizing framework for our literature review that reflects the breadth of tax accounting research on real effects. When presenting our framework, we connect tax accounting research to the baseline theory from Hall & Jorgenson (1967), and we discuss other relevant theoretical considerations based on existing work.

As an early theoretical contribution in public economics, Hall & Jorgenson (1967) model the relationship between taxes and investment. Their model focuses on firms' marginal investment in *depreciable physical capital* in response to changes in the *deductibility of investment costs* given existing *corporate income tax rates*; see Figure 1, Panel (A). Equation 1 provides

their key result:

$$f'(I) = MPK = r \frac{(1 - \tau_c z)}{(1 - \tau_c)} = CoC \quad (1)$$

This equation shows that firms invest as long as the marginal revenue product of capital (MPK) is equal to the cost of capital (CoC). With respect to taxes, the model shows that greater tax deductibility of investment in fixed tangible capital (z) increases marginal corporate investment (I) via a reduction in the after-tax cost of capital, which reduces the hurdle rate for investment ($\downarrow MPK$). If firms' initial investment costs are not fully tax deductible ($z < 1$), as typically the case in many jurisdictions, the model also shows that higher corporate income tax rates (τ_c) discourage investment. We view this model as a useful starting point for research on the real effects of taxes because the general view is that corporate tax changes affect the economy primarily through firms' investment decisions. Consequently, a vast number of papers on firms' real responses to tax incentives implicitly or explicitly build on this model.⁶

2.2 Framework for the Review and Suggestions for Future Research

Panel (B) of Figure 1 visualizes the organizing framework for our review, which builds on the theoretical relation depicted in Panel (A) but has been adapted to reflect the the range of research conducted in accounting. For example, our review includes (i) outcomes other than investment in depreciable capital, ii) tax policies beyond changes in tax depreciation rules or tax rates, and (iii) settings in which firms trade-off real and reporting responses (Scholes & Wolfson 1992, Scholes et al. 1992, Slemrod 1992).

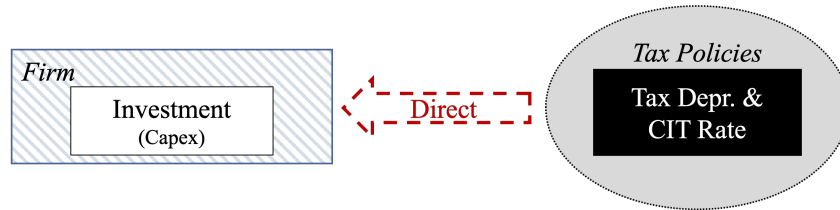
First, the right side of the figure includes other tax system features beyond the two tax parameters in the original model, the corporate income tax rate and depreciation of tangible capital investment. Accounting researchers have leveraged institutional details and firm-level data to study how reductions in the tax base, such as through repatriation tax holidays, innovation box regimes, or the U.S. Domestic Production Activities Deduction (“DPAD”), lower a firm’s taxable income and thus effectively reduce the corporate income tax rate, thereby impacting real responses.⁷ Our review also discusses other tax policies, such as changes in non-income

⁶See Section A.1 of the Online Appendix for a more detailed discussion of this model.

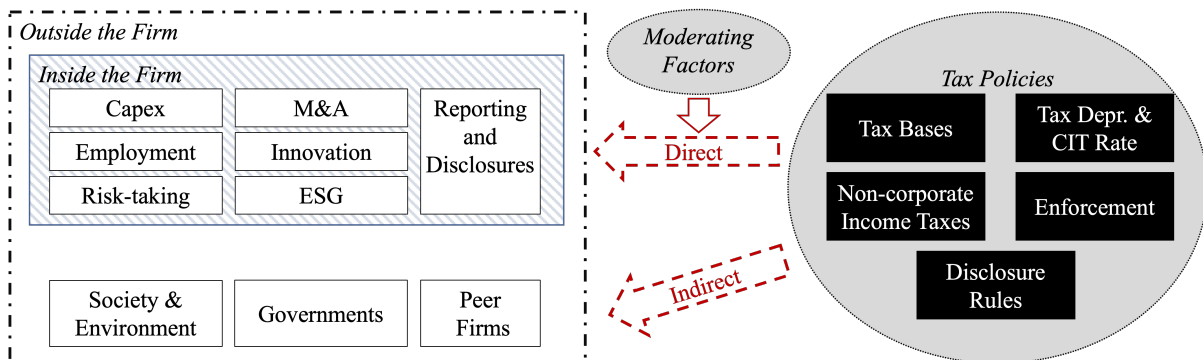
⁷For example, firms participating in the 2004 U.S. repatriation tax holiday, as passed in the American Jobs Creation Act, received an 85% dividends-received-deduction (“DRD”) on amounts repatriated from the foreign

Figure 1: Basic Theory and Framework for the Review

(A) Basic Theory: Corporate Taxes and Investment



(B) Framework for the Literature Review: Tax Policies and Firm Responses



Notes: Panel (A) of this figure illustrates the basic theory on the relationship between corporate tax incentives and firms’ investment. Panel (B) illustrates the framework for our literature review.

taxes (i.e., sales or value-added taxes), which also affect real spending.

Second, in addition to including specific types of tax policies, the right side of the figure includes tax enforcement and tax disclosure rules. Tax enforcement operates in a similarly indirect manner as changes in tax bases: greater tax enforcement (indirectly) increases expected tax burdens (e.g., Allingham et al. 1972, Sandmo 1974).⁸ Thus, if firms expect higher tax burdens due to greater enforcement, investment will decrease as in the standard case of a tax rate increase or a lower tax depreciation deduction. However, tax enforcement effects are nuanced, because enforcement reflects tax authorities’ actions on behalf of governments and can thus be seen as a form of political risk (Hassan et al. 2019, Gallemore, Hollander, Jacob & Zheng 2024). Greater tax enforcement can also *increase* tax certainty and thus lower tax risk. In this case, firms might respond by increasing investment as predicted by standard theory

subsidiary to the U.S. parent. This DRD effectively lowered the tax rate on repatriated funds to 5.25% (85% DRD x 35% U.S. statutory income tax rate). The U.S. DPAD and some innovation box regimes operate in a similar manner by permitting reductions that lower the tax base and thus effectively also lower the tax rate τ_c .

⁸Allingham et al. (1972) and Sandmo (1974) apply Becker’s theory of crime to individual tax evasion. The underlying mechanisms from these theories can be extended to the business setting; specifically, increasing the penalties for tax evasion and/or the probability of detection should similarly reduce business tax evasion.

(e.g., [Pindyck 1988](#), [Bloom 2009, 2014](#)).⁹

Tax disclosure regimes are distinct from the other policies included in the figure because they do not directly alter the treatment of business transactions under tax law. Thus, researchers cannot simply invoke the standard theory when motivating studies examining the real effects of disclosure. However, changes in mandated or voluntary reporting directly impact the amount or type of firm information provided to external stakeholders, including shareholders, creditors, consumers, employees, citizens, the press, and tax authorities. As managers anticipate that stakeholders will use the disclosed information in ways that can affect the firm, firms may alter their tax planning.¹⁰ Firms may alter their real decisions in response to disclosure changes ([Leuz & Wysocki 2016](#)). Our review shows that examining these firm responses to tax disclosure rules is another key contribution of accounting scholars.

Third, the left side of the figure maps a number of outcomes beyond capital investment. These include other measures of investment studied in the prior literature, most notably mergers and acquisitions (M&A) and innovation-related investment (R&D) for which the original theory has been adapted (for example, [Rao \(2016\)](#)). The left side also includes other outcomes, such as those motivated by alternative theoretical frameworks (i.e., risk-taking based on [Domar & Musgrave \(1944\)](#)), or those indirectly impacted by tax policy changes (i.e., employment). When reviewing these outcomes, we discuss the relevant theoretical extensions important for future scholarly work.¹¹

⁹These models focus on investment responses to expected cash flow uncertainties when investors are risk-averse and investment decisions are not fully reversible. The theoretical literature has also identified two mechanisms through which uncertainty can potentially have a positive effect on long-run investment. First, uncertainty itself can increase the potential value of an investment project if bad news has a less severe impact on the project than good news (growth options). Second, uncertainty can increase investments if firms can expand projects to exploit good outcomes and contract in bad outcomes (Oi–Hartman–Abel effect). As these effects occur in longer-run scenarios and are more descriptive of the relationship between investment decisions and output prices or macroeconomic developments, they should play a negligible role when considering corporate responses to changes in tax enforcement.

¹⁰[Müller, Spengel & Vay \(2020\)](#) and [Hoopes et al. \(2022\)](#) provide recent reviews of the literature on private or public tax disclosures. Most studies reviewed in [Hoopes et al. \(2022\)](#) focus on the relationship between these rules and firms' information environment, with a particular focus on the effectiveness of tax disclosure rules in limiting tax avoidance behavior. This effect typically occurs through the revelation of incremental information about a firm's tax avoidance activities to tax authorities.

¹¹For example, there is only an indirect effect of tax policy changes on employment; the extent to which labor responds is a function of the complementarity or substitutability of investment. Employment effects also depend on tax incidence, which is the extent to which different parties ultimately bear the burden of tax studied in a given setting. If tax increases decrease a firm's demand for capital sourced from suppliers, they could also potentially decrease the demand for labor. Depending on the business tax incidence, the firm's responses might also lead to changes in factor prices (i.e., wages, input goods, final goods) ([Goolsbee 1998](#)), such that employees, suppliers,

Fourth, the left side also includes reporting outcomes. While tax policies are often intended to motivate real outcomes, such as increasing investment and jobs, these responses can be costly. Firms may instead engage in other “reporting” responses first, trading off the benefits from claiming the incentive with the relative cost of each response. Some of the earliest work in accounting focuses on trade-offs of incentives (Scholes et al. 1992, Maydew 1997), often documenting that reporting responses dominate. Slemrod (1992) formalizes this framework when thinking about real responses, outlining that firms first alter the timing of transactions, then recharacterize transactions with accounting choices, and finally engage in the real response. Understanding and documenting empirical evidence on these real versus reporting trade-offs is a second key contribution of accounting scholars to this literature. In particular, we discuss how this research directly informs tax policy by documenting variation or delay of the real response. Furthermore, to the extent that reporting changes made for tax reasons affect financial statement numbers, these reporting changes impact financial reporting quality, creating broader capital market and real effects (Hanlon 2021, Roychowdhury, Shroff & Verdi 2019).

Finally, the arrows for “Moderating Factors” highlight that there is substantial variation in the extent to which the tax policies motivate real outcomes. Research studying such moderating factors typically departs from the basic assumptions of the canonical theory, which models a single firm maximizing the NPV of each investment in the absence of non-tax frictions like reporting incentives, agency conflicts, and uncertainty. A key example of such moderating factors in accounting research includes firms’ reporting incentives. The intuition is that firms face public reporting costs (or benefits) when changing corporate actions in response to tax policy. A consequence, these costs impede the real response. Examples of costs include the disclosure of proprietary information, the reduction of financial reporting income, or a decrease in usefulness of accounting information for financial statement users.¹² Beyond financial reporting incentives, accounting researchers have contributed by applying their institutional knowledge of settings to identify important variation in firm responses and settings in which the standard theory assumptions do not hold. One example of the latter is documenting the presence of

or customers bear some of this tax burden (Harberger 1962, Clausing 2013, Suárez Serrato & Zidar 2016).

¹²See Hanlon (2021) for a recent discussion. Graham et al. (2012) review the literature on the usefulness of tax-specific disclosures in financial statements. For the FIN 48 standard in particular, Mills et al. (2010) theoretically model the strategic interactions between publicly listed firms disclosing uncertain tax benefits and the tax authority.

agency issues that impact firm investment decisions (e.g., [Edwards et al. 2016](#), [Hanlon et al. 2015](#)). Another example is showing that managers do not always optimize on tax policy parameters that maximize NPVs (e.g., [Graham et al. 2017](#)). These papers span both investment and employment outcomes and are discussed throughout the review.

3 Investment Levels and Locations

3.1 Corporate Investment and Taxation

3.1.1 Capital Expenditures

3.1.1.1 Theoretical Underpinnings and Overview

We start with capital expenditures (“capex”) because investment in tangible depreciable assets is most directly predicted by the theory discussed in Section 2. Further, it is the most commonly studied real outcome among accounting scholars. The economics field provides foundational evidence for studying the relation between taxation and investment, focusing primarily on documenting and quantifying the negative relation between capex and tax rates across a number of settings. Estimates from this literature of the elasticity of investment with respect to the tax-adjusted cost of capital range from -0.25 to -1.0 ([Hassett & Hubbard 2002](#), [House & Shapiro 2008](#), [de Mooij & Ederveen 2008](#), [Jacob 2022](#)). Recent work refines elasticity estimates through improved identification ([Zwick & Mahon 2017](#)) and further documents heterogeneity in the real response due to capital adjustment costs and policy uncertainty ([Cooper & Haltiwanger 2006](#), [Chen et al. 2022](#), [Guceri & Albinowski 2021](#)).

Accounting scholars have progressed this literature in three primary ways: i) documenting the role of tax losses as a moderating factor, ii) studying trade-offs in real versus reporting responses, and iii) studying non-income or shareholder-level taxes. Below we discuss each of these contributions.

3.1.1.2 Capex and Moderating Factors - Tax Status

Since the call for more work on tax losses in [Hanlon & Heitzman \(2010\)](#), accounting scholars have produced a number of papers on the measurement, risk-taking, and investment implications of tax losses. This research is important because many firms are in a tax loss position and thus are likely less sensitive to policy changes such as tax rate cuts or bonus depreciation.¹³

¹³Prior work shows that over 50% of companies have a U.S. tax loss ([Cooper & Knittel 2010](#)), over 90% of the largest publicly traded firms report some form of domestic, state, or foreign tax loss ([Heitzman & Lester 2021](#)),

Specific to capex, two papers study tax loss carrybacks (LCBs) as a policy mechanism to stimulate investment activity. [Dobridge \(2021\)](#) examines how companies use LCB cash refunds in two recessionary periods in which the U.S. government extended the LCB period. During the first, less severe recession at the end of 2001, firms spent \$0.40 of each dollar of LCB refunds on capex.¹⁴ However, in the more extreme global financial crisis from 2007 to 2009, firms retained \$0.96 of each LCB refund dollar in cash, subsequently using the funds to pay down long-term debt. The paper finds that firms do not necessarily spend the cash tax infusion on investment if macroeconomic circumstances lead firms to prioritize other uses of extra cash. [Bethmann, Jacob & Muller \(2018\)](#) exploit variation in LCB refunds across countries and over time to study the efficiency of LCB-induced investment during non-recessionary periods. Their main finding is that LCB refunds induce overinvestment by relatively unproductive firms.

An open question from these two papers is whether loss-offset-induced investment spending is more efficient when such spending occurs during recessionary times. That is, if investment under more generous LCB rules is not necessarily efficient on average as shown in [Bethmann et al. \(2018\)](#), how does the tax-induced tax efficiency vary in times of distress as studied in [Dobridge \(2021\)](#)? Related to this intriguing question, [Hillmann & Jacob \(2023\)](#) show that firms experiencing quasi-exogenous losses invest less, and not more, when loss carryforward (LCF) provisions are more generous. This finding suggests an opposite relationship between generous LCB versus LCF rules and investment. Consistent with the finding on market exits of less productive firms in [Olbert \(2023\)](#), this finding also indicates that economies may recover more quickly after periods of sudden downturns if tax loss policy is less generous. Understanding the efficiency of tax loss-related investment is important given that policymakers often introduce tax incentives during economic downturns, with the intent to stimulate investment that aids economic recovery. Furthermore, future research could help reconcile these relatively strong documented effects of tax loss carrybacks with earlier findings of a generally weak relationship between tax incentives and investment spending among tax loss firms ([Devereux, Keen &](#)

and these tax losses are both frequent and large in magnitude ([Christensen, Kenchington & Laux 2022](#), [Goldman, Lewellen & Schmidt 2022](#), [Henry & Sansing 2018](#), [Olbert 2023](#)).

¹⁴For comparison, [Guenther, Njoroge & Williams \(2020\)](#) study the use of cash tax savings more generally (i.e., not in the context of loss firms or recessionary times) and estimate that firms spend \$0.36 of cash tax savings on capex on average.

Schiantarelli 1994, Edgerton 2010). Careful measurement, both for correctly capturing firms' loss status (Heitzman & Lester 2021, Drake et al. 2020) and addressing the endogeneity of loss-related tax policies (which are often implemented during economic downturns), is critical for future work to arrive at precise estimates and progress this literature.

3.1.1.3 Tradeoff of Real Capex versus Reporting Responses

Some of the first tax accounting research examines reporting effects and the associated trade-offs that firms make when responding to tax incentives (Scholes & Wolfson 1992, Scholes, Wilson & Wolfson 1992). Slemrod (1992) expands on this framework to outline trade-offs between real and reporting responses; this framework states that firms first shift the timing of their transactions, then engage in "accounting recharacterization" to recast certain transactions for purposes of claiming a tax incentive, and finally engage in the intended real response.

Two recent studies in accounting use granular data to disentangle reporting from real investment responses to tax policy changes. Studying firm responses to the Domestic Production Activities Deduction ("DPAD"), Lester (2019) shows that companies increased domestic investment by \$100 million, but only once the largest tax benefits are available. The delayed investment response is because firms first alter their corporate reporting, engaging in intertemporal and cross-border income shifting of \$5 - \$25 million in the initial six years of the incentive. Coles et al. (2022) study companies' responses to *increasing* tax burdens (rather than declining tax burdens as in Lester (2019)). Using a sample of corporate tax returns, the paper shows that firms reduce their taxable income by 9.1% in response to a 10% change in the tax rate. Approximately 67% of this change is due to the reporting response of increased intertemporal income shifting, while the remaining 33% is due to real responses, including reductions in capex and employment.

Beyond these studies, we do not know much about how reporting responses (in lieu of a real capex response) differ for firms with different ownership structures and financial statement users. For example, private firms, which do not publicly report their financial performance, likely exhibit the largest reporting effects in lieu of the real response because they incur relatively lower costs of such reporting responses. Thus, future work documenting variation in these trade-offs across firms is needed to more completely quantify these often-unintended pol-

icy responses across the business sector.

3.1.1.4 Capex and Non-Corporate Income Tax Policies

Motivated by the fact that firms incur a multitude of taxes, recent work studies the role of non-income taxes and shareholder taxes on investment. These taxes can affect firms' real responses if firms bear part of the taxes (incidence) or if the taxes change other determinants of investment decisions. [Jacob, Michaely & Müller \(2019\)](#) show that higher consumption tax rates reduce capex with elasticities comparable to that of income taxes. [He, Jacob, Vashishtha & Venkatachalam \(2022\)](#) show that the differential taxation of short and long-term capital gains impact firms' long-term capex, likely due to the taxes' effects on managerial myopia.¹⁵ The evidence in [Jacob & Vossebürger \(2022\)](#) suggests that higher personal income taxes reduce capex because personal income taxes reduce consumption and increase the cost of labor.

While several studies show a negative association between non-corporate income taxes and capex, the specific mechanisms driving these results are still relatively unclear and warrant more research. One example of research with a clear proposed mechanism from the finance literature is [Tsoutsoura \(2015\)](#). This study shows that family succession taxes lead to a 40% decline in investment, which is likely due to equity owners becoming cash constrained when paying succession taxes. An example in accounting is [Jacob & Zerwer \(2023\)](#) who study emission taxes and link the real effects to firms' incidence of these taxes (see Section 4.2).

Given the recent decline in corporate tax revenues, due to base erosion of countries' income tax base, declining statutory tax rates, and the rise of non-corporate entities, countries are likely to increasingly rely on alternative sources of tax revenue, such as non-income and investor-level taxes. Thus, additional research on the real and reporting effects of these taxes will both add to this nascent literature and provide guidance for future policy.

¹⁵Shareholder level taxes have also received attention in both the public economics and finance literature. [Chetty & Saez \(2005\)](#) and [Yagan \(2015\)](#) both study the 2003 dividend tax rate cut, documenting sizeable effects on firm payout and investment, respectively. [Becker, Jacob & Jacob \(2013\)](#) study how shareholder dividends and capital gains taxes affect corporate investment, finding that firms with a greater wedge between the cost of internal and external equity (due to payout taxes) exhibit greater investment cash flow sensitivities. [Moon \(2022\)](#) finds that a 2014 capital gains tax cut in Korea increases investment, particularly among cash-constrained firms. In contrast to these other findings, [Isakov et al. \(2021\)](#) find no evidence that the tax exemption of dividends increases capex in a Swiss setting.

3.1.2 Innovation

3.1.2.1 Theoretical Underpinnings and Overview

Prior research defines innovation as the improvement or invention of a production process, product, method, or platform (Arrow 1972, Romer 1990, Glaeser & Lang 2024). Because innovation is the most important driver of economic growth in modern economies and because innovation outcomes are uncertain *ex-ante*, governments use regulation to encourage private sector investment. Tax policies are one example of a regulatory policy to stimulate innovation spending.

There are three types of tax policies that target innovation activities. The first are “front end” incentives, such as special deductions and tax credits tied to innovation spending. The second are “back end” incentives, such as innovation box (“IB”) regimes, which provide lower tax rates on income earned on successful innovation (see also Merrill 2016 and Evers et al. 2015 for overviews of the policies). The third is a generally favorable tax environment (i.e., low statutory tax rates on all business income).

The theory linking taxation to innovation investment builds on Hall & Jorgenson (1967), but it requires extensions (see, e.g., Rao 2016). With respect to R&D deductions, immediately deductible R&D ($z = 1$) motivates firms to innovate, similar in spirit to how bonus depreciation motivates firms to invest in tangible capital.¹⁶ With respect to R&D credits, the dollar-for-dollar tax benefit directly lowers the *CoC* via cash tax refunds, thereby increasing the marginal return to investment. “Back-end” incentives reduce tax burdens by either changing the tax base through increased or super-deductions for innovation ($z > 1$), by providing a lower rate on innovative income (τ_c), or both.

As with capex, the economics and finance literature generally uses tax policy shocks to identify and quantify the relation between tax policy incentives and innovation investment. This literature documents relatively large effects, with elasticities in excess of 1.¹⁷ Accounting

¹⁶While wages to research personnel are typically tax deductible absent special tax policies, R&D rules often extend this deductibility to tangible capital and other long-term investment outlays. Fully deductible R&D costs should minimize the impact of statutory tax rates as in Hall & Jorgenson (1967). However, these policies provide only limited incentives to loss-making firms (see in Section 3.1.1). Waegenare et al. (2012) provide an analytical model to link R&D spending with tax rates generally, showing a negative relationship if R&D-related production occurs in the same jurisdiction. This finding suggests that tax rates can affect R&D if the related spending involves investment in tangible capital, which links this theory back to the baseline model in Hall & Jorgenson (1967).

¹⁷Akcigit & Stantcheva (2022) review the recent economics literature in detail. Their framework goes beyond

scholars have contributed to this innovation literature along the following three dimensions of our extended framework: (i) documenting the role of reporting incentives and information frictions as moderating factors in claiming R&D tax incentives, (ii) examining real and (to a lesser extent) reporting responses to innovation box regimes, and (iii) applying institutional knowledge to identify unique settings in which to study the impact of tax policies on innovation outcomes. We summarize contributions along these three dimensions below, focusing primarily on research published since [Hanlon & Heitzman \(2010\)](#).¹⁸

3.1.2.2 R&D Credits and Moderating Factors - Reporting Incentives & Information Frictions

Recent work documents that reporting standards and public reporting incentives affect firms' R&D credit take-up rate. [Williams & Williams \(2021\)](#) and [Goldman et al. \(2023\)](#) show that the financial reporting rule FIN 48 reduces firms' investment in innovation. FIN 48 requires firms to record and disclose liabilities on their financial statements for uncertain tax positions, such as those taken when calculating the rather complex U.S. R&D tax credit. Because FIN 48 requires firms to delay reporting the full cash tax benefit of R&D tax credits on their financial statements, the informational benefit from claiming the credit declines, and firms cut their R&D spending. While [Williams & Williams \(2021\)](#) report an economically significant R&D decline attributable to financial reporting costs, [Hepfer, Judd & Rice \(2023\)](#) posit that reporting incentives induce positive real responses to R&D tax credits. Specifically, they study why firms who otherwise appear unable to benefit from the credit (i.e., pre-IPO loss firms) claim the credit. They argue that disclosing an R&D tax credit signals that firms' innovative activity is credible, which is important given that pre-IPO firms' R&D investment is otherwise unobservable and unverifiable. As these reviewed papers suggest very different roles of financial reporting incentives, more evidence is needed to clarify, separate, and quantify the role of reporting incentives in altering firms' tax credit decisions.

Several papers study how the internal information environment impacts the relationship between firm responses, integrating personal taxation and responses of individual inventors. A recent U.S.-focused study is [Rao \(2016\)](#), who uses administrative data to document increased spending of \$1.98 per dollar of R&D credit claimed. Other papers document increased R&D spending in response to state-level R&D credits ([Wilson 2009a](#)), as well as credits in the U.K. ([Guceri & Liu 2019](#)) and Canada ([Agrawal et al. 2020](#), [Klassen et al. 2004](#)).

¹⁸[Hanlon & Heitzman \(2010\)](#) primarily focus on studies of the R&D credit based on research conducted at that time, starting with [Berger \(1993\)](#), which highlights the role of implicit taxes as a moderating factor due to an increase in input costs. [Glaeser & Lang \(2024\)](#) also review recent work published in accounting journals.

tween innovation tax incentives and R&D spending, thereby also identifying a direct channel likely contributing to the relationship between the quality of firms' internal information environment and tax planning outcomes (Gallemore & Labro 2015). Huang, Krull & Ziedonis (2020) find that firms claim more R&D incentives if they have relatively greater internal information flows, measured based on patent applications listing inventors from more than one country. In the same vein, Cowx (2022) shows that firms spend less on R&D when their internal information environment is weaker, likely due to the inability of substantiating and defending the credits. Finally, Finley, Lusch & Cook (2015) show that frictions related to tax law complexity for reporting and claiming R&D tax credits impede firms' responses to innovation tax policies.

There are at least four important open questions related to "input-based" R&D incentives. First, there is little evidence in accounting about trade-offs between real and reporting responses to these incentives. Recent work in economics shows that, in a sample of Chinese firms, 25% of reported R&D expenses are the result of relabeling activities to benefit from a lower tax rate for research-intensive firms (Chen et al. 2021). In addition to documenting a significant reporting outcome, the results in Chen et al. (2021) also suggest that the policy decreases the information quality of firm reporting, leading to overestimates of the policy's real investment and productivity effect. Additional evidence is needed to shed light on the existence and amount of these trade-offs in other settings where the institutions – and, by extension, the real and reporting incentives – differ from China.

Second, there is little evidence measuring the nature or extent to which these tax policies achieve the intended spillover effects on the broader economy. On one hand, innovation policies may have positive spillover effects if firms mimic peers' innovation spending (Kim & Valentine 2021). On the other hand, these policies may induce tax competition that results in firms simply shifting the location of innovation rather than engaging in new, incremental R&D activity (Wilson 2009a). In this case, there could be negative externalities because taxpayer dollars are used to subsidize activity that may have limited spillover benefit. Research that quantifies and evaluates the extent to which innovation tax policies stimulate new activity is important to evaluate these spillovers.

Third, there is limited evidence on private firms in the innovation setting, even though entrepreneurial businesses are the source of substantial innovation. A 2015 U.S. tax law change in the Protecting Americans from Tax Hikes (PATH) Act now allows these small companies to use the R&D credit to offset payroll taxes. This change provides a setting to uncover both the real and reporting responses to incentives among pre-revenue and pre-income firms otherwise unable to benefit from the traditional U.S. R&D credit.

Finally, the literature has largely ignored the role of the R&D deduction, even though the U.S. tax benefit derived from such deduction is at least twice as large as the tax benefits from the credit. The limitations on R&D deductibility passed in the Tax Cuts and Jobs Act of 2017, the first major change to the deduction since 1954, provide a new setting for scholars to quantify how the removal of tax policies impacts real innovative spending. Furthermore, financial statement disclosures about this change provide a window into firms' innovation activities, presenting opportunities to contribute to other disclosure-related accounting research on innovation (i.e., [Koh & Reeb 2015](#)).

3.1.2.3 Innovation Box Regimes - Real Responses

As of 2024, more than 20 countries have innovation or intellectual property (“IP”) boxes. These regimes reduce taxes on intangible-related income, such as license fees, royalty income, and sales revenue derived from IP (for institutional details, see [Merrill 2016](#), [Evers et al. 2015](#), [Alstadsæter et al. 2018](#)). The goal is to retain and attract both real innovative activity and reported income that might otherwise be shifted to lower-tax jurisdictions.

Several papers examine the real response, finding increased patenting activity after these regimes are in place ([Bradley et al. 2015](#), [Alstadsæter et al. 2018](#), [Schwab & Todtenhaupt 2021](#), [Shehaj & Weichenrieder 2024](#)). However, research also suggests that the activity is re-allocated from other jurisdictions and is not driven by new, incremental spending ([Gaessler et al. 2019](#), [Schwab & Todtenhaupt 2019](#)). Beyond patenting outcomes, [Chen et al. \(2023\)](#) and [Bornemann et al. \(2023\)](#) show that the IP regimes increase fixed capital investment and salaries within the IP box countries. When considered with the evidence on patenting activity, the results imply that firms co-locate innovation and fixed investment in the same jurisdiction in response to IP box incentives. However, these co-location effects predominantly occur within countries providing

the greatest IP box tax benefits, or within countries imposing “nexus” restrictions that require firms to have real economic presence in the country (Chen et al. 2023). Bradley et al. (2021) similarly show that nexus requirements are important when studying M&A responses to IP box regimes: these requirements reduce tax-driven acquisitions that lack economic substance.

While there are several papers studying the real effects of IP boxes, academic work has produced only suggestive evidence on firms’ income shifting responses; see discussion in Section 3.3.6. Additional evidence in this setting on real and shifting responses is crucial because innovation-related tax regimes are one of the few types of country-level instruments for tax competition that the OECD and the European Commission do not consider harmful. The OECD and European Commission now require all IP regimes to include nexus provisions that are intended to reduce the potential economic distortions of the regimes (Hauffer & Schindler 2023). As the nexus provisions require economic substance to claim tax benefits, researchers can exploit these policy changes to further distinguish real from income shifting responses. In addition, researchers could exploit alternative data sources to examine innovation activity related to outcomes beyond patents, such as trademarks or trade secrets. These outcomes have substantial impact on firm value and typically rely on a broad set of input activities beyond R&D (Heckemeyer et al. 2018, Glaeser 2018). We look forward to research that comprehensively assesses firms’ real and tax planning responses in this regard.

3.1.2.4 Alternative Settings to Study Innovation Outcomes

Beyond R&D-specific tax incentives, evidence points to overall favorable tax regimes as key for motivating innovative activity (Karkinsky & Riedel 2012, Mukherjee et al. 2017, Cloyne et al. 2023). Two accounting papers use state and federal settings to further examine these effects. Li, Ma & Shevlin (2021) study nuanced U.S. state tax accounting rules intended to reduce intangible-related income shifting by limiting the deductibility of within-firm royalty payments (i.e., state “add back” rules). In response to these rules, firms not only decrease cross-state income shifting activity but also cut back on patenting activity. The key takeaway is showing how tax laws related to intercompany reporting induce a real negative effect on innovation activity. Huang et al. (2023) examine the innovation effects of TCJA provisions intended to increase the amount of innovation-related income reported in the U.S. (Foreign

Derived Intangible Income, or FDII). They provide early evidence suggestive of increased R&D employment to maximize these benefits.

What remains unclear from this work and the related work on R&D-specific policies is which type of tax policy induces the most incremental spending on innovation activities. Furthermore, we have limited evidence on the types of firms that are more responsive to targeted innovation incentives (like the R&D credit or innovation boxes) versus overall favorable business-tax-friendly environments. While no single study can fully answer this question, accounting researchers can advance this work in two ways: incorporating reporting responses when examining the policy impact and improving measurement of outcomes based on granular firm disclosures and institutional knowledge that informs the research design.

3.1.3 Mergers & Acquisitions

3.1.3.1 Theoretical Underpinnings and Overview

Mergers & acquisition (“M&A”) activity increases the size of the firm through the acquisition of a wide array of firm assets, including fixed tangible assets. Thus, the underlying link to the [Hall & Jorgenson \(1967\)](#) theory is that higher taxes affect the return earned on firm assets (i.e., income) and should reduce M&A activity from the buyer’s perspective. In line with this after-tax cost of capital view, [Arulampalam et al. \(2019\)](#) uses country-level variation in tax rates to quantify a tax rate elasticity of acquisitions of -0.3 to -2.3.

M&A investment also involves the acquisition of intangible assets and other assets for which the tax treatment is more nuanced. Further, different parties such as sellers, buyers, and investors bear different types of taxes, all of which could affect the amount, level, or type of acquisitions. We review studies in accounting and related fields that examine these nuanced effects of taxation on M&A. Specifically, accounting research has provided evidence on i) the M&A response to worldwide and territorial tax systems, ii) the role of tax avoidance in M&A investment decisions, iii) the role of individual-level taxes, and iv) the interrelation between tax and financial reporting incentives.

3.1.3.2 M&A Response to Worldwide and Territorial Tax Systems

Several studies use M&A activity to examine the investment implications of the U.S. worldwide tax system (with deferral) and the corresponding repatriation tax in place prior to 2017. In

addition to motivating firms to retain cash offshore (Foley et al. 2007, De Simone et al. 2019), the policy also increased firms' foreign investment, measured with M&A (Edwards et al. 2016, Hanlon et al. 2015). Further, the policy created domestic underinvestment problems (Harford, Wang & Zhang 2017). For example, Harris & O'Brien (2018) observe lower levels of domestic M&A among U.S. MNCs with more complicated foreign tax structures, and Bird & Karolyi (2017) show an increased likelihood of U.S. domestic targets being acquired by foreign firms due to the U.S. international tax system in place at this time. These studies document important investment inefficiencies of the U.S. worldwide tax system prior to 2017: U.S. tax rules motivated foreign, not domestic, investment.

Two open questions remain from this literature. First, these papers primarily focus on M&A as a "sufficient statistic" for overall firm investment patterns. Future research can contribute by documenting how the tax-induced M&A effects translate into actual tangible and intangible firm-level investment and employment to more fully understand the implications of these tax rules for competitiveness. Second, most countries, including the U.S. since 2017, have shifted to a territorial system. It is important to understand whether these changes are effective in reversing the investment inefficiencies in the market for corporate control. Initial evidence of this change is consistent with fewer, and more value-increasing foreign acquisitions after the U.S. TCJA (Amberger & Robinson 2023). However, the results in Feld et al. (2016) and in Liu (2020) suggest that a territorial tax policy *increases* foreign investment. Longer run evidence is necessary to reconcile these conflicting predictions and provide more evidence about the investment response to the territorial tax system.

3.1.3.3 Tax Savings Opportunities and M&A Activity

Accounting scholars have further contributed to the M&A literature by i) extending the evidence in Arulampalam et al. (2019) on the negative relationship between tax rates and M&A activity using statutory tax changes and ii) studying the relation between firm-specific tax burdens (i.e., tax avoidance measures) and M&A. With respect to the first, Blouin, Fich, Rice & Tran (2021) quantify the M&A response to the U.S. DPAD investment incentive. They find increased acquisitions in response to lower tax burdens on acquirers claiming the DPAD. Bradley et al. (2021) also quantify acquisition responses to innovation box policies (see Section 3.1.2.

Bührle, Casi-Eberhard, Stage & Voget (2023) show that stricter loss-trafficking rules reduce M&A activity, suggesting that acquiring firms view net operating losses of target firms as a valuable asset that reduce future effective tax burdens and thus can make acquisitions financially more attractive.

Two accounting papers study the relation between firm-specific tax avoidance strategies and M&A activity. Chow, Klassen & Liu (2016) examine how tax avoidance affects M&A outcomes, finding that target firms attract higher takeover premiums if they disclose that they did not engage in tax shelters. The authors interpret this result as acquirers paying more for firms that do not have large, uncertain future tax liabilities. Hu et al. (2023) studies the relation in reverse, focusing on how M&A take-over laws affect tax avoidance. The paper finds that, after changes in these laws, firms increase acquisitions but reduce tax avoidance due to reductions in managers' abilities to consume private benefits. Both papers find evidence consistent with a relation between tax avoidance and M&A, but the direction of the relation is unclear: does avoidance drive changes in acquisition behavior, do changes in M&A activity impact tax avoidance, or both?

3.1.3.4 The Role of Individual-level Taxes for M&A Investment

In addition to studying the relation corporate tax effects on M&A, scholars have studied the role of individual-level taxes. Understanding the role of individual-level taxes is particularly critical for M&A as the tax treatment of the deal is a function of both entity- and owner-level taxes. This literature shows that shareholder-level taxes impact M&A activity: capital gains tax burdens inhibit efficient M&A deals (Ayers et al. 2004, Todtenhaupt et al. 2020), and these effects on tax structure and price are largely driven by target firm CEOs' personal capital gains tax liabilities (Hanlon et al. 2021). Further work shows that dividend taxes also impact acquisition price (Ohrn & Seegert 2019).

More research is needed to understand the mechanisms linking individual tax liabilities to deal activity, structure, and pricing. Furthermore, the literature lacks clarity on the relative weight of firm-level versus shareholder taxes when determining the characteristics of specific transactions. For example, the literature should examine whether firms actually forego acquisitions in response to taxes or if, on the margin, they alter other deal characteristics, including

structure (asset versus stock deals) or price paid.

3.1.3.5 *Interrelation of Tax Incentives and Financial Reporting*

Lynch, Romney, Stomberg & Wangerin (2019) provide evidence about the relationship between tax and financial reporting incentives when studying M&A. They examine how acquiring firms allocate the purchase price of assets after an acquisition. While purchase price should be allocated according to the assets' fair market value, the study shows that managers exercise discretion and allocate greater amounts of the purchase price to fixed assets, permitting firms to recover their investment via tax depreciation quicker than if the purchase price were allocated to longer-lived intangible assets. Since purchase price allocation is the same for tax and financial reporting purposes, firms then typically understate the book value of intangible assets shown to financial statement users.

Beyond this paper, we have little understanding of these types of trade-offs that firms make and when tax dominates financial reporting concerns (or vice versa) in the context of M&A investment. Thus, more evidence about this in the context of M&A (or even more generally for investment and employment) is needed.

3.1.4 *Synthesis and Suggestions for Future Research*

Here we summarize three key points that apply across all studies of investment. First, future research can more comprehensively capture firms' investment responses and better evaluate the relative magnitude of effects across investment type. While the reviewed studies typically focus on one type of investment, a more likely scenario is that companies allocate tax savings to investment across different categories as suggested by Olbert & Severin (2023) who study private firms' investment behavior after private equity buyouts. We do not encourage scholars to test every investment type in every setting but recommend that scholars carefully consider theoretical predictions in their setting and articulate why they focus on a particular outcome for their research question.¹⁹ When it is appropriate to study multiple measures, pa-

¹⁹This is similar to the discussion in Hanlon & Heitzman (2010)'s review about tax avoidance measures: they make a key point that different tax avoidance measures capture different types of avoidance. As a consequence, researchers should carefully select a measure rather than taking a "shotgun" approach where papers use multiple measures without an appropriate rationale. Our point is the same but for the real effects literature: studying multiple real outcomes in response to every tax policy change is not appropriate because some policies are more targeted at specific types of spending than others. Furthermore, using the same policy variation to examine different outcomes (also framed as multiple hypothesis testing) can induce bias, leading to overestimated effects of taxation (Heath et al. 2023).

pers should clearly discuss why these measures are selected and the expected interaction: to evaluate spillover effects, uncover the complementarity or substitutability of production factors, quantify co-location benefits, or study unintended consequences of the tax policy.

Second, accounting scholars should continue to build on insights from other areas of accounting research. We have highlighted several examples that underscore the role of reporting incentives (as moderating factors) and reporting responses (as outcomes) in measuring the real response. Other examples relate to agency issues, equity ownership, corporate governance, and capital market pressures to name a few. Evidence documenting variation along these dimensions would complement studies in public economics that typically focus on average responses to a tax policy change.

Finally, future work should address measurement challenges. For instance, while accounting standards provide a clear definition of capex, researchers across disciplines measure capex in very different ways. This is largely driven by data availability across datasets.²⁰ Measurement issues exist for innovation and M&A activity.²¹ As a consequence, research inconsistently measures the investment response, blurring the inferences for both other academics and key policy makers. Our suggestion is three-fold. First, researchers must clearly describe how they calculate these measures, highlighting departures from calculations used in prior work. Second, accounting researchers should continue to pursue other measurement approaches.²²

²⁰For example, researchers obtain capex amounts from public financial statements via Compustat, but this is a worldwide amount that may be inappropriate when studying jurisdiction-specific tax policies. Segment disclosures in public financial statements also provide capex information, but companies vary widely in reporting segment information, and the information with the best coverage relates to total assets – not capex or even total fixed assets from which capex could be estimated. In contrast, the Bureau van Dyck Orbis data do not include capex information, requiring researchers to estimate this by using the change in tangible assets. Furthermore, computing the change in fixed assets necessitates adding back depreciation to arrive at the change in gross (not net) fixed assets, but BvD depreciation details also include amortization expense, resulting in an over-adjustment in this calculation.

²¹For instance, only approximately 30% of Compustat firms report R&D expense, leaving a large group of companies providing very little insight into the amount of innovative activity occurring within a firm. The use of patent data, while helpful, is also imperfect because patent ownership is concentrated, and some of the most innovative outputs may be retained as trade secrets rather than patented. Using M&A data from deal databases that capture deal activity and prices does not necessarily allow researchers to quantify true investment responses in the real economy.

²²For example, public firms' provide specific disclosures about intended investment spending in management guidance. This guidance may help pin down firm responses and also provide qualitative context important for interpreting the real response. Another example is obtaining access to federal, state, and local administrative datasets that permit better measurement of location-specific investment. In general, recent advances in large language models and AI provide great opportunities to identify and quantify investment responses and types around tax changes.

Finally, researchers could provide elasticity estimates when interpreting magnitudes. These estimates not only would facilitate comparisons across papers using different settings, datasets, and measurements but also position accounting research to be more easily consumed by those outside of the field and in policy, who often speak in terms of elasticities.

3.2 *Employment and Taxation*

3.2.1 *Theoretical Underpinnings and Overview*

When relating employment studies to the canonical model of Eq. A.1, one cannot simply think of firms' labor input as the investment variable I . The reason is that employment expenses are usually fully tax deductible when incurred, such that z would be 100%, and corporate income tax rates should have no effect on firms' input decision (see the right extreme in Figure OA.1). However, taxes can affect employment through two channels. First, employment is linked to investment based on either the complementarity or substitutability of capital and labor. For example, if capital and labor are complements (i.e., if firms need more workers to run newly-acquired fixed assets), then tax incentives lowering the CoC will increase both fixed investments and employment. In contrast, if firms can substitute labor with new machinery (i.e., automation), employment may decrease after corporate tax cuts (Curtis, Garrett, Ohrn, Roberts & Serrato 2022).

Second, corporate tax policy can affect labor if employees bear some burden of the corporate tax ("tax incidence"). Firms may pass on their tax costs (savings) to employees, in which case tax increases (decreases) may impact workers. The extent to which this occurs is largely a function of firms' and workers' wage bargaining power.

Research in finance and economics documents that higher corporate income tax rates induce firms to decrease employment, measured with either the number of employees, wages, or both. These studies use high-quality administrative labor data and different econometric strategies to overcome measurement and endogeneity challenges. Specifically, Giroud & Rauh (2019), Ljungqvist & Smolyansky (2018), and Suárez Serrato & Zidar (2016) exploit staggered U.S. state-level corporate tax rate changes. Fuest, Peichl & Siegloch (2018) exploit more than 6,000 business tax rate changes across German municipalities to quantify the tax effect on employment. While the estimated effect sizes vary, the collective evidence confirms a negative

relation between taxes and employment or wages.

Accounting scholars have contributed to this literature in three ways: i) examining outcomes beyond firm-level employment and wages, ii) studying non-income tax policies, and iii) studying cross-border employment decisions.

3.2.2 *Outcomes Beyond Firm-level Employment and Wages*

The research discussed above focuses on the effect of a tax rate change on employment levels. This section discusses research revisiting this main relation in two ways: using alternative measures for tax burdens and alternative measures for employment.

[Shevlin, Shivakumar & Urcan \(2019\)](#) show that lower publicly listed firms' aggregate cash ETRs are associated with higher country-wide employment growth. While the paper is not focused on employment as the primary outcome, results confirm that the negative relation between tax rates and employment holds at the macroeconomic level.²³ [Standridge \(2023\)](#) uses market reactions in response to the U.S. TCJA as a proxy for the expected tax benefits aggregated over firms operating in a given county. He documents that these benefits are correlated with wage increases of more than three percent at the U.S. county level. Surprisingly, little research exists on the effects of taxation on labor outcomes beyond firms' employee count or wages. A notable exception is [Hutchens, Lynch & Stomberg \(2024\)](#), who exploit the TCJA setting to examine employment satisfaction of rank-and-file employees as firms announced they would pass on corporate tax savings attributable to the TCJA-related. Interestingly, they find a *decrease* in employee satisfaction, consistent with the one-time increases in wages being perceived as too small relative to the TCJA-related tax savings for firms.

3.2.3 *Specific Tax Policies Beyond Corporate Income Taxes*

Recent work studies employment effects on non-income taxes. [De Simone, Lester & Raghunandan \(2022\)](#) focus on relatively small but prevalent firm-specific business incentives granted by state and local governments. These incentives include abatements of property taxes and sales taxes, as well as incentives tied to location in specific areas, such as enterprise zone credits and tax increment financing.²⁴ They find that local subsidies have positive employment

²³For studies in economics on the impact of tax changes on aggregate economic activity, including employment, see [Romer & Romer \(2010\)](#), [Mertens & Ravn \(2013\)](#), and [Cloyne et al. \(2023\)](#).

²⁴Much of the prior literature focuses on large "mega deal" incentives that are commonly granted to entice a firm to move to a new jurisdiction ([Slattery & Zidar 2020](#)). This line of research confirms that these incentives are

effects, but only when subsidies are subject to internal disclosure laws. The results suggest that within-government monitoring is important to ensure that companies follow through on their job commitments. Future accounting research could help to further evaluate responses to local tax and subsidy programs in at least two ways. First, new work could examine the interactive effect of tax policies and other local business incentives that the commonly used dataset from Good Jobs First does not capture. Second, accounting researchers could leverage theory and institutional knowledge to provide evidence on how transparency mandates at the firm and government levels affect the allocation and effectiveness of subsidies. Such evidence is important as these increasingly popular state and local policies reallocate substantial taxpayer funds.

Lester (2021) provides evidence that U.S. firms reduce domestic employment in response to the 2004 U.S. DPAD, a policy that targeted capex responses by lowering the CoC for capital investments. Among other outcomes, Chen et al. (2023) study how innovation box regimes in European countries affect firms' employment responses when the policy goal is to stimulate innovation activity (for details, see Section 3.1.2). Interestingly, the authors fail to document employment increases for the average firm despite the often large tax benefits, but their evidence is consistent with an increase in average salaries per retained employee. Thus, this study shows that employment responses likely depend on the underlying nature of the policy's targeted investment and also the type of firm claimant. In the case of innovation, firms may expand their activities and tax-favored income by scaling up with the existing higher-skilled workforce rather than by adding jobs. As employment is a central outcome of interest for policymakers, more work is needed to understand how tax policies intended to stimulate specific firm actions impact total employment at the firm level as well as the composition of the workforce.

The evidence on the impact of non-corporate income taxes on employment is relatively scarce, despite these taxes' economic significance for firms' cash tax remittances and potential tax incidence. Jacob (2021) documents that Swedish firms' employment (wages) increased on average by (more than) 1% annually after a 10 percentage-point dividend tax rate cut in 2006. This finding is consistent with the *traditional view* of dividend taxes suggesting that firms relying on new equity reduce investment in response to higher after-tax costs of equity financing.

indeed associated with increased employment at the recipient firms and in the local area.

Jacob & Vossebürger (2022) find that personal income tax (PIT) rate changes of one percentage point correlate with workforce reductions by 0.25%, suggesting that firms bear part of the PIT and thus reduce investment and labor inputs. De Simone & Olbert (2024) examine the European consumption tax, the value-added tax (VAT) system. They show that multinational firms generating digital B2C sales decrease employment in countries with low VAT rates after a major reform allocated taxing rights to the countries where consumers reside and VAT rates are higher.²⁵ In sum, these studies suggest that firms consider investor-level, personal income, and consumption taxes in their employment decisions and that firms and employees share part of the effective burden. However, the specific mechanisms at work are still understudied and identification challenges persist as tax policies are often endogenous to employment outcomes. Future research could leverage increasingly available disclosures on firms' human capital choices to assess the mechanisms behind employment responses to specific tax policy changes and better rule out that correlated factors drive the association between tax policy changes and employment outcomes.

3.2.4 *Employment Effects of Inter-jurisdictional Taxation*

Several studies show firms' employment responses to changes in international tax regulations and employment responses in countries other than the one where tax policy changes. Dyreng & Hills (2021) examine the employment effects of the repatriation tax holiday in the American Jobs Creation Act of 2004. By showing that employment increased in geographic areas near the headquarters of repatriating MNEs, they provide evidence that partly conflicts with the results in Dharmapala et al. (2011).

Lester (2021) offers supplementary analyses that find limited evidence for U.S. firms' increased foreign employment in response to the domestic tax rate reduction due to the DPAD. While not conclusive, this evidence would be consistent with firms increasing investment due to a lower *CoC* in their home jurisdiction but not increasing labor in the same jurisdiction because labor inputs should be insensitive to tax rate changes if the expenses are fully deductible (see Eq. A.2). Instead, firms seem to expand employment abroad, potentially due to

²⁵Several studies in economics show that U.S. domestic firms' employment decreases as state-level sales tax rates increase (e.g., Thompson & Rohlin 2012, Beem & Bruce 2021). These results are strongest for firms located in counties that border other states and with price-sensitive consumers, suggesting that firms bear a significant part of consumption taxes in the U.S.

a scale effect and higher marginal returns to labor investment in less developed markets. Interestingly, [Samuel \(2022\)](#) provides contrasting evidence. He finds that after the U.S. TCJA in 2017, U.S. firms decreased employment in foreign subsidiaries by 1 to 3 percent, suggesting that lower home country tax burdens and the abolishment of the repatriation tax decrease foreign investment and employment, which become relatively less tax-attractive. Reconciling these contrasting findings is important for understanding whether, and in which circumstances, investment and capital are complements and substitutes. To do so, the literature must use location-specific measures of investment and employment to precisely measure the total and domestic versus foreign response.

Two recent studies examine the impact of corporate tax rule changes that determine where a firm's pre-tax income is subject to taxation. [Welsch \(2023a\)](#) shows that service firms' employment in a given U.S. state increases by up to 5% after states introduce the apportionment of taxable income based on the location of final consumers. As the results seem mostly attributable to business expansion rather than reallocation across states, this result is consistent with a decrease in the after-tax cost of labor investment increasing the overall level of employment in high-tax states. [Suárez Serrato \(2019\)](#) examines U.S. domestic employment effects in response to higher firm-wide effective tax rates due to limited tax avoidance opportunities after the U.S. limited income shifting opportunities to the tax haven Puerto Rico. This finding is consistent with higher overall tax burdens increasing the *CoC* and the complementary relation between labor and capital.

3.2.5 Synthesis and Suggestions for Future Research

Despite the first-order economic importance of employment, empirical research on the link between business taxes and firms' labor capital decisions is limited, likely due to four main reasons. First, tax policy changes are highly endogenous to employment outcomes, posing challenges in establishing causal relationships. Second, the scarcity of high-quality panel data on employment outcomes complicates the analysis. Third, theoretical predictions regarding the relationship between corporate taxes and employment are not straightforward; see discussion below. Fourth, firms might not only change employment levels in response to corporate income tax rates (as reviewed in [Jacob 2022](#)), but they may also alter the allocation of employment

across jurisdictions or the level of wages.

We believe that future accounting research can leverage nuanced settings and explore new data sources to shed light on the employment responses to taxation (see also [Lester 2021](#)). Specifically, just as in the more developed literature on investment, accounting research could examine whether firms make real human capital changes or strategically report on employment outcomes to benefit from tax incentives. One may expect strategic human resource-related reporting for tax purposes as firms' tax treatment under cross-jurisdictional tax base apportionment or transfer pricing assessments depend heavily on the location of labor. New international regulations and transfer pricing practices aim to more closely align real activities with taxation, further stressing the role of employment reported to a given jurisdiction. Also, to the extent researchers are granted access, using tax returns can be a useful and to-date underused resource. For example, W-2 forms in the U.S. would allow researchers to construct reliable measures on employee counts and characteristics. Furthermore, there is no consensus on the complementarity or substitutability of capital and labor. For example, the results in [Lester \(2019\)](#) and [Curtis et al. \(2022\)](#) are somewhat contradictory. Accounting researchers could look into voluntary disclosures about human capital strategies in response to tax changes to improve our understanding of this question. Finally, building on the extant governance or executive compensation research and exploiting information from firms' disclosures or the Equal Employment Opportunity Commission (EEOC), accounting researchers are uniquely positioned to study alternative employment beyond wages and employment such as differences by gender, hierarchies, or other employee characteristics. As managers can be biased, taxes could plausibly induce firms to respond differently depending on employee characteristics. The evidence on such issues is of first-order relevance from a stakeholder and sustainability perspective. It would also shed more light on the distributional consequences of tax policy through firm responses.

3.3 Geographical Allocation of Physical Capital and Employment

3.3.1 Theoretical Underpinnings and Overview

A key managerial decision is *where* to invest. National and sub-national governments engage in cross-border tax competition that alters where companies located, complicating researchers' efforts to fully capture the real response. Beyond conceptual and policy issues,

commonly used data sources limit researchers' ability to correctly identify where investment occurs. Thus, studying the location of real outcomes is not straightforward due to conceptual, policy, and data issues.

The canonical model in [Hall & Jorgenson \(1967\)](#) focuses on marginal capex decisions. [Devereux & Griffith \(2003\)](#) adapt this theory for the jurisdictional allocation of investment. They show that multinational firms should respond to differences in average *effective* tax rates across jurisdictions based on firm-specific investment parameters, holding constant the total amount of investment (see also [Mutti & Ohrn 2019](#) and [Chodorow-Reich et al. 2023](#) for model extensions that incorporate firms' international investment decisions). This prediction extends to the U.S. state and local setting, where firm location decisions are also impacted by firm-specific tax incentives provided by governments ([Slattery & Zidar 2020](#)).

Additional theory outside of the [Hall & Jorgenson \(1967\)](#) theoretical framework applies when studying firms' foreign investment response to domestic tax cuts. Finance theory shows that firms should fund the highest NPV projects, regardless of jurisdiction ([Hayashi 1982](#)). Thus, when presented with cash tax savings or reduced costs of production via tax cuts, firms should expand the scale of operations, and this may occur at home or abroad, depending on the available projects. Because the tax cut also changes the relative price of investment, foreign investment will only increase if domestic and foreign investment are complements ([Desai, Foley & Hines Jr 2005, 2009](#)), or if the scale effect dominates substitution toward domestic investment [Hoopes et al. \(2023\)](#).

Prior work in economics has produced substantial evidence on the negative relationship between firms' foreign direct investment and host countries' or states' tax rates (e.g., [Devereux & Griffith 1998](#), [Feld & Kirchgässner 2003](#), [Djankov et al. 2010](#), [Feld & Heckemeyer 2011](#), [Barrios et al. 2012](#), [Becker et al. 2012](#), [Giroud & Rauh 2019](#)). Accounting scholars contribute along the following dimensions: studying i) foreign investment responses to domestic tax policy changes, ii) allocation of employment, iii) employment responses to worldwide and territorial tax regimes, iv) tax haven planning, and v) income shifting.

3.3.2 *Foreign Investment Responses to Domestic Tax Policy Changes*

Several studies show that tax changes in one country impact firms' investment and employment in other countries. [Lester \(2019\)](#) finds evidence consistent with lower U.S. tax burdens due to the DPAD leading some U.S. multinationals to increase capex in foreign subsidiaries. [Glaeser, Olbert & Werner \(2023\)](#) and [Marsi, Jacob, Schindler & Xu \(2023\)](#) confirm this finding in the European setting, showing a positive association between home country statutory tax rate cuts and increases in fixed tangible assets of subsidiaries in foreign countries. While these studies do not offer specific tests on the mechanisms behind these findings, the authors argue that firms have lower costs or better growth opportunities abroad and, thus, use the additional cash tax savings to finance foreign instead of domestic investment. [Hoopes, Klein, Lester & Olbert \(2023\)](#) extend this work to study how U.K. multinationals responded to a major U.K. corporate income tax cut. They document sizable increases in the number of subsidiaries in African developing countries owned by U.K. multinationals after a major U.K. corporate income tax cut. The authors argue that these results are attributable to an increase in overall firm scale due to the significantly lower cost of capital after the tax cut.

Collectively, these studies provide novel and highly policy-relevant insights. However, due to challenges in measuring within-firm mechanisms, there is no conclusive evidence on the conditions under which and the reasons why firms respond to domestic tax cuts by increasing foreign investments. [Hoopes, Klein, Lester & Olbert \(2023\)](#) provide evidence consistent with the scale effect discussed above, but future research could examine specific settings that permit more analysis to uncover the theoretical mechanisms driving the observed foreign investment.

3.3.3 *Allocation of Employment and Tax Strategies*

A growing literature uses firm-level data to separate the contemporaneous domestic and foreign employment choices of firms. This research relates to several studies suggesting that firms reallocate employment in response to lower local jurisdictional tax incentives within a country ([Giroud & Rauh 2019](#), [Welsch 2023a](#)).

Several papers study the role of taxes in the offshoring phenomenon. [Williams \(2018\)](#) finds a positive association between low foreign tax rates and the likelihood and number of U.S. firms' offshored jobs in the respective foreign countries. While the studied sample is small

and the documented effects seem large, the findings are consistent with a sizable real effect of international tax competition in a period when the U.S. had one of the highest statutory tax rates among industrial nations.²⁶ Fox, Krull & Rane (2020) complement Williams (2018) by showing that U.S. employment offshoring is particularly concentrated in foreign countries that offer tax holidays to foreign investors, resulting in very low effective foreign tax rates for U.S. multinational firms. Drake, Goldman & Murphy (2022) provide additional evidence suggesting that, once U.S. firms allocate more employees abroad, firms engage in more aggressive outbound income shifting.

Related work studies how employment responds to non-income taxes. De Simone & Olbert (2024) show that firms' labor allocation across European countries changes based on value-added tax incentives for digital services revenue. This evidence is consistent with anecdotal evidence that Apple reallocated thousands of employees from Luxembourg to Ireland, as the mix of income and value-added tax incentives changed in favor of Ireland. Collectively, this evidence suggests that the relationship between taxes and foreign employment has a very important follow-on or potentially simultaneous effect: low foreign tax rates not only attract employment, but firms can also engage in more aggressive income shifting to low-tax countries as the presence of labor helps substantiate tax planning strategies (De Simone, Klassen & Seidman 2022, De Simone & Olbert 2022).

3.3.4 *Worldwide and Territorial Tax Regimes*

Several papers study employment responses when firms change from a worldwide system of taxing multinational firms' foreign profits to a territorial regime. Theory suggests that a switch from a worldwide to a territorial system should effectively lower a firm's tax burden if foreign tax rates are lower than domestic tax rates; firms should then increase foreign investment. However, regime shifts can be accompanied by transition taxes on historical earnings not previously subject to the repatriation tax, decreasing investment at least in the short run. Further, as tax planning incentives also change substantially under territorial systems, the nuanced predictions for subsequent investment depend on firm characteristics including agency issues and tax strategies.

²⁶Rao (2015) provides consistent descriptive evidence on U.S. corporate inversions.

Arena & Kutner (2015) and Amberger, Markle & Samuel (2021) test investment levels and investment efficiency, respectively, after Japan and the U.K. switched from a worldwide to territorial system; Albertus, Glover & Levine (2022) study this question for U.S. firms after the TJCA. All of these papers find less investment abroad after the change. The results also suggest that investment efficiency increases after this regime change, which is attributed to a reduction in agency conflicts that had otherwise driven overinvestment offshore.

However, Liu (2020) revisits the U.K. territorial regime shift and finds *increased* foreign investment after the tax regime change. This increased investment occurs in relatively low-taxed countries and thus is consistent with the basic theoretical argument that investment should increase if firms' tax burdens decline.

Future research could help reconcile the partly conflicting results in this literature about whether foreign investment increases or decreases. The conflicting results may be due to measurement choices; for example, Liu (2020) includes both tangible investment, as studied by Arena & Kutner (2015) and Amberger et al. (2021), as well as intangible investment. The papers also employ different samples and research designs. More important than replicating / resolving the sample and research design differences, it is important to understand if there are conceptual differences, such as unexplained firm characteristics that drive different foreign investment choices. Future work in this area could also shed more light on how U.S. companies responded to the TCJA, extending the structural estimates by Albertus et al. (2022).

3.3.5 Tax Haven Investment and Tax Planning

A specific contribution of accounting scholars to the literature on firms' investment and resource allocation choices has been to use financial reporting data to identify firm locations. Dyreng & Lindsey (2009) demonstrates how to use U.S. firms' Exhibit 21 information to identify where firms have subsidiaries.²⁷ Subsequent work uses Exhibit 21 data to study tax haven subsidiaries in particular. For example, Dyreng et al. (2015) and Murphy (2023) document that preferential tax treatment motivates multinationals to establish foreign holding companies in low-taxed jurisdictions such as Hong Kong, Singapore, Luxembourg, Switzerland, the Netherlands, and Ireland. Law & Mills (2022) go beyond the use of Exhibit 21 data to analyze textual

²⁷Other work makes use of the increasingly decent coverage of tax haven operations in the Orbis database. See Olbert et al. (2024) for a review and discussion of the Orbis Ownership data.

financial reporting disclosures; these disclosures show that firms' tax haven entities actively own assets and make sales and purchases to and from other affiliated subsidiaries.

Recent work studies factors that constrain haven use. [Fox et al. \(2022\)](#) show that firms reduce their investment in and transactions with subsidiaries located in European tax haven countries once the European Commission investigated the tax-ruling practices of these countries. The authors attribute their finding to firms' perceived increases in tax enforcement and expected increases in tax burdens associated with transacting and investing in these countries.

While the policy issue of firms' tax haven use is longstanding, the empirical evidence on the actual activities within tax haven subsidiaries is young and underdeveloped. The current measurement in the literature, which is usually an indicator for a haven subsidiary, does not reveal information about the haven entities' function, nor does it capture the amount of investment or employment in these jurisdictions. Furthermore, relying on the data in Exhibit 21 alone could introduce systematic measurement error, given that companies now appear to strategically reduce the number of haven entities that are publicly disclosed ([Dyreng, Hoopes, Langetieg & Wilde 2020](#)). We encourage future research to combine existing measures with novel data sources (e.g., from satellite imagery, surveys, or employee profiles) to shed light on the actual activity in havens and quantify tax and non-tax motives. Such evidence is particularly important, as recent domestic and multilateral proposals, including private and public Country-by-Country reporting and the OECD's international tax reform, include provisions intended to constrain the use of havens ([Olbert et al. 2024](#)).

Two aspects warrant specific attention in future research. First, non-tax regulatory and societal changes might also affect firms' tax haven investments. Prior evidence shows that firms' tax haven use depends on mandated public disclosures about geographic footprints ([Hope et al. 2013](#)). Furthermore, public sentiment about social issues is changing, particularly in Europe, which could affect firms' tax haven use; however, prior work does not find strong evidence of reputational costs of tax avoidance ([Gallemore et al. 2014](#), [Asay et al. 2024](#), [Nesbitt et al. 2023](#)). Second, in response to stricter international tax enforcement and transfer pricing assessments, firms appear to increasingly place resources in jurisdictions that both afford tax

benefits and also have other favorable characteristics of the business environment.²⁸ Future research could provide systematic evidence to assess the broader investment implications of this development.

3.3.6 *Real Activity versus Book Income Shifting*

In inter-jurisdictional taxation, a central question is to what extent do different tax policies across jurisdictions induce changes in firms' real activity and to what extent firms respond by strategically reporting taxable income. A large literature in accounting and public economics shows that firms shift pre-tax income across their international subsidiaries to benefit from cross-border tax rate differentials. [Dyreg & Hanlon \(2021\)](#) review this literature.²⁹ A separate literature shows that firms (re)allocate capital and human resource to locations with attractive tax regimes (see Section 3.3). The literature in the innovation box setting also addresses real activity and income shifting separately. While several studies document increased investment spending (see Section 3.1.2), other studies find evidence on firms exploiting IP boxes for income shifting purposes ([Koethenburger et al. 2019](#), [Bornemann et al. 2023](#)). However, observing greater levels of income (or lower ETRs) does not necessarily mean that firms altered their income shifting strategies, and neither [Koethenburger et al. \(2019\)](#) or [Bornemann et al. \(2023\)](#) employ empirical strategies that are common in the literature to specifically identify income shifting responses.

As a consequence of most studies focusing on income shifting or real activity as firm outcomes in isolation, relatively little direct evidence exists on the interrelation between firms' real activity and income shifting (i.e., reporting responses in this setting). Several studies take a stance on the relationship between real activities and income shifting in their settings and thereby advance our thinking about this concept.

²⁸Such jurisdictions appear to have a less disproportionate ratio of multinational firms' tax bases to total market size ([Gómez-Cram & Olbert 2023](#)). For example, firms appear to employ substantial numbers of workers and have sizeable investment footprints in countries such as Ireland and Singapore, which help to substantiate the firm's presence in these low-tax jurisdictions.

²⁹Recent contributions of accounting scholars include providing evidence on (i) the negative association between income shifting and financial reporting quality ([Chen, Hepfer, Quinn & Wilson 2018](#)), (ii) the comparability of countries' financial reporting standards as a driver of more aggressive income shifting ([De Simone 2016](#)), (iii) firms' reporting responses to avoid anti-income shifting legislation as part of the U.S. TCJA ([Kelley, Lewellen, Lynch & Samuel 2023](#)), (iv) the use of intra-firm transaction data to show price manipulations for income shifting purposes ([Kohlhase & Wielhouwer 2023](#)), and (v) improved methods to measure firms' income shifting ([Blouin & Robinson 2021](#), [Dyreg, Hills & Markle 2023](#)).

Some recent studies use novel data to study the internal firm transactions that facilitate the shifting of income to low-tax jurisdictions ([Hebous & Johannesen \(2021\)](#) on intrafirm services and [Langenmayr & Reiter \(2022\)](#) on financial trading assets in banking). The findings in [Langenmayr & Reiter \(2022\)](#) suggest that tax-motivated income shifting co-moves with the location of financial assets, but not with employment in the banking sector, which stands in contrast to related results on industrial firms ([Williams 2018](#), [Drake et al. 2022](#), [De Simone & Olbert 2022](#)). [Chow, Maydew & She \(2023\)](#) exploit U.S. firm-level shipment data from the S&P Global Panjiva database to examine whether imports from foreign (tax haven) countries decrease once income shifting opportunities decrease.

Other studies explicitly interpret their evidence in light of the interrelationship between income shifting and real activity. One strand argues that firms make real decisions to then successfully implement income-shifting strategies; for example, the evidence in [De Simone & Olbert \(2022\)](#), [Williams \(2018\)](#), and [Drake, Goldman & Murphy \(2022\)](#) suggests that firms re-allocate human or physical capital in a way that supports profit shifting strategies (i.e., income shifting comes after these real decisions have been made). Another strand of studies takes the opposite perspective and asks what the consequences of profit shifting for subsequent investment are. For example, [Suárez Serrato \(2019\)](#) shows that the repeal of U.S. firms' ability to use Puerto Rico as a low-tax income-shifting destination increased U.S. firms' overall tax burden and decreased investment, particularly U.S. domestic CAPEX and employment. As another example, [De Simone, Klassen & Seidman \(2022\)](#) develop a proxy of firm-level income shifting aggressiveness based on the sensitivity of subsidiary-level pre-tax income to domestic tax rates. Using this proxy, the study then shows that subsidiary-level tangible and human capital investments are less sensitive to domestic investment opportunities if the multinational firm engages in greater income shifting. While the two papers point to different effects of income shifting on real activities, both provide evidence consistent with income-shifting activities affecting both the level and efficiency of investment.

Taken the evidence from these different streams of research together, it is clear that both the allocation of real resources such as physical investment or employment *and* the reporting of taxable income respond to tax incentives. However, a critical issue is that the empirical litera-

ture has mostly not directly embraced the dynamics of firms' real and income shifting responses to international tax regime differences. This is a "chicken-egg" problem. To date, the evidence is mixed on whether tax incentives attract real activities (the chicken) that then facilitate income shifting (the egg), whether income shifting motives lead to real resource reallocation, or whether real activity and income shifting strategies change simultaneously as firms anticipate income shifting opportunities when they make investment decisions. We acknowledge that all three scenarios are possible and not mutually exclusive. Consequently, future research carefully needs to distinguish between different types of firms and institutional factors, in particular with respect to global tax enforcement (pre-BEPS, post-CbCR, Pillar 2).

Addressing this "chicken-egg" problem is important for three reasons. The first is policy-related: the interpretation of the interrelationship between real activity and income shifting, which can depend on the setting and firm type, matters for the policy implications.³⁰ Specifically, many recent policies attempt to reduce tax-motivated income shifting on the basis that the shifting is only "on paper" and thus lacks real substance. To the extent that income shifting follows substance, it may directly alter researchers' inferences and also change the type of policy intervention. The second relates to understanding the externalities of shifting: to the extent that firms re-allocate capital and labor to substantiate income shifting strategies, it may come at the cost of the most efficient pre-tax allocation of resources to international markets. However, without addressing this simultaneity problem, it is challenging for researchers to evaluate the efficiency of firms' location decisions. The third is a research design issue: it is unclear how to interpret economic results by studying income shifting as the outcome and controlling for physical and labor input factors if these real factors are simultaneously affected.³¹ A promising starting point is to study real and income shifting outcomes separately within the same setting that has clear predictions based on the policy change. As a recent example, [Gschossmann & Pfrang \(2024\)](#) show evidence consistent with the new EU-wide controlled foreign company

³⁰For instance, a government may intent to offer income shifting opportunities if firms invest in their jurisdiction as a consequence while the same government may want to impose anti-avoidance legislation if a firms' global footprint is set and income shifting activities are increasing.

³¹This "bad controls" problem may bias coefficient estimates. Addressing this issue is challenging, and there is no obvious methodological fix. We encourage researchers to acknowledge the issue and, at a minimum, conduct diagnostic tests to assess the issue in light of their inferences. We also look forward to research that makes a contribution by actively addressing the issue and proposing methodological advancements.

(CFC) regulations inducing firms to back up existing income shifting strategies with additional real resource allocations.

While the studies reviewed in this section have clearly increased the awareness of the co-movement of tax planning and real responses, more research is needed to understand whether and how pure tax planning considerations and real investment decisions interact over time. Given the inherent challenges in identification, we recommend that researchers devote considerable effort to refining their research designs and relying on theoretical frameworks. Recent international tax policy changes, such as those included in the TCJA and future changes in response to Pillar 2, may afford opportunities for this analysis.

3.3.7 Synthesis and Suggestions for Future Research

As our review shows, studying the location of real outcomes in response to taxes is not straightforward due to conceptual, policy, and data issues. At a conceptual level, firms' real allocation decisions are typically interlinked with a substantial amount of tax planning that occurs within multi-jurisdictional firms, making it hard to disentangle real from tax planning effects. In terms of measurement, properly identifying where firms allocate physical, intangible, and human capital in response to taxation is challenging with publicly available data. As a result, the evidence on the association between tax-motivated income shifting and real outcomes for corporate resource allocation is premature. One reason is that firms likely simultaneously decide the levels of reported pre-tax and real factor allocations across countries, which introduces a major identification challenge for empirical researchers. Many income-shifting studies use unconsolidated financial accounting data to measure both reported pre-tax income and real outcomes such as investment as control variables to estimate excess income reported for tax reasons. Due to said simultaneity issue, the coefficient estimates from regressions using human or physical capital as independent variables should be interpreted with caution.³² We believe that future research could exploit tight and innovative research designs and make clever use of (multiple) datasets to advance the literature on the consequences of income shifting for firms and governments.

Another issue for this literature is understanding the differing mobility of capital and la-

³²This aspect also applies to the setting in [De Simone, Klassen & Seidman \(2022\)](#), who transparently note that both income shifting and investment are measured with error.

bor and how that impacts firms' responsiveness to cross-border tax incentives. Previous work provides evidence of strong reallocation of capital and labor across borders (Giroud & Rauh 2019, De Simone & Olbert 2022), with some evidence that labor may be more mobile than capital. These findings are recent and somewhat in contrast to the more traditional view that capital is more mobile than labor (e.g., Keen & Konrad 2013, Piketty & Saez 2013). Consistent with this view, recent research in economics shows that people are not very responsive to tax incentives if they need to move away from home to access lower tax rates (Akcigit et al. 2022). This finding indicates that firms' labor location responses to tax incentives likely depend on the characteristics of the workforce, and that firms may resort to hiring more in local labor markets in one versus the other location if their existing workforce is not mobile. Given the economic relevance of labor outcomes and the increasing public interest in firms' human resources strategies as a social issue, future research in accounting can make a contribution by shedding light on this type of heterogeneity.

3.4 Real Responses to Tax Disclosure Regulation

3.4.1 Overview

In response to tax disclosure mandates, firms often make voluntary or forced reporting response changes (Hoopes et al. 2022 summarize this evidence). Prior work shows that firms indeed alter financial reporting choices to avoid additional disclosure to tax authorities (e.g., Abernathy et al. 2013, Towery 2017, Honaker & Sharma 2017, Bozanic et al. 2017, Belnap 2023, Xia 2023). These findings are relevant as the additional voluntary public disclosures, for example, due to perceived lower proprietary costs after Schedule UTP, can influence firms' investment decisions (Roychowdhury, Shroff & Verdi 2019).³³ We review the young and scarce empirical literature on firms' direct real responses to tax disclosure mandates.

3.4.2 International Tax Disclosure Regulation

In the past two decades, governments worldwide have introduced coordinated mandatory transparency rules and exchange of information agreements (see Olbert et al. (2024) for a review). The main policy objective is to combat aggressive tax avoidance. These mandates

³³Schedule UTP (Form 1120) requires the separate reporting of each U.S. federal income tax position taken by a firm on its tax return if the firm as recorded an uncertain liability with respect to this position in its financial statements.

use disclosure rules as a key path to achieving improved transparency that helps tax authorities worldwide better audit the operations and tax positions of foreign multinationals. The most significant recent international disclosure regulations are the different private and public Country-by-Country Reporting (CbCR) regimes. Tax accounting researchers have started to produce important evidence on the real effects of these rules, building on the large literature on the real effects of mandatory disclosures in accounting research.

[Rauter \(2020\)](#) studies the public CbCR mandate specific to extractive industries, which demand the disclosure of in-scope firms' extraction payments by country. Exploiting the staggered adoption of the reporting regime across European countries and Canada, he documents that affected firms increase extraction payments to governments by 12% but decrease their investment activity in extraction countries by almost 5%. This evidence suggests an increase in operating costs and lower returns to investment, consistent with the negative market reactions to the announcement of the mandatory disclosure regime ([Johannesen & Larsen 2016](#)). Supplementary tests in [Rauter \(2020\)](#) suggest that the public scrutiny channel of mandatory disclosure “works” – as results are concentrated among firms with higher reputational costs. However, a potential cost of the regime seems to be the reallocation of activity to unregulated firms, resulting in lower overall productivity in the sector.

[De Simone & Olbert \(2022\)](#) study the private CbCR setting, which affects all multinationals with consolidated revenues greater than EUR 750 million and operations in at least one country signed up to the OECD minimum standard. Using both a regression discontinuity design and a difference-in-differences approach, they find evidence consistent with no change in firms' consolidated human capital or physical investments. However, this study documents sizable estimates suggesting re-allocation effects: investment shifts to European tax-favorable jurisdictions and away from tax haven operations. This evidence is consistent with multinationals substantiating their tax-motivated transfer pricing structures with large tax bases allegedly reported in countries like Luxembourg, the Netherlands, or Ireland. Overall, these findings imply that affected multinationals made real changes, rather than altering tax reporting strategies that would only impact tax outcomes, which is consistent with the relatively small effects on ETRs and the limited evidence on reduced profit shifting behavior in [Joshi \(2020\)](#) and [Hugger \(2024\)](#).

Joshi, Markle & Robinson (2023) provide supplementary evidence to interpret the real responses to private CbCR by examining changes in the extent to which multinational firms report profits relative to their real (fixed assets) in high-tax countries. The study finds that after the introduction of CbCR, multinational firms reduce the level of *misalignment* between reported profits and real activities. Based on additional tests using additional macroeconomic data from bilateral FDI positions and aggregated CbCR data, the authors conclude that high-tax countries with previously low multinational firms' profits-to-assets ratios were the primary beneficiaries of firms' reallocation activities in response to CbCR.

The reviewed work has not specifically studied the effect of third-party reporting and information sharing through the CbC Multilateral Competent Authority Agreement. However, this information sharing is an important element of the CbCR regime, and previous studies have documented significant effects of similar information sharing policies in other settings. For example, Bennedsen & Zeume (2018) study stock market reactions around the passage of Tax Information Exchange Agreements (TIEAs) and document results consistent with greater transparency of haven activities, increasing the market value of affected firms by reducing non-tax expropriation opportunities by managers.³⁴ Several studies have documented that TIEAs are associated with a reduction in multinational firms' tax haven operations and that these operations most likely served income shifting purposes (e.g., Li & Ma 2022, Brown et al. 2019, Eberhartinger et al. 2021, Chow et al. 2023; see also Olbert et al. 2024 for a review).³⁵

3.4.3 Evidence from the U.S.

Focusing on Schedule UTP, Jacob, Wentland & Wentland (2022) find that firms affected by this tax return disclosure delay large capital investments and make less efficient investments.

³⁴Other market reaction studies exploit the leakage of multinational firms' tax strategies in tax havens, rather than the official sharing of information among authorities. O'Donovan et al. (2019) study the market reactions to the leakage of tax haven secrets (Panama Leaks), finding a significant reduction in firm value, partly attributable to higher tax payments in the future and firms' potential reduction of operations in corrupt countries. Interestingly, Nesbitt et al. (2023) study a similar setting (Luxembourg Leaks) and find positive market reactions, suggesting that investors value cash flow-increasing tax avoidance with relatively high certainty.

³⁵Other studies focus on the OECD Common Reporting Standard (CRS) or the U.S. Foreign Account Tax Compliance Act (FATCA) (De Simone, Lester & Markle 2020, Casi, Spengel & Stage 2020). These studies do not specifically examine firms' real outcomes, and FATCA and CRS regulations target individual taxpayers' tax avoidance. However, the strong evidence concerning a reduction in tax haven use and tax avoidance by both multinationals and individuals suggests that the information exchange policies could have broader implications for firms for at least two reasons. First, changes in firms' organizational structures and tax avoidance levels can impact real decisions. Second, global investors might change global capital allocation decisions, which could impact firms' ability to finance their real investments.

In cross-sectional tests, the authors find evidence consistent with Schedule UTP disclosures increasing tax risk, leading firms to hold up investment as a buffer against potentially higher future tax payments. [Goldman et al. \(2023\)](#) and [Goldman \(2023\)](#) focus on the enhanced financial statement disclosures of tax information under FASB Interpretation Number 48 (FIN 48) and document evidence consistent with FIN 48 inducing firms to invest less in capex and innovation. Their proposed channel is increased scrutiny by tax authorities, which increases the riskiness of and lowers the after-tax return of investments. [Yost \(2023\)](#) documents that tax aggressive firms are more likely to de-list prior to the adoption of FIN 48. This evidence is also consistent with the enactment of the mandatory disclosure rule of FIN 48 imposing tax-related proprietary costs, which likely reduces investment in the future due to limited capital market access ([Bharath et al. 2014](#), [Dobridge et al. 2022](#)).

3.4.4 *Regulatory Avoidance and Real Effects*

Given that disclosure mandates typically impose costs on firms ([Leuz & Wysocki 2016](#)), firms have an incentive to avoid the tax transparency mandates. Several studies explicitly show that firms actively avoid the mandatory disclosure of tax information, in particular by under-reporting pre-tax income ([Hasegawa et al. 2013](#), [Hoopes et al. 2018](#)) or revenue in the case of CbCR ([Hugger 2024](#)) to not hit disclosure thresholds. These effects are more pronounced for private firms with less capital market pressure. These findings indicate that firms are willing to under-report their true performance to outsiders to avoid higher expected tax payments or the use of additional tax disclosures by global tax authorities.³⁶

While these existing studies only speak to the presence of regulatory arbitrage and firms' willingness to incur costs to avoid additional tax reporting, firms' size management can have significant real implications as demonstrated in several other settings of accounting and disclosure regulation (e.g., [Bernard et al. 2018](#) on public financial reporting mandates in Europe). Thus, important open questions for future research remain regarding the policies' potentially

³⁶Regulatory arbitrage as a firm response is likely most prevalent but not limited to disclosure regulation settings. Specific tax rules can also apply to firms with specific characteristics, such as firm size. These rules then also create incentives to engage in size management or other actions to avoid or select into certain tax treatments. For example, [Andries et al. \(2017\)](#) also document evidence of downward size management by U.S. firms to benefit from tax deductions related to loan loss provisions, potentially inhibiting bank-specific and bank-industry-wide growth. A recent policy example is the new global minimum tax rate of 15% (OECD Pillar 2), which will apply to multinationals reporting more than EUR 750 million in revenue.

unintended effects on firm investment, growth, and organizational design attributable to the size-based mandatory reporting thresholds.

3.4.5 *Synthesis and Suggestions for Future Research*

The emerging work on the effects of tax disclosure mandates on firms' tax reporting and avoidance has documented significant costs associated with FIN48 in the U.S., leading to lower and less risky investments. The evidence on other settings is sparse, leaving much room for future research given the importance of tax disclosure mandates as a policy tool to foster equality and transparency.³⁷ Further, future research can help to reconcile magnitudes of firm responses documented across studies and relate effect sizes in tax disclosure research to those documented in other disclosure policy settings. This is a classical area of accounting research and thus of general interest. We hope future research makes progress towards addressing identification challenges inherent to regulatory avoidance and classification of firms affected versus unaffected by the policy mandates.

In the international setting, researchers have documented an array of real effects of private CbCR. While the literature in this space is burgeoning, still more research is needed to reconcile existing findings, including their economic magnitudes in relation to other work in disclosure research. More research is also needed to understand the comprehensive effects of CbCR across countries with different tax systems and macroeconomic characteristics and across firms with different information environments and global footprints. To do so, it will be important to separate reporting choices from real choices, potentially exploiting administrative data on employment outcomes or intra-firm transactions (e.g., [Fuest et al. 2018](#), [Hebous & Johannesen 2021](#)). Further, it is still unclear whether firms' disclosure of CbCR reports to one domestic tax authority alone drives the documented results or whether the information sharing across jurisdictions as well as the publication of CbCR reports (as mandated in the EU from 2024) can have incremental and nuanced effects on cross-border resource allocation. Some studies indicate that the *public* CbCR mandate in the financial industry is costly for the affected firms through less tax avoidance opportunities ([Dutt, Ludwig, Nicolay, Vay & Voget 2019](#), [Joshi,](#)

³⁷[Lennox, Li, Lin & Wang \(2015\)](#) provide indirect evidence on domestic disclosure requirements for R&D investments (required to obtain R&D tax credits) reduce R&D investments of tax-aggressive firms. The authors interpret their findings as evidence consistent with tax-aggressive firms foregoing investments to avoid additional scrutiny by the domestic tax authorities.

[Outslay & Persson 2020](#), [Overesch & Wolff 2021](#)). Future work can extend this evidence by directly looking at real outcomes as the change in tax behavior and investor reactions likely come with operational changes. Another important area for future research is the broader consequences of international tax transparency regulations initiated by influential governments of developed countries with high quality information and tax enforcement environments. Examples are tax enforcement and corporate behavior in (developing) countries where tax authorities so far have limited access to information about large MNCs' global operations and tax affairs.

4 Other Types of Investment and Indirect Outcomes of Investment

4.1 Risk-taking and Statutory Tax Rate and Base Rules

4.1.1 Theoretical Underpinnings and Overview

The theory of how taxes impact the riskiness of investment is outside of the traditional framework based on [Hall & Jorgenson \(1967\)](#). [Domar & Musgrave \(1944\)](#) first propose the theory about this relationship, focusing on the investment choices of individual taxpayers. Specifically, they study how the tax system, which includes both a tax rate t and a tax loss offset rule, affects investment I . More generous loss offsets effectively lead to risk-sharing between the taxpayer and the government as follows: the government enjoys a payoff if the project is profitable by taxing the return at t , but it also shares in the downside risk if the project generates a loss because it grants the taxpayer a refund to offset prior or future taxable income. Because this risk-sharing reduces the variance of the project below the amount preferred by the investor, the taxpayer selects I with a higher level of risk *ex ante* to restore the expected return to the pre-tax level. [Langenmayr & Lester \(2018\)](#) adapt this theory to the business tax setting; their model's predictions show that more generous tax loss carryback rules, and, to a lesser extent, more lenient carryforward rules, have a direct effect of increased corporate risk taking. Higher tax rates discourage risk taking more if tax loss carryback and carryback rules are relatively strict. Below we discuss the empirical literature examining this theory for i) corporate taxes and ii) individual taxes affecting executives.

4.1.2 Corporate Taxes and Corporate Risk-Taking

[Langenmayr & Lester \(2018\)](#) provide empirical evidence from the European setting confirming the key theoretical predictions, showing that corporate risk-taking is increasing in the

tax loss period, with the largest effects for loss carrybacks. In subsequent tests, they also document that the effect of the tax rate hinges on the extent to which the company expects a tax loss benefit. Using variation in U.S. states' tax rates and tax reporting regimes, [Ljungqvist et al. \(2017\)](#) and [Welsch \(2023b\)](#) also provide evidence consistent with greater loss-offset possibilities increasing firm-level risk-taking.

Several other papers also examine this theory, using different empirical settings for corporate entities ([Ljungqvist et al. 2017](#), [Olbert 2023](#)) and examining non-corporate businesses ([Glenn 2021](#)). The literature generally confirms the positive relation, although this work suffers from two challenges. The first is that, although the theory centers on the importance of *tax loss offsets*, several papers focus primarily on tax rate effects with only tax losses treated as second order (i.e., [Ljungqvist et al. 2017](#)). The second is that several papers make use of the state tax setting, but it is unclear the extent to which changes in state tax loss rules will drive these important real effects, given the relative size and magnitude of state tax loss rules. A better understanding and comparison of the magnitude of effects across jurisdictions is important for the literature to understand the importance and relative ranking of these effects on investment.

4.1.3 Individual Taxes on Executives and Corporate Risk-Taking

A related but distinct literature examines risk-taking decisions based on individual tax considerations of managers. [Armstrong, Glaeser, Huang & Taylor \(2019\)](#) show that managers' tax rates are positively related to corporate risk-taking; [Yost \(2018\)](#) focuses on a specific type of tax burden – the amount of CEOs' unrealized capital gains attributable to firm stock – and finds that this is negatively associated with corporate risk-taking. The intuition in [Yost \(2018\)](#) is that CEOs' unrealized capital gains tax liabilities overexpose the executives to firm risk, thereby reducing their incentive to invest in risky projects. An open question then is understanding the relative importance of manager tax burdens in the “pecking order” of tax policy choices. That is, it is unclear where managerial tax burdens fall as compared to corporate tax rates and tax losses.

4.1.4 Synthesis and Suggestions for Future Research

The collective evidence from this work is that the corporate tax system indeed influences business risk-taking. We have less evidence about how this occurs in flow-through businesses,

where the amount of loss offset is determined at the owner level. Given the prevalence and growth in flow-through businesses in the U.S., it is important to assess the extent to which this theory also holds for these businesses. The challenge, of course, is identifying the owners/shareholders of these businesses, particularly given the lack of public data. [Glenn \(2021\)](#) advances this work at the S corporation level, focusing on a sample of S corporation banks in which the majority shareholder faces the relevant income tax changes. While on a small sample, the evidence is consistent with risk-taking also occurring in those firms. [Ferguson et al. \(2023a\)](#) further advances this work in the horse-racing industry, but understanding whether and to what extent this also holds in the much broader population of partnership businesses is unclear.

The other area for which we have little evidence of this theory is in specific corporate decisions that incorporate elements of uncertainty, such as entering new (risky) markets or existing old (less risky) markets, where markets can refer to product markets, entire industries, or geographic markets.³⁸ Studies that provide evidence on such specific firm boundary and technological changes would go beyond the existing work that has proxied for risky investment using consolidated capex or return volatility measures. Such evidence is needed to understand how tax policies can affect firm behavior around specific (mega)-trends like investments in artificial intelligence or green technologies.

4.2 *Firm Responses to Environmental Taxes*

4.2.1 *Theoretical Underpinnings and Overview*

The explicit or implicit intent behind environmental taxes is to induce businesses to reduce their pollution. Thus, it is key to understand how firms respond to these climate tax policy changes. By taxing either firms' emissions in the production process or taxing firms' products or services that are greenhouse gas-intensive (e.g., a carbon tax on gasoline), governments raise the price of using emissions-intensive inputs or decrease the net revenue from selling emissions-intensive outputs. Relating this to the framework in Section 2.1, a carbon tax reduces the marginal return to investment through lower profit margins (i.e., a lower MPK in Eq. A.2). An emissions tax would be an additional tax τ_e on using emission-intensive inputs at a rate

³⁸See [Bührle et al. \(2023\)](#) and [Olbert \(2023\)](#) for recent working papers in the area, suggesting that more generous loss-offset provisions can increase the number of firms' market entries and deter market exits.

likely proportional to investment, I . Thus, τ_e would enter Eq. A.2 with a negative sign in the numerator and increase the cost of capital. Firms have incentives to reduce this cost by decreasing emissions, either by switching to greener technologies (i.e., making more green investments as in [Krass, Nedorezov & Ovchinnikov \(2013\)](#) and [Shapiro & Metcalf \(2023\)](#)) and/or decreasing overall output and, by extension, reducing investment. Firms may also avoid environmental taxes either through strategic reporting or regulatory arbitrage (i.e., reallocating activities, which is often framed as “carbon leakage”).

We give a brief overview of the evidence in economics on the impact of environmental taxes on pollution and other economic outcomes. We then focus on the younger literature studying specific firm responses, as this is an area where accounting researchers are particularly well-positioned to contribute to the literature and policy debate given the field’s expertise on measuring and quantifying firm-level transactions and outputs and its understanding of reporting trade-offs. Both the macroeconomic and firm-level evidence can be broadly categorized into (i) the effectiveness of tax policies for reducing emissions, (ii) the consequences for other economic outcomes such as investment, including green technologies, and (iii) tax avoidance issues, including *carbon leakage*.

4.2.2 Macroeconomic Evidence

A relatively large literature in economics has investigated the central question of the elasticity of pollution to environmental taxes, or carbon prices more broadly; see [Rafaty, Dolphin & Pretis \(2020\)](#) and [Metcalf \(2021\)](#) for reviews of this literature. Several studies suggest that taxes that increase carbon prices reduce aggregate pollution ([Rafaty et al. 2020](#), [Andersson 2019](#), [Metcalf & Stock 2022](#)). However, the documented effect sizes vary widely, and the generalizability of the findings remains unclear due to measurement and identification challenges at the aggregate level.³⁹

Another strand of research examines the impact on economic outcomes other than pollution, documenting weakly positive effects on GDP and employment growth ([Metcalf & Stock 2022](#)), no measurable impact on long-run inflation ([Konradt & Weder di Mauro 2021](#)), and

³⁹The general consensus in this literature so far is that carbon taxes are associated with reductions in emissions. However, several studies fail to document economically and statistically significant effects. [Leslie \(2018\)](#) even finds that carbon taxes can *increase* emissions under certain market structures.

labor reallocation from carbon-intensive to more energy-efficient firms (Dussaux 2020). Kaenzig (2022) exploits high-frequency changes in carbon prices due to regulatory changes in the ETS. He documents a temporary decline in economic activity, mostly borne by low-income households, as well as some evidence consistent with firms adopting greener technologies.

The relatively modest effects of environmental taxes on pollution and aggregate economic activity, despite the theoretically large additional tax cost, begs the question of whether polluting entities engage in regulatory arbitrage. A specific concern is carbon leakage, broadly defined as the shift of greenhouse gas emissions from a regulated market, e.g., one country that imposes a carbon tax, to another unregulated market so as to circumvent regulation. Aichele & Felbermayr (2015) and Naegele & Zaklan (2019) provide evidence consistent with a carbon leakage effect using bilateral trade flows by sector after the Kyoto Protocol. Kaenzig, Marenz & Olbert (2023) also provides preliminary evidence that higher carbon prices in Europe, measured based on ETS-based carbon price changes or carbon taxes, are associated with higher pollution levels at the macro level in Africa. However, beyond these two studies, there is little evidence on the leakage effects of specific policies.

4.2.3 Firm-level Evidence

A recent set of studies use different settings in isolation and provide evidence consistent with firms significantly reducing their own emissions in response to higher carbon prices caused by taxes or cap-and-trade systems (Martin, de Preux & Wagner 2014, Dussaux 2020, Colmer, Martin, Muûls & Wagner 2022). Two recent studies use novel firm-level data and thorough identification strategies. Martinsson, Sajtos, Strömberg & Thomann (2024) exploit plant and firm-level emissions document that Swedish firms reduce CO₂ emissions by 2% for every 1% increase in the carbon price due to a higher rate in the Swedish carbon tax rate over a period of 30 years. Aggregated over time, these findings imply that the 2015 emissions of Swedish firms would have been 30% higher in the absence of a carbon tax. Quite in contrast to these large findings, Erbertseder, Jacob, Taubenböck & Zerwer (2023) find a relatively small effect of a 1.2% reduction in firm-level emissions in response to the introduction of a local emission tax in Spain.⁴⁰ While the modest effects at the firm level are consistent with the lower bound

⁴⁰It is hard to directly compare the estimated magnitudes in Erbertseder et al. (2023) and Martinsson et al. (2024) as Erbertseder et al. (2023) exploit the introduction of an emissions tax and use control firms that do not

effects documented in studies at the macroeconomic level (Metcalf & Stock 2022, Rafaty et al. 2020), the variation in the sizes of the documented effects in studies at the firm level indicates that there is a large heterogeneity in the responses of firms to environmental taxes. emission.

The direct empirical evidence on firm-level investment responses to environmental taxes is surprisingly sparse and inconclusive. Earlier work finds either little evidence on firms' real responses or modest reduction in energy consumption (Martin et al. 2014, Dussaux 2020). Jacob & Zerwer (2023) document evidence consistent with substantial firm-level decreases in fixed tangible investments of almost 1 percent in response to the local emissions tax emissions tax in the Valencian community of Spain.⁴¹ Brown, Martinsson & Thomann (2022) provide the first firm-level evidence on technological changes in a cross-country setting, showing that a one standard deviation higher tax on sulfur oxide increases the average firms' R&D expenses by 11%. While Brown et al. (2022) find no effect on innovation outcomes on average, pollution taxes are positively related to new patents in air pollution abatement technologies, suggesting that environmental taxes encourage the development of clean technologies in dirty industries.⁴²

A young stream of research examines if firms reallocate resources in a way that they can avoid paying or bearing environmental taxes while not necessarily reducing emissions or investing in greener technologies. Colmer et al. (2022) document no changes in firm-level economic activity or imports in response to ETS-driven carbon price changes. However, firms may continue to reallocate production within firm boundaries to less regulated markets. A recent strand has used survey data on multinational firms' carbon emissions by geographic region from the Carbon Disclosure Project (CDP), producing inconclusive evidence (Dechezleprêtre, Gennaioli, Martin, Muûls & Stoerk 2022, Ben-David, Jang, Kleimeier & Viehs 2021). The

face any emission tax burden and Martinsson et al. (2024) exploit changes in tax rates over time. However, the estimates in Erbertseder et al. (2023) seem small given that treated firms face a local emissions tax of EUR 9 to EUR 50 per ton in 2013, which is relatively high compared to OECD averages in carbon taxes. Another aspect that complicates the comparison of studies is that Erbertseder et al. (2023) use a very local setting and exploit satellite data to approximate nitrogen oxides (NOx) emissions, while Martinsson et al. (2024) use reported plant-level emissions from administrative filings.

⁴¹Jacob & Zerwer (2023) argue that the effect of environmental taxes is attributable to firms bearing the tax just as in the case of a corporate tax. Relating this argument to the baseline theory, the environmental tax τ_e would be additive in Eq. A.2, i.e., the altered tax rate term τ'_c could be interpreted as $\tau_e + \tau_c$. Jacob & Zerwer (2023) also validate this finding by exploiting two introductions of CO2 taxes in a stacked difference-in-differences design.

⁴²Colmer et al. (2022) also provide evidence that firms in France invested in pollution-reducing technologies in response to higher carbon prices and sustained their level of economic activity. Yamazaki (2022) studies the association between carbon taxes and productivity and provides evidence consistent with value-added through within-firm technological changes based on the introduction of the Canadian carbon tax in 2008.

early evidence in [Kaenzig et al. \(2023\)](#) suggests that multinational firms in heavy industries reallocate polluting activities to their subsidiaries in Africa in response to higher carbon taxes in European countries.

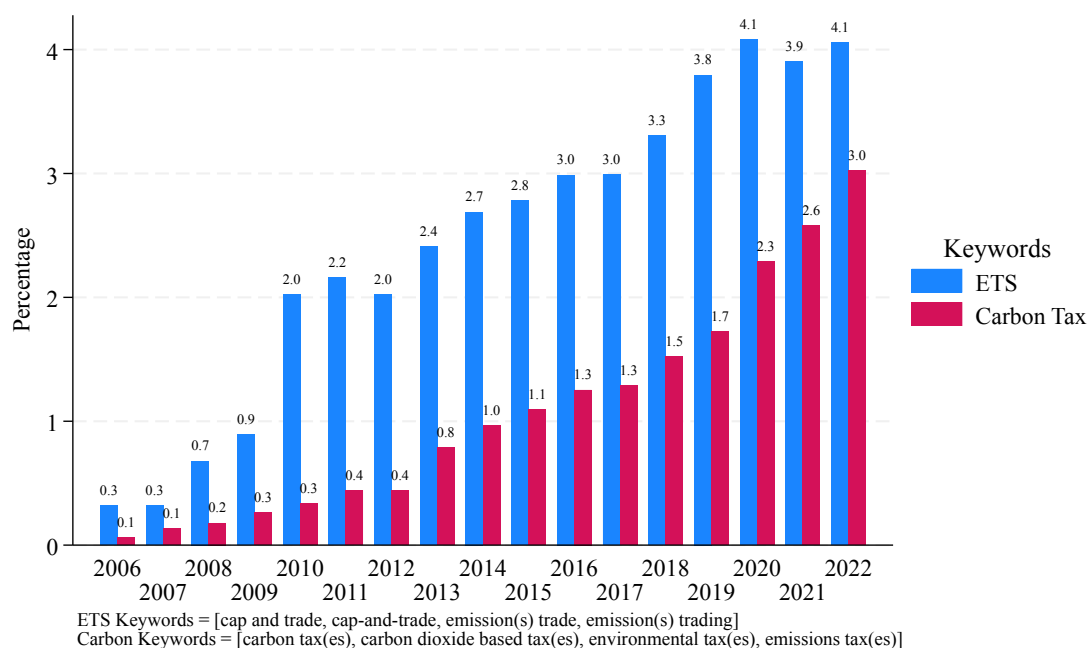
4.2.4 *Synthesis and Implications for Future Research*

Combating the looming climate crisis is at the top of the global policy agenda, and most policymakers and academics consider environmental taxes a key policy tool to reduce global greenhouse gas emissions (e.g., [Weder di Mauro et al. 2021](#)). Therefore, we identify enormous potential for accounting scholars to study firms' responses to environmental taxes. Generally, the evidence in this area across disciplines is young and inconclusive because effective policies have only been introduced recently, and measuring firm-level responses is challenging. However, our exploratory analysis of the universe of Form 10-K annual reports published by U.S. firms in the period 2006-2022 in [Figure 2](#) reveals two facts that highlight potential avenues for future research in accounting. First, for an increasing number of U.S. firms, environmental taxes are financially so material that they warrant specific mentioning (above and beyond general tax policy) in their annual reports. Second, mandatory disclosures can be used to measure firms' exposure to environmental taxes.

Accounting scholars can contribute to the literature by leveraging public and private disclosures to overcome challenges when measuring emissions for a large sample of firms (see [Lu & Nakhmurina \(2022\)](#), [Bolton et al. \(2021\)](#), [Serafeim & Caicedo \(2022\)](#) and [Tomar \(2023\)](#) for such efforts and discussions) and when measuring firms' exposure and responses to environmental policies by combining unconsolidated and consolidated information.⁴³ Accounting researchers can also exploit nuanced settings with available data and policy variation to reconcile conflicting evidence in the literature. For example, [Brown et al. \(2022\)](#) interpret their results as strong evidence for firms' increased investment in green technologies in response to environmental taxes. In contrast, [Jacob & Zerwer \(2023\)](#) documented robust decreases in fixed tangible investment as firms bear larger environmental tax burdens.

⁴³The latter aspect is crucial to distinguish between reporting, avoiding, and aggregate real responses. For instance, it is unclear to what extent a firm's investments in green technologies or changes in emissions measured based on consolidated firm-level information should respond to environmental taxes if the policy change only affects a firm's operations in one jurisdiction but a firm has operations in multiple jurisdictions. That said, recent studies likely document lower-bound effects.

Figure 2: Trend in the Materiality of Environmental Taxes for U.S. Firms



Notes: This figure shows the annual share of Form 10-K annual reports published by U.S. firms that mention carbon price policies (in %). We separately show mentions of cap-and-trade systems (left blue bars) and environmental taxes (right pink bars). The sample includes the universe of Form 10-Ks available on Edgar.

Future accounting research could delve into several important aspects. One aspect relates to the potential costs of climate policies like carbon taxes in terms of economic growth or resource allocation and competitive distortions. Future research could help understand these tradeoffs at the firm level as accounting researchers are uniquely positioned to simultaneously measure firms' responses to tax incentives and their communication about environmental policy risk and benefits. Further, accounting researchers can leverage firm-level insights to offer evidence on mechanisms for changes in environmental outcomes and reconcile findings at the macroeconomic level.⁴⁴ Reconciling existing evidence at the macroeconomic level with firm-level evidence on the mechanisms ultimately explaining the macroeconomic outcomes is particularly important because environmental taxes can lead to the intended goal of reducing emissions through (i) a reduction in economic activity (i.e., firm-level investment), (ii) a within-firm shifts in activities towards greener business models, and (iii) additional investments in greener

⁴⁴If the association between environmental taxes and investment as documented in [Jacob & Zerwer \(2023\)](#) is causal and representative of corporate responses in broader settings, this evidence stands in contrast to the (arguably young) evidence in macroeconomic studies which show no negative and even modest positive associations between environmental taxes and aggregate economic activity.

technologies sustaining the same business model (which would likely not manifest in reduced firm-level investment), or any combination of those three mechanisms. While [Jacob & Zerwer \(2023\)](#) offers some first and intriguing evidence on an important topic, many open questions need to be answered regarding the representatives of the within-Spain setting in [Jacob & Zerwer \(2023\)](#), differential responses across sectors and institutional environments, and other margins of firm responses, such as changes in business models, geographic reallocations.

Two related areas are particularly important to the accounting community: First, future work can build on theory and evidence in other areas of accounting research and investigate whether tax incentives that aim to improve environmental outcomes work better under more transparent reporting regimes and whether firms make reporting choices rather than real changes under new environmental policies (i.e., tax incentives could trigger greenwashing or strategic reporting). Second, researchers can build on prior work in accounting on specific settings and policies that resemble those that give rise to several policy-relevant but unaddressed questions around environmental taxes. For example, the issue of carbon leakage is similar to tax avoidance, and there could be a market for tax havens for environmental issues ([Levinson 2008](#)). Further, the institutional arena to be investigated spreads far beyond the most salient carbon tax rates. Firms likely make real and reporting responses to carbon trading schemes, subsidy regulations like the U.S. IRA, more nuanced regulations like taxes aimed to stimulate the circular economy (plastic taxes), deforestation, or water cleanliness, or tax incentives targeted at consumers who may alter their product choice as in the case of electric vehicles ([Giese & Holtmann 2023](#)).

4.3 Indirect Real Effects: Externalities of Tax Policy through Firms' Responses

4.3.1 Theoretical Underpinnings and Overview

Tax policy can induce competitive externalities if firms directly affected by tax changes potentially alter their real actions in a way that changes their competitive situation vis-a-vis firms that are not directly affected by the tax changes. The theoretical prediction for the tax policy effects on the indirectly affected firms' outcomes can be derived from the economics literature and depends on the final nature of competition and product markets ([Tirole 1988](#)). Consider the case of tax cuts. On the one hand, directly affected firms may use the cash savings to increase

investment or engage in other behavior that improves their competitive situation (e.g., marketing spent). In a perfectly competitive market, indirectly affected peer firms will adjust by either cutting expenses, cutting investment in the short run, or possibly even *increasing* investment to not lose out in the longer run. On the other hand, tax benefits might significantly increase the market power of the directly affected firms, such that the performance of indirectly affected firms can suffer, leading to lower profits. These firms may eventually exit the market.

We review the emerging literature in accounting that exploits different settings to study how tax policies, and firms' responses to these policies, induce changes in competition.

4.3.2 *Competitive Effects of Taxation*

[Gaertner, Hoopes & Williams \(2020\)](#) provide indirect evidence on tax reforms' competitive externalities by documenting negative stock price changes of non-U.S. firms around the U.S. 2017 TCJA. The authors infer that investors expect negative impacts of the U.S. tax cuts on the future profitability of foreign competitors (in particular, Chinese firms in steel, business equipment, and chemical manufacturing). Several recent studies focus on the specific competitive mechanisms behind the tax policy externalities, leveraging empirical designs that compare outcomes of firms with greater exposure to peer firms to firms with less exposure to such firms. This approach helps to control for classical confounding factors correlated with changes in tax policies, thereby permitting stronger inferences.

[Kim, Nessa & Wilson \(2021\)](#) develop a measure of U.S. manufacturing firms' exposure to foreign tax policy through import competition and document that firms more strongly exposed to foreign tax cuts use more competition-related words in their 10-Ks, suggesting that favorable home country tax policies foster the competitive position of domestic firms operating in foreign markets. Further, their evidence indicates that U.S. firms decrease their price-to-cost margins and thus seem to lose their competitive edge following an increase in exposure; but the same firms also increase capex, suggesting that greater competition increases firm investment. Focusing on a specific U.S. tax law change that disparately affected domestic firms within the U.S., [Donohoe, Jang & Lisowsky \(2022\)](#) also provide evidence consistent with tax cuts inducing competitive effects.⁴⁵ Specifically, this study uses the repatriation tax holiday under the

⁴⁵Using a similar empirical strategy, [Armstrong, Glaeser & Kepler \(2019\)](#) show that U.S. firms reduce their effective tax rates after peer firms have easier ability to engage in tax avoidance due to favorable foreign tax cuts

American Jobs Creation Act of 2004 (AJCA) and shows that several measures of firms' operating performance decrease after the reform, if firms compete against peer firms that benefit from low-tax cash repatriations. Several cross-sectional results support the interpretation that windfall tax benefits stimulate predatory behavior by tax-advantaged firms.

[Glaeser, Olbert & Werner \(2023\)](#) extend this U.S.-based evidence. They start by showing that tax rate cuts in European countries induce domestic producers to export more; furthermore, multinational firms increase their foreign subsidiary-level investment. [Glaeser et al. \(2023\)](#) then show that the employment of European domestic firms decreases in response to exposures to foreign tax rate cuts via both import competition and direct competition from foreign-owned peer firms in home markets.

4.3.3 Synthesis and Suggestions for Future Research

So far, the literature on indirect real effects of taxation has focused on tax policy changes in foreign markets. We encourage researchers to extend this field by studying other settings. The research discussed in other sections of our review points to economically meaningful direct real responses by firms to taxation. Further, and tax disclosure mandates and tax enforcement likely have wide-ranging informational and real effects. Therefore, it is likely that such tax policy changes trigger a host of indirect and so-far understudied consequences of taxation (see, e.g., [Gallemore & Jacob 2020](#) on local tax enforcement and bank lending).

The conclusive evidence from the reviewed papers is that tax cuts in one country affect the investment and performance of firms not directly targeted by the tax cut. Besides the main effect being pronounced among firms more exposed to general competitive forces and less able to weaver competition, little is known about the specific competitive actions by firms that enjoy tax benefits in their home countries. Future research providing more direct evidence could yield intriguing insights on firms' use of cash tax savings to engage in predatory behavior. Leveraging recent advances in textual analysis via large language models, accounting scholars could potentially detect such actions from management guidance or other voluntary disclosures on capex and other firm activities at the time around tax policy changes. Further, additional

in Ireland. Although this study does not specifically examine real outcomes or operating performance, lower ETRs ultimately increase net margins, highlighting possible competitive externalities (see also [Bird et al. \(2018\)](#) and [Bauckloh et al. \(2021\)](#) for consistent evidence using other empirical settings).

evidence would help evaluate the findings in the reviewed papers that appear economically very large given how much policymakers are typically willing to do to induce a small growth in domestic investment or employment. In this vein, future research could also investigate whether tax-induced competition is potentially welfare increasing in the long run despite short-run negative effects on domestic firms' employment (e.g., if the least productive firms decrease their activity and exit the market).

5 Other Emerging Topics and Methodologies

5.1 Tax Avoidance and Real Effects

5.1.1 Theoretical Underpinnings and Overview

Responding to the call for research in [Hanlon & Heitzman \(2010\)](#), researchers have produced a wealth of evidence on the determinants of corporate tax avoidance, typically measured using effective tax rates or other proxies from consolidated financial statements. However, it is not well studied whether and how firms' tax avoidance behavior impacts firms' real outcomes beyond tax payments relative to reported income ([Dyreg & Hanlon 2021](#), [Jacob 2022](#), [Wilde & Wilson 2018](#)). Evidence on such real outcomes is necessary not only to evaluate the costs and benefits of anti-tax avoidance regulations, but also to better understand the general equilibrium effects of taxation. The reason is that governments may be willing to accept relatively low effective tax rates of individual firms for the sake of larger tax bases and economic growth associated with positive investment effects (e.g., [Olbert & Severin 2023](#)).

Accounting researchers have recently proposed theoretical frameworks for studying the relationship between tax avoidance and other economic outcomes of firms. [Reineke, Weiskirchner-Merten & Wielenberg \(2023\)](#) examine real outcomes when firms decide simultaneously on investment and tax avoidance. Their model predicts that these outcomes depend on anti-avoidance rules and their enforcement that jointly determine firms' tax avoidance opportunities. The key takeaway is that underinvestment arises due to tax authorities' strategic audit decisions and firms' anticipation of such choices in their investment decisions. However, because stricter anti-avoidance rules restrict firms' tax avoidance opportunities and corresponding audit risk, stricter rules can increase investment incentives, thereby making underinvestment less severe. [Dyreg, Jacob, Jiang & Müller \(2022\)](#) posit and show that the level of tax avoidance depends

on the level of tax incidence. Specifically, a firm that bears more of a given tax will alter real actions more if this tax changes. At the same time, the model in [Dyreng et al. \(2022\)](#) would predict that the same firm will also avoid more of that tax. Thus, tax avoidance could have a mediating effect on the relationship between tax policy and firms' real outcomes.

5.1.2 Tax Avoidance, Firms' Information Environment, and Real Effects

Tax avoidance can have varying real and firm value effects through the effects of a firm's information environment on asset prices (see [Bond, Edmans & Goldstein 2012](#) for a review). Specifically, financial reporting quality impacts the efficiency of market prices to predict future cash flows. As financial reporting quality is often negatively associated with tax avoidance actions ([Balakrishnan, Blouin & Guay 2019](#)), it is important to understand how tax avoidance actions shape a firm's information environment and how the market perceives these actions correspondingly.⁴⁶ While [Balakrishnan et al. \(2019\)](#) do not study subsequent effects on market valuations, [Wilson \(2009b\)](#) and [Inger, Meckfessel, Zhou & Fan \(2018\)](#) provide suggestive evidence consistent with the notion that investors discount (value) tax avoidance when they provide less (more) transparent financial disclosures. [Chen, Hepfer, Quinn & Wilson \(2018\)](#) extend this evidence by documenting a negative relationship between cross-border income shifting and corporate transparency. Collectively, the evidence is consistent with theory and suggests that firms can mitigate negative investor perceptions and subsequent capital allocation issues of aggressive tax strategies by providing high-quality disclosures.

5.1.3 Real Effects Associated with Tax Avoidance Actions

Evidence from studies on the capital market outcomes associated with tax avoidance suggest that tax avoidance comes with other corporate outcomes that have firm value implications

⁴⁶The results in [Balakrishnan et al. \(2019\)](#) are economically meaningful as a one-standard-deviation higher value in firms' tax avoidance proxies is associated with approximately 20% greater financial reporting transparency issues. Consistent with the findings in [Balakrishnan et al. \(2019\)](#), [Wilson \(2009b\)](#) and [Lisowsky \(2010\)](#) show that tax-aggressive firms using tax shelters as observed in confidential IRS data are likely to have more opaque financial reporting environments. Two studies provide more direct evidence on the channels through which firms with higher measures of tax aggressiveness likely reduce the transparency of their disclosures. [Chychyla et al. \(2022\)](#) find that the likelihood of using the percentage instead of U.S. dollar format tax reconciliation table and of mentioning the effective tax rates in the qualitative part of 10-Ks is lower for firms with low GAAP ETRs (three-year average ETR below 20 percent). [Inger et al. \(2018\)](#) show that the Fog index of qualitative tax footnotes in 10-Ks is significantly higher (i.e., the footnotes are more complex and less readable) for firms with below-industry-median three-year ETRs. Consistent with these less transparent disclosures likely being associated with future investment effects, [Inger et al. \(2018\)](#) also show suggestive evidence of investors discounting firm value when firms disclose lower ETRs and provide less transparent tax footnote disclosures.

beyond the pure cash flow effect of relatively lower tax payments. A large body of work examines the relationship between tax avoidance and firm risk as perceived by market participants. This evidence is mixed. Some studies find a negative or no association (e.g., [Goh et al. 2016](#), [Guenther et al. 2017](#)), consistent with the cash flows from tax avoidance having less risk than overall cash flows. Other studies find a positive association (e.g., [Heitzman & Ogneva 2019](#), [Lewellen et al. 2021](#), [Donelson et al. 2022](#)), consistent with firms engaging in greater tax avoidance being exposed to greater tax uncertainty and cash flow risk ([Dyreng et al. 2019](#)).⁴⁷ [Hutchens, Rego & Williams \(2024\)](#) reconcile these findings using latent class models to show that the relationship between tax avoidance and priced risk and idiosyncratic risk differs across subsamples of firms. Overall, these findings suggest that firms engaging in tax avoidance through riskier tax positions have more volatile stock returns.

One strand of research shows that investors' concerns regarding managerial rent extraction likely explain lower valuations for firms engaging in tax avoidance. [Desai et al. \(2007\)](#) establish this result in theory and [Atwood & Lewellen \(2019\)](#) provide supporting empirical evidence for firms operating in tax havens with weak investor protections. Consistent with this notion, [Kim, Li & Zhang \(2011\)](#) show that firms avoiding taxes also engage in obfuscation and rent extraction such that bad news accumulates until revealed, leading to an elevated stock price crash risk. The stock market tests in [Blaylock \(2016\)](#) provide inconsistent evidence that challenges this interpretation, at least for the average large U.S. firm with weak governance. However, [Bennedsen & Zeume \(2018\)](#) show that investors are predominantly concerned about rent extraction and reward firms for greater transparency even if they employ complex tax avoidance strategies in tax havens. Collectively, these findings demonstrate that some firms sacrifice good governance and transparency practices when engaging in tax avoidance, consistent with the findings in [Balakrishnan et al. \(2019\)](#) and [Lewellen \(2023\)](#), while other firms are well governed and manage to create value through more tax avoidance, consistent with the theory in [Desai & Dharmapala \(2009\)](#) and the survey evidence in [Armstrong, Blouin, Jagolinzer & Larcker \(2015\)](#) for low levels of tax avoidance.

⁴⁷[Hasan et al. \(2014\)](#) document a robust positive association between tax avoidance and bank loan and bond spreads, consistent with the interpretation that tax avoidance entails future cash flow risk. See also [Shevlin et al. \(2020\)](#) and [Platikanova \(2017\)](#) for similar evidence when studying the cost of debt capital.

Another set of studies provides evidence on firm outcomes that are typically associated with greater tax avoidance activities. These studies shed light on the average characteristics of firms after their tax avoidance increases without attributing any causal relationship between tax avoidance and other firm outcomes. [Green & Kerr \(2022\)](#) study firms' use of cash generate likely resulting from tax avoidance activities. For the average international firm, they document that firms make investments or repurchase shares rather than paying dividends out of cash tax savings. [Olbert & Severin \(2023\)](#) show that greater tax avoidance moves in parallel with firm performance and fixed capital investment after firms undergo private equity buyouts. These results are broadly consistent with the theory in [Desai & Dharmapala \(2009\)](#) given that private equity firms likely impose superior governance structures. [De Simone, Klassen & Seidman \(2022\)](#) show that multinational firms engaging in more aggressive cross-border income shifting exhibit a lower investment-to-investment-opportunities sensitivity. The authors interpret their findings as evidence consistent with tax avoidance, in the form of income shifting, coming at the cost of less efficient international investment.⁴⁸

A fairly recent set of studies examines whether the cash savings from corporate tax avoidance have implications for the future competitive positions of firms. [Gallemore, Maydew & Yoder \(2024\)](#) provide evidence that U.S. “*superstar*” firms, identified based on market share and profitability, do not appear to engage in more tax avoidance than their peer firms. [Gaertner, Glover & Levine \(2023\)](#) provide somewhat conflicting evidence, showing that large firms, on average, benefit from lower effective tax rates. [Martin, Parenti & Toubal \(2022\)](#) proposes a model and empirical evidence suggesting that greater tax avoidance increases firms' sales. The key channel is that tax-avoiding firms can expand their activity due to lower marginal costs, leading to greater market shares of large tax-avoiding firms. In sum, the important question of whether superstar firms pay relatively low taxes, or whether the tax system favors the rise of monopolist firms, is unanswered. The main challenges in addressing this question are over-

⁴⁸As the authors note, establishing this direct causal link is challenging, and more work is needed. Broadly consistent with the evidence in [De Simone, Klassen & Seidman \(2022\)](#), [Traini et al. \(2022\)](#) show that firms with higher levels of tax avoidance make poorer labor investment decisions. Further, the results in [Chyz & Gaertner \(2018\)](#) suggest that greater tax avoidance leads to a higher likelihood of CEO turnover. The authors attribute the findings to personal reputational risk for managers associated with firm-level tax avoidance. However, CEO turnover could also be due to concomitant effects of tax avoidance discussed in this section, in particular given the evidence on stock market outcomes of tax avoidance as stock prices are tied to CEO labor outcomes.

coming simultaneity issues when studying effective tax rates and firms' market power and disentangling the declining trend in multinational firms' foreign tax rates from pure performance or size-related factors (Rego 2003, Dyreng et al. 2017).

5.1.4 *Synthesis and Suggestions for Future Research*

Several studies have documented economically significant associations between firms' tax avoidance outcomes and their financial reporting quality and highlight specific channels through which tax avoidance influences firms' information environment, in particular measured based on investor perceptions. Although it is hard to establish a causal link between tax avoidance actions and financial reporting transparency (e.g. Chen et al. 2018), we encourage researchers to take advantage of granular data and comprehensive identification strategies to further examine the specific disclosure choices firms make when minimizing taxes and the real effects associated with changes in the information environment of firms related to tax avoidance. For example, an open question is whether firms change investment strategies as they consider market feedback (e.g., Bond et al. 2012, Jayaraman & Shuang Wu 2020) when this market feedback is in response to tax avoidance-related reporting behavior.

The collective evidence on tax avoidance and equity prices suggests that tax risk is one explanation for greater valuations of firms engaging in tax avoidance as investors demand equity premiums for risky stocks. Further, the literature suggests that investors are concerned about managerial rent extraction for tax-avoiding firms. This empirical result is likely due to the fact that the same firm characteristics like tax haven operations and opaque legal structures can facilitate both rent extraction and tax avoidance.

There is only limited direct evidence on investment and other real outcomes associated with tax avoidance actions. Although some studies point to the importance of high-quality governance for simultaneously effective tax and investment strategies (Armstrong et al. 2015), much more research is needed. Due to the endogenous and simultaneous nature of tax avoidance and investment decisions, we encourage researchers to employ research designs that isolate shocks to firms' tax avoidance opportunities that are likely independent of future investment decisions. Further, building on relatively clear theoretical predictions as in Reineke et al. (2023) would be

particularly useful given the identification challenges for empirical research.⁴⁹

5.2 *Advances in Research Design*

5.2.1 *Cross-border Income Shifting and the Measurement of Real Effects*

Multinational firms' tax avoidance via cross-border income shifting is a longstanding and important policy issue. Unsurprisingly, the empirical literature is extant and spans the fields of accounting, finance, and economics (Dyreng & Hanlon 2021). However, the documented results so far do not provide a clear picture of absolute tax revenue losses and taxes saved by specific firms. A key reason is that researchers cannot observe the *true* pre-tax income by jurisdictions and must estimate counterfactuals. This measurement challenge applies to firm-level studies and aggregate macro-estimates. Recent studies have advanced our awareness of measurement issues.

Blouin & Robinson (2021) point out the importance of correctly using firm and subsidiary-level data on reported income, with a focus on U.S. firms' affiliate-level data from the BEA. The key message is that researchers must carefully interpret reported pre-tax income figures of a subsidiary in a given country (subsidiary A), as these might include income that is also reported as pre-tax income of a subsidiary incorporated in another country but owned by the former subsidiary. Typically, such holding entities like subsidiary A are incorporated in countries with favorable corporate and capital markets regulation, which often coincide with preferential tax rules. In such a case, interpreting subsidiary A's unadjusted pre-tax income would include dividend income from the majority-owned subsidiary and thus overestimate income shifting activities. This issue can pervade at the macroeconomic level, as administrative macro data are often sourced from firm-level reports.

At the macroeconomic level, Guvenen, Mataloni Jr, Rassier & Ruhl (2022) show how firms' reporting choices impact statistics like GDP and returns on FDI. Specifically, they show that firms' tax-motivated reporting of pre-tax income in tax-favorable jurisdictions results in overstated returns on FDI in these countries and understated returns on FDI in the U.S. and other

⁴⁹Specifically, one empirical strategy could be to exploit market reactions to regulatory changes that affect tax avoidance opportunities conditional on ex-ante firm-specific characteristics as such shocks can be identified in narrow high-frequency asset pricing settings and then be used as an instrument for future real effects (e.g., Gómez-Cram & Olbert 2023).

high-tax jurisdictions.⁵⁰ In a recent paper, [Dyreng, Hills & Markle \(2023\)](#) make innovative use of U.S. firms' 10k disclosures on foreign income and Exhibit 21 subsidiaries to estimate taxable income shifted out of the U.S. and booked in tax havens by firm and year. After aggregating their firm-year estimates, [Dyreng, Hills & Markle \(2023\)](#) also show that macroeconomic estimates of income shifting (to tax havens) are likely overstated and likely driven by a small number of very large firms in the IT and pharmaceutical industries.

We believe there is much more potential for future contributions by accounting scholars to address measurement challenges, in particular with respect to the total amount of pre-tax income shifted per firm, per country and between country pairs. Accounting researchers can build on [Blouin & Robinson \(2021\)](#) and [Güvenen et al. \(2022\)](#) and leverage their institutional expertise to propose methodologies to cleanly measure income shifting and other reporting choices at the firm level and translate those into aggregate data, as aggregate data are often used for policy-making and research.⁵¹

5.2.2 *Difference-in-Differences Designs*

Econometricians have recently highlighted issues and recommendations when employing difference-in-differences (DiD) strategies (see [Roth et al. 2023](#) for an overview). DiD designs are key in empirical tax research, as tax policies often affect firms differentially. Even if thoroughly implemented, standard DiD designs can face at least two challenges. First, if treatment timing varies across treated groups, using already treated units as control units can bias DiD estimates. Staggered treatment timings are common in tax research. For example, tax rate changes occur in different years across jurisdictions or disclosure regimes like schedule UTP

⁵⁰Similarly, standard country-level FDI measures often reflect multinational firms' overstated capital or profits in tax havens which relate to real activity of affiliated parent entities in other countries (e.g., [Janský & Palanský 2019](#) and [Damgaard, Elkjaer & Johannesen 2019](#)). [Güvenen et al. \(2022\)](#) develop a methodology to reattribute returns on FDI to the countries of origins absent income shifting and when accounting for the double counting issues raised in [Blouin & Robinson \(2021\)](#).

⁵¹Cross-validating income shifting estimates based on firm-level data with more aggregate data is also helpful to provide a better economic interpretation of results. Such approaches can also provide incremental and new insights on the relationship between shifted tax bases and actual real activities. This is important because more traditional approaches using firm-level financial accounting data fail to disentangle these two dimensions. For example, [De Simone & Olbert \(2024\)](#) and [Gómez-Cram & Olbert \(2023\)](#) benchmark data from multinational firms' CbCR reports to the Worldbanks' data on country-level household consumption and show that the ratio of reported external revenues and profits relative to domestic household consumption varies systematically across countries in the sense that tax-favorable jurisdictions.

are gradually phased in for different groups of firms.⁵² As an example, [Welsch \(2023a\)](#) employs a stacked-cohort DiD design to alleviate staggered treatment timing issues when estimating the impact of U.S. states' adoption of market-based tax base allocations on labor outcomes. The study mentions that a standard DiD design produces coefficients that are slightly larger, pointing to the importance of addressing variation in treatment timing for inferences. Second, results might be sensitive to parallel trends violations even if researchers estimate statistically insignificant pre-trends ([Rambachan & Roth 2023](#)). As an example, [Olbert & Severin \(2023\)](#) follow [Rambachan & Roth \(2023\)](#) and estimate that differences in pre-trends would need to change by more than 4% across consecutive periods in the post-period to invalidate the inferences regarding the impact of private equity buyouts on local public finances. This sensitivity test gives the reader intuition for the economic relevance of parallel trend violation and helps assess the DiD-based inferences.

Another issue for the interpretation of DiD estimates is that control units are also (in)directly affected by the treatment (i.e., a violation of the stable unit treatment values assumption (SUTVA)). Several studies point to this issue in tax research. For example, tax avoidance actions can have peer effects, and tax policies affect firms not subject to the actual tax law through competitive interactions (e.g., [Armstrong, Glaeser & Kepler \(2019\)](#), [Donohoe et al. \(2022\)](#)). [Berg, Reisinger & Streitz \(2021\)](#) propose an approach to disentangle the effects of tax policies or other shocks on directly treated and (arguably) untreated control firms. [Hoopes et al. \(2023\)](#) implement this approach when comparing the effect of the U.K. tax reform on U.K. versus French firms' foreign investment. They show that positive spillover effects on French control units are likely material if U.K. firms have a large market share. This finding shows that the tests suggested in [Berg et al. \(2021\)](#) are important to inform policymakers about the differential effects of tax policies on different economic agents and precisely estimate policy treatment effects.

To assess the overall effect of a tax policy, researchers should also consider expanding firm-level analyses by using aggregate outcomes. This approach will capture direct and indirect spillover effects and is relevant if researchers aim to inform regulators who may be less inter-

⁵²Several papers discuss these issues and applications in detail, e.g., [Athey & Imbens \(2022\)](#), [Barrios \(2021\)](#), [Baker et al. \(2022\)](#) and, relevant for tax researchers, [Clair & Cook \(2015\)](#) for public finance applications.

ested in average effects across firms but be more concerned about aggregate outcomes in the economy (see [Breuer \(2021\)](#) for a discussion). As an example, [Glaeser et al. \(2023\)](#) show that tax competition through lower tax rates in foreign countries not only reduce employment of the average domestic firm but have broader effects at the domestic industry level.

5.2.3 *Exposure Designs*

Shift-share designs or so-called Bartik instruments are increasingly popular among empiricists to overcome endogeneity concerns inherent to, for example, standard DiD designs ([Goldsmith-Pinkham, Sorkin & Swift 2020](#)). [Breuer \(2022\)](#) provides a thorough discussion of Bartik-based designs for accounting research. The basic idea is to exploit the differential impact of a common shock on treated and control firms, similar to DiD designs. However, Bartik instruments typically exploit continuous treatment exposures and use exposures based on characteristics of treated units measured as of before, and ideally independently of, the policy shock. Consequently, the instrument's variation is less likely to be driven by reverse causality or simultaneity (e.g., tax policy changes due to or in anticipation of firms' tax avoidance or investment patterns). Bartik instrument-based strategies could be a powerful in tax research as there is often ex-ante heterogeneity in the extent to which firms, industries, or regions are affected by a certain tax policy change. Some of the analyses in [Kim et al. \(2021\)](#), [Fox et al. \(2022\)](#) and [Glaeser et al. \(2023\)](#) are examples of exposure-based continuous tax policy treatment designs although the exposure shares are not always pre-determined. A more direct application is the main design in [Garrett et al. \(2021\)](#). They study local labor market effects of U.S. tax law changes using exposures of U.S. counties based on the number of firms affected by the law changes and operating in the respective counties.

5.2.4 *Outcomes with 0s and Count Data*

Tax researchers frequently study (count nature) outcome variables that can take zero values. A common approach is to use the logarithmic transformation of one plus the raw outcome as the dependent variable in regressions and interpret the coefficients of interest in percentage terms. [Chen & Roth \(2023\)](#) show theoretically and empirically that the percentage approximation is problematic. The reason is that log-based results can be strongly sensitive to the units of the raw variables, in particular if responses to changes in the dependent variable of interest

happen along the extensive and intensive margins. This finding is important for tax research as firms often respond along the extensive and intensive margins (e.g., whether and how many subsidiaries to disclose or whether and how to engage in M&A activity; [Dyrenge et al. 2020](#), [Harris & O'Brien 2018](#)). Further, researchers' goals are often to quantify the economic costs and benefits of tax reforms for regulators or investors, which stresses the importance of valid economic interpretations of regression estimates. As remedies, [Chen & Roth \(2023\)](#) suggest using Poisson estimations, separately estimating intensive and extensive margin effects, or assigning a value for extensive margin effects relative to intensive margin effects. [Cohn et al. \(2022\)](#) recommend Poisson fixed effects regressions when dealing with count data in general, and recent studies in tax accounting have followed this recommendation (e.g., [Fox et al. 2023](#), [Ferguson et al. 2023b](#), [Richter et al. 2023](#)).

5.2.5 *Synthesis and Suggestions for Future Research*

We encourage researchers to follow recent examples and consider the recommendations from the methodological literature to foster the credibility and improve the exposition of results in future empirical tax research.⁵³ We stress that not all empirical research in tax requires tight causal identification but that it is important to transparently discuss identification challenges and take a stance on whether a study provides descriptive insights or whether the goal is to establish causality.⁵⁴ There can be substantial value in descriptive studies that address important and understudied topics and provide readers with novel facts by thoroughly analyzing correlations, trends, and other patterns in high-quality datasets (see also [Armstrong et al. \(2022\)](#) for a discussion). However, researchers interested in the real effects of taxes often ask causal questions to assess policies or estimate elasticities, at least implicitly (e.g., in [Lester 2019](#), [De Simone & Olbert 2022](#), [Joshi 2020](#)). As in other fields of accounting studying policy

⁵³Other recent methodological advantages that we do not discuss here but are potentially useful for tax accounting research are alternative approaches to extract exogenous variation in tax policy, such as the narrative approach from [Romer & Romer \(2010\)](#) that is recently applied in [Cloyne et al. \(2023\)](#) and discussed in [Welsch \(2023b\)](#). This approach could be useful for firm-level studies based on accounting data. Further, bunching estimation techniques as in [Hugger \(2024\)](#) or kink designs are potentially powerful methodologies in for future work in tax accounting. For example, the size thresholds imposed by the CbCR and OECD Pillar 1 and 2 rules lend themselves to bunching designs that may provide an understanding of what companies are willing to sacrifice to avoid tax disclosures and/or continue to save taxes under existing tax avoidance opportunities.

⁵⁴For example, the evidence in [Rao \(2015\)](#) on employment reallocations after corporate inversions is likely not causal but provides important and striking descriptive insights that deserve further attention to draw strong conclusions and inform policymakers and other stakeholders.

questions, this type of research should use the most suitable empirical approaches for credible identification and carefully interpret the underlying variation and coefficient estimates to inform policymakers and researchers across disciplines (Breuer & deHaan 2024).⁵⁵

We conclude with three general recommendations. First, approaching empirical studies with a design-based approach as described in Leuz (2022) and relying on clear theoretical predictions can be particularly fruitful for tax accounting research due to the richness of informational and institutional nuances.⁵⁶ Second, we encourage researchers to triangulate main results using alternative alternative data sources as well as combining narrow empirical strategies with high internal validity and broader, potentially less stringent designs. As recommended in Armstrong et al. (2022), such approaches can be particularly helpful in the absence of clearly exogenous treatment variation, which is likely the case in many tax policy settings. Recent examples are Belnap (2023) who combines a field experiment with survey data to validate mechanisms, Langenmayr & Lester (2018) who use both a narrow, single-country regression discontinuity design and a cross-sectional design based on an international sample to stress the internal and external validity of their results, or Joshi et al. (2023) and De Simone & Olbert (2024) who use subsidiary-level financial data from Orbis and administrative bilateral data to address measurement challenges.

Finally, we encourage tax researchers to make more extensive use of visualizations. Transparently visualizing patterns in raw data, using graphs to illustrate identification strategies and institutional settings, and plotting instead of tabulating (DiD) estimates can make results more

⁵⁵Often, research questions in tax research are not entirely new given the state of the literature and the relatively sticky nature of tax system design, which sometimes raises questions about a study's incremental contribution. However, building on earlier work and tightening the research design can be a valuable contribution in research on the real effects of tax policies in particular. The reason is that the questions are usually very policy-relevant and can add significant social value. However, the mere accumulation of studies in one area does not help fully answer a policy question if existing research still suffers from identification and measurement problems (Leuz 2022). Thus, we encourage researchers to improve upon existing work in terms of data and identification if the work tackles first-order questions. Likewise, we hope journal reviewers acknowledge the importance of such work even if existing results are not necessarily overturned.

⁵⁶For instance, when researchers study the effects of public Country-by-Country reporting, it will not only be crucial to develop an identification strategy that exploits plausibly exogenous variation. Instead, it will also be key to articulate the useful and potentially problematic variation that remains (e.g., the informational situation of firms before the disclosure mandate, differences across listed versus private firms, or differences across firms facing different regulators or consumer markets). For a thorough discussion of the remaining variation after the inclusion of a stringent set of fixed effects see, for instance, Bethmann et al. (2018). A good example for a clear theory to test would be the model Reineke et al. (2023) which predicts how changes in anti-tax avoidance of tax enforcement affect firm's investment in certain assets or countries.

credible and accessible to a broad readership across disciplines, which is crucial for research on the real effects of taxation to have impact. At the same time, we believe that visualized data patterns do not always need to look perfect, (e.g., not-so-parallel pre-trends), given that researchers can motivate sensitivity tests and discuss valid explanations based on the observed data patterns. Examples in tax accounting research are [Amberger et al. \(2021\)](#) who illustrate how their research designs compares subsidiaries located in the same country but owned by different multinational firms, [Chyz \(2013\)](#) who visualizes sample partitioning based on institutional characteristics, [Olbert & Severin \(2023\)](#) who visualize nearly all DiD results on private equity buyouts firm-level aggregate public finance outcomes, and [Coles et al. \(2022\)](#) who show excellent graphs to explain their identification using kinks based on firms' marginal tax rates.

5.3 *ESG and Firms' Responses to Taxation*

5.3.1 *Theoretical Underpinnings and Overview*

Firms' tax affairs and their disclosures have become an important part of the ESG debate, in particular for firms exposed to mandatory disclosure regulations and pressure from stakeholder groups to voluntarily report on their ESG performance. However, to date, there is no clear theory or conceptual framework for how stakeholders, shareholders, or managers consider tax issues as part of a firm's broader ESG strategies ([Bonham & Riggs-Cragun 2022](#)).⁵⁷ Within the framework of our review, we identify three ESG aspects that span firms' responses to taxation.

First, governments, shareholders, and other stakeholders increasingly consider firms' tax payments as a social outcome of ESG activities, since tax payments contribute to public finances which ultimately serve society.⁵⁸ As firms are increasingly assessed on their tax contribution as part of their ESG performance, credibly communicating that a firm pays what is perceived as a fair share becomes a more important corporate strategy. Relatedly, ESG-related transparency regulations make many aspects of firms' tax affairs a publicly observable matter,

⁵⁷We thank the keynote speaker, Alenka Turnsenk, and participants at the 2023 LBS-Stanford Global Tax Conference as well as Irina Luneva for their valuable input on the discussion of the framework around firms' ESG and tax strategies. [Bonham & Riggs-Cragun \(2022\)](#) develop a theoretical model showing conditions under which tax policy can effectively drive ESG outcomes.

⁵⁸Legal scholars see tax strategies as an integral part of ESG behavior ([Hongler et al. 2021](#)), and this conception is seemingly shared among industry practitioners (see, e.g., PwC's thought pieces and website marketing material [here](#)). The KPMG tax advisors [Janowak & Global \(2021\)](#) provide some evidence on institutional investors driving responsible tax strategies in investee companies. [Cowan & Cutler \(2023\)](#) even question whether ESG-minded firms should make use of tax incentives provided by local governments as exploiting the associated benefits can constrain local public finances.

which represents a shift compared to the traditional setting of tax (return) secrecy. To accelerate this trend, investors and academics have made the case for more tax-specific transparency (Rajgopal 2020, Kaplan & Ramanna 2021, Rajgopal 2022 and GRI 207). Thus, firms will likely reconsider their mandatory and voluntary tax disclosures and actual tax strategies.

Second, tax policy and disclosure regulations are widely considered to stimulate sustainable business practices. As discussed in the case of carbon taxes in Section 4.2, a tax on a certain outcome that regulators perceive to have negative ESG characteristics reduces the marginal return to investment choices that drive these outcomes (i.e., a lower MPK in Eq. A.2). Such a Pigouvian-type tax would be an additional tax τ_{esg} on using certain inputs, for example, labor inputs that deviate from a regulator's desired workforce composition, at a rate likely proportional to investment, I . Thus, τ_{esg} would enter Eq. A.2 with a negative sign in the numerator and increase the cost of capital. Firms have incentives to reduce this cost by altering the respective ESG outcomes.⁵⁹ The theoretical argument behind disclosure mandates is that they possibly allow market forces to drive corporate change (e.g., investor and other stakeholder pressure in response to greater transparency; Christensen, Hail & Leuz 2021).

Third, as the voluntary ESG reporting landscape, firms also have an incentive to reconsider their voluntary tax disclosures to address the demand for information by a wide variety of stakeholders. Although disclosures are often related to real outcomes, it is unclear how these often strategic disclosures inform about real activities driving tax-related sustainability outcomes and whether they are informative to the addressees.

We review the early work in these three areas, incorporating relevant findings from prior work studying the effects of tax and non-tax disclosure regulations. We then identify avenues for future research based on the notion that firms will likely not pursue ESG (disclosure) strategies in isolation but make changes to their real operations that improve sustainability and maximize firm value in the long-run (Edmans 2023, 2024).

⁵⁹The effectiveness of taxes as a policy tool is apparent for the environmental component, as executives view carbon tax policies as the most powerful driver of change in firms' environmental behavior (Stroebel & Wurgler 2021), and governments around the world have introduced respective policies. We review empirical studies on the effects of environmental taxes in Section 4.2. There are also arguments for a broader system of taxing or subsidizing other ESG-related actions, but the complexity of such a regime and the political divide on the topic make such types of taxes unlikely in the near future (Bonham & Riggs-Cragun 2022).

5.3.2 *Tax Strategies as an ESG Outcome*

Several studies suggest that corporate tax avoidance is correlated with irresponsible corporate behavior. [Hoi, Wu & Zhang \(2013\)](#) provide early evidence using a sample of publicly listed U.S. firms from 2003 to 2009 and binary indicators on corporate actions with a negative CSR connotation along 34 dimensions from the KLD Research & Analytics database. They find that the group of firms with a relatively high number of negative CSR actions exhibit higher values in several tax avoidance measures. Using the same database, [Lanis & Richardson \(2015\)](#) provide consistent evidence focusing on a small sample of firms facing tax disputes due to aggressive tax planning. [Al-Hadi, Taylor & Richardson \(2022\)](#) also focus on U.S. firms in the period 1998 to 2014 and show that firm-level tax avoidance is higher for firms headquartered in U.S. states with a number of corporate corruption cases. While this study cannot establish a direct mechanism at the firm level, the results suggest that tax avoidance is correlated with corporate corruption, a negative ESG outcome. [Overesch & Willkomm \(2022\)](#) complement this evidence by showing a negative correlation between high CSR performance and international tax-motivated income shifting behavior.

Other work provides evidence inconsistent with the interpretation that tax avoidance is associated with firms' general social responsibility outcomes. [Davis, Guenther, Krull & Williams \(2016\)](#) show a statistically significant correlation between U.S. firms' ESG ratings from the MSCI database (formerly KLD CSR indicators) and firms' cash tax avoidance and tax-related lobbying, suggesting firms substitute tax avoidance with good performance in other ESG dimensions. [Mayberry & Watson \(2021\)](#) employ the staggered introduction of constituency statutes in the U.S. as a plausibly exogenous shock to directors' legal permission and incentives to consider how a firms' CSR outcomes affect a wider range of stakeholders beyond shareholders. The authors fail to document changes in tax avoidance in response to these shocks and interpret their findings as evidence suggesting that firms decouple CSR from corporate tax strategies. Based on hand-collected data on U.S. firms' tax haven affiliates and CSR ratings, [Col & Patel \(2019\)](#) provide suggestive evidence that more tax aggressive firms can even be perceived as more socially responsible. In light of this conflicting empirical evidence and the lack of clearly identified mechanisms, big open questions are whether socially responsible firms pay

higher taxes or whether tax aggressive firms actively decouple tax from broader sustainability strategies, and what the associated firm characteristics and other economic consequences of such tax-related ESG strategies are.

5.3.3 *Mandatory Public Disclosure Regimes and Firm Responses to Stakeholders*

Recently, regulators have imposed mandatory *public* tax disclosures with the intent to curb firms' aggressive tax behavior. The underlying assumption is often that public pressure by the media and consumers will lead firms to increase their tax payments to stress their social contribution. Prior work suggests that public pressure is indeed needed for the effectiveness of these policies (Belnap 2023, Bozanic et al. 2017).⁶⁰ Hoopes et al. (2018) examine the Australian setting of public tax return disclosure for large firms, providing some evidence for consumer backlash for tax-avoiding firms. Hoopes et al. (2018) also examine tax payments after the public disclosure, finding only small increases in tax payments for large non-listed firms only. Consistent with this result, Bilicka, Casi-Eberhard, Seregini & Stage (2023) and Xia (2023) find no change in tax avoidance for listed U.K.-firms after a reform mandating public qualitative tax disclosures with the intent to limit tax avoidance. However, Bilicka et al. (2023) show that treated firms required to publish a tax strategy report increase the overall extent but not the informativeness of tax strategy disclosures. Kays (2022) also documents strategic voluntary tax disclosure patterns to potentially mitigate consumer backlash and public scrutiny in the Australian setting.⁶¹ While limited, the collective evidence so far suggests that country-specific mandatory public tax disclosure regimes do not necessarily encourage firms to highlight their social performance by higher tax payments, but likely impose compliance and proprietary costs for affected firms.

Limited research exists on the association between non-tax specific sustainability disclosure mandates and firms' tax outcomes. Rauter (2020) studies a public disclosure mandate for

⁶⁰However, little is known about how end-customers view of firms' tax behavior generally beyond anecdotal examples. Asay et al. (2024) provide evidence suggesting that consumers are rather insensitive to negative tax information. These findings are consistent with the lack of evidence for reputational effects of tax avoidance and the notion of hyper-rational consumers potentially preferring tax-avoiding corporations if they expect some tax savings to be passed on through lower consumer prices (Dyreg, Jacob, Jiang & Müller 2022, Gallemore, Maydew & Thornock 2014).

⁶¹Such strategic voluntary tax disclosure share the nature of strategic voluntary, and likely biased, ESG disclosure of firms facing pressure from stakeholder groups Kim & Lyon (2011), Gatti, Seele & Rademacher (2019), Abraham, Olbert & Vasvari (2023). Thus, future research exploiting tax settings can inform the broader debate around greenwashing in response to voluntary and mandatory sustainability disclosures.

multinational firms in extractive industries. He finds that firms affected by the extraction payments disclosures increase their tax payments to governments in extraction countries but also decreased their economic activity relative to firms not subject to the disclosures. [Fiechter, Hitz & Lehmann \(2022\)](#) find increases in EU firms' CSR activities after the public CSR reporting mandate in 2014. While this study does not focus on tax outcomes, affected EU firms could also have altered their tax strategies as irresponsible tax issues like tax fraud controversies are often included in CSR ratings provided by data vendors such as Refinitiv's Asset4. As general sustainability disclosure regulation is increasingly implemented worldwide and can impact an array of firms' reporting and real decisions (e.g., [Fiechter et al. 2022](#), [Krueger et al. 2023](#) and [Abraham et al. 2023](#)), future research could specifically examine the impact of general disclosure mandates on tax outcomes to improve our understanding of how firms' incorporate their tax affairs in their sustainability strategies.

5.3.4 Voluntary Tax Sustainability Frameworks and Firm-specific Disclosures

Recent descriptive papers discuss firms' adaptation of public tax-related sustainability disclosures. While tax-related sustainability disclosures are, in principle, required for firms subject to mandatory sustainability reporting such as the NFRD in Europe, these tax-related disclosures have remained predominantly voluntary. The reason is that the reporting frameworks applied under mandatory reporting (predominantly GRI) leave it to firms to decide about the materiality of topics, and thus the extent of related disclosures ([Kopetzki, Spengel & Weck 2023](#)). As a consequence, firms do not uniformly provide tax-related sustainability disclosures and the quality of these disclosures varies widely. For instance, in fiscal years 2020 and 2021, 68% of the 112 largest listed EU firms examined in [Kopetzki et al. \(2023\)](#) did not consider the topic of taxes as material for sustainability reporting, and 82% of firms provided some form of qualitative disclosures (see also [Hardeck & Kirn \(2016\)](#) and [Reiter \(2020\)](#) for similar statistics).

[Adams, Demers & Klassen \(2022\)](#) find that firms with lower effective tax rates provide less voluntary tax-related disclosure. Their results also suggest that firms engaging in more aggressive international income shifting are less likely to voluntarily provide informative country-by-country reporting (CbCR) disclosures. The lack of conclusive evidence in this research is likely due to endogenous and infant nature of voluntary tax sustainability disclosures. Fur-

thermore, the availability and informativeness of public tax sustainability disclosures appears limited to date, leaving the question open whether investors or other stakeholders would act on the information, which in turn could induce real corporate reactions (Leuz & Wysocki 2016).

5.3.5 *Synthesis and Suggestions for Future Research*

Taxation as part of firms' sustainability outcomes is an emerging and promising field for future research in tax accounting. Several studies have examined the long-standing question of whether corporate tax avoidance is correlated with irresponsible corporate behavior. Mixed evidence leaves this debate unsettled. Further, research on the role of firms' tax strategies as part of firms' ESG strategies and on the impact of ESG-related regulation on firm's tax outcomes is in its infancy. ESG regulations and firm-specific strategies can have nuanced and potentially substantial consequences for taxation, as changes in firms' ESG strategies can induce technological changes toward greener technologies and more IT-based solutions, shifts in the geographic and demographic composition of the workforce and related compensation, and changes in domestic and international supply chains. These changes will impact the tax assessment of firms' transactions overall (e.g., access to R&D credits or other tax exemptions, changes in payroll or other indirect taxes) and with respect to the allocation of taxable income across jurisdictions (e.g., transfer pricing). Further, firms are increasingly embracing ESG strategies as a value-creation factor (Servaes & Tamayo 2013, Hawn & Ioannou 2016, Lins et al. 2017). If a firm indeed generates value through ESG strategies and this value is reflected in higher taxable income, it will be important where the key assets and functions for ESG value-creation are located from an international taxation perspective. Thus, ESG strategies and value creation itself will have transfer pricing and related international tax consequences.

Future research could advance our understanding by focusing more on plausibly exogenous shocks to tax avoidance opportunities or exposure to ESG disclosure regulations and ESG-focused investors to examine firms' tax-related sustainability disclosures and outcomes. Potentially fruitful settings include the EU's mandatory public CbCR mandate as well as spillover effects of firms committing to the GRI 207 tax sustainability reporting standards or firms and investors publicly showing their ESG commitment via the United Nations Principles of Responsible Investing (UN PRI) or the carbon disclosure project (CDP) (Kim & Yoon 2023,

[Cohen et al. 2023](#)). Future research could also study the effect of existing tax rules on ESG outcomes if there is a clear theoretical link. A recent example is [Yost & Shu \(2022\)](#) who provide novel evidence on taxes and governance outcomes. Their results suggest that stricter corporate tax enforcement reduces managers' propensity to manipulate stock gifts and engage in insider trading. Future research would likely benefit from exploiting alternative data sources and developing practically relevant measures of firms' tax-related sustainability disclosures. The reason is that it is unclear that the stakeholders of interest (e.g., often consumers or the media) consume and digest the fragmented landscape of tax-related in existing sustainability reports. Potential datasources and settings include firm-specific news ([Li et al. 2023](#)), firms' websites ([Abraham et al. 2023](#)), or social media ([Gómez-Carrasco et al. 2021](#)).

6 Conclusion

This manuscript reviews empirical research on the real effects of taxation with a focus on recent contributions from accounting scholars. We started with the canonical theory from [Hall & Jorgenson \(1967\)](#) and propose an organizing framework that reflects the breadth of outcomes and tax policies studied by tax accounting scholars.

We identify and highlight five key ways that accounting scholars contribute to the literature on real effects. One of the predominant contributions relates to disclosure: scholars have provided new evidence about the extent to which disclosure regimes not only increase reported information but also impact firm's real investment and employment. Accounting scholars have also advanced the literature through exploiting institutional nuances and improving measurement of firms' tax status and reported and real outcomes. While more work can be done on these three dimensions, we encourage more work around two dimensions: (i) documenting and quantifying reporting responses and (ii) studying the relevance of financial reporting incentives in either facilitating or impeding the real response. Evidence along these two dimensions builds on our comparative advantages as accounting scholars and provides opportunities to contribute to the broader literature spanning economics, finance, and accounting. We look forward to work that advances knowledge along these dimensions and further provides policy-relevant evidence about the ever-growing areas of tax policy.

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Firms' Real and Reporting Responses to Taxation: A Review

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[A - Discussion of Neoclassical Investment Theory](#)

A.1 Discussion of Neoclassical Investment Theory

Model set-up: After-tax Investment Costs

Based on neoclassical investment theory, [Hall & Jorgenson \(1967\)](#) propose the concept of the user cost of capital (*CoC*) to determine the relationship between tax incentives and the level of corporate investment. The *CoC* is obtained from comparing the price of investment goods and the discounted value of periodic capital services (from renting assets to obtain capital services).¹ The *CoC* depends on how the cost of investment outlays change when periodic capital services are taxed; to maximize firm value, managers will invest as long as the marginal returns from the investment do not fall below the after-tax *CoC*. Empirical researchers commonly cite this canonical theory to motivate real responses to tax policy broadly, despite the theory's important assumptions and simplifications (discussed below). Therefore, this section provides an exposition of the model's key takeaways and limitations so that researchers can evaluate the extent to which their research follows or departs from the standard setting and assumptions.²

Consider a simplified two-period model with no agency issues. The tax system includes a corporate income tax rate τ_c and allows for an immediate tax depreciation of the fraction z of investment expenditures. The manager invests I to maximize firm value V . Eq. A.1 below outlines firm value V based on investing I in the first period as follows. V declines by the cash outlay ($-I$) and increases by the tax savings from expensing a fraction z of investment cost I from the current year's tax base (i.e., $z * I$, multiplied by the corporate income tax rate τ_c). V also increases by the cash received in the second period, which is discounted with interest rate r . The cash received in the second period is the net profit from the investment after paying corporate taxes $((1 - \tau_c)f(I))$, plus the tax savings from expensing the remaining depreciable amount of the investment from the second year's tax base $(\tau_c(1 - z)I)$:

$$\max_I V = -I + \tau_c z I + \frac{[(1 - \tau_c)f(I) + \tau_c(1 - z)I]}{1 + r} \quad (\text{A.1})$$

Key results

Eq. A.1 shows that more favorable tax depreciation rules stimulate investment spending in the presence of non-zero corporate income tax rates. As long as the interest rate r is positive, the tax benefit from depreciating a fraction of investment expenditures in the first period will always increase firm value by more than the tax benefit from depreciating a corresponding fraction in any future year. Put differently, a higher present value of each annual tax depreciation deduction stimulates more investment ([Hall & Jorgenson 1967](#), [House & Shapiro 2008](#)). Differentiating Eq. A.1 with respect to I to find the manager's optimal level of investment and rearranging the first-order condition yields the following:

$$f'(I) = MPK = r \frac{(1 - \tau_c z)}{(1 - \tau_c)} = CoC \quad (\text{A.2})$$

This equation shows that a firm should increase investment until the marginal return from investing, also called the marginal revenue product of capital, MPK , equals the after-tax user cost of capital, CoC ([Hassett & Hubbard 2002](#), [Creedy & Gemmell 2017](#)). The *CoC* depends on the interest rate r and the ratio of 1 minus the corporate income tax rate, multiplied by the fraction of immediately tax-deductible investment expenditures $(1 - \tau_c z)$ to 1 minus the corporate income tax rate $(1 - \tau_c)$. The key insights include the following:

1. Corporate income taxes ($\tau_c > 0$) provide incentives to increase the level of investment when z ,

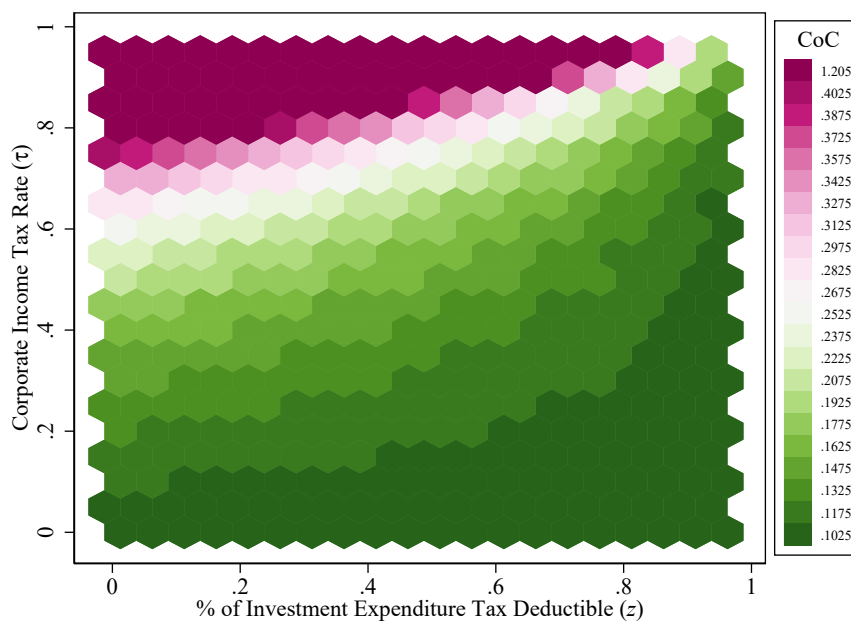
¹See [Hassett & Hubbard \(2002\)](#) and [Mirrlees & Adam \(2010\)](#) for discussions of neoclassical investment theory and [Furno \(2022\)](#), which applies this model to the macroeconomic setting.

²Recent work has extended this model to account for financial and agency frictions, policy uncertainty, variation in tax incidence, and general equilibrium effects at the macroeconomic level, among other factors. As our goal is to offer a brief summary as the foundation for the empirical work we review, we do not refine these theories or offer a complete model incorporating all possible tax policies, firm responses, and underlying frictions. Instead, we highlight that this work is important for scholars to consider.

the proportion of investment expenditures deductible in the year of investment, is higher.³

2. If investment expenditures are not fully tax deductible at the time of investment (i.e., $z < 1$), higher corporate tax rates increase the CoC and discourage corporate investment.⁴
3. There is an interactive effect of tax rates and tax depreciation rules on the CoC . Tax rate reductions induce a larger decrease in the CoC , and thus a larger predicted increase in investment, when tax depreciation rules are more restrictive (i.e., if there is less expensing in earlier periods or a lower z). In contrast, the required after-tax return on investment is less affected by tax rates if depreciation policy is more generous. Thus, more generous tax depreciation rules induce a greater decrease in CoC under higher tax rates τ . Figure OA.1 plots this relationship, showing the extent to which CoC changes depending on the tax rate and tax depreciation provisions.⁵

Figure OA.1: Interplay of Corporate Income Tax Rates and Tax Depreciation Rules and the Effect on the Cost of Capital



Notes: This figure visualizes the after-tax cost of capital based on Eq. A.2. Specifically, it shows the CoC based on the level of the corporate income tax rate (τ , y-axis) and the fraction of investment expenditures deductible at the time of investment (z , x-axis). The interest rate r is assumed to be 10%.

³Hall & Jorgenson (1967) consider straight line depreciation schedules over multiple years and accelerated depreciation policies such as the sum-of-the-years' digits and the double declining balance method. U.S. bonus depreciation policies are settings in which z is equal to 30%-50% of the asset base; see Zwick & Mahon (2017).

⁴It is notable that Hall & Jorgenson (1967) do *not* focus on the direct impact of tax rate changes on investment, even though this theory is often invoked in studies about tax rate changes. The model actually assumes that the tax rate remains unchanged, as motivated by the policy debates in the U.S. at that time. However, the effect of the tax rate on investment can be observed in Eq. A.2. Thus this model provides the theoretical foundation for studying the effect of both depreciation and tax rate changes on investment.

⁵For example, for a country with either very low tax rates or very generous tax depreciation rules, a policy change in the other dimension, even if large, will have relatively modest effects on the CoC . In the most extreme case of full expensing ($z=1$), changes in the corporate income tax rates have no effect on the CoC . Based on these insights, scholars have argued in favor of a cash-flow-based tax system in which investment would be fully deductible when the asset is acquired. Under such a system, corporate income taxes do not distort efficient investment decisions (Bond & Devereux 2003, Auerbach 2010).

Assumptions of Basic Neoclassical Theory

The neoclassical theory in [Hall & Jorgenson \(1967\)](#) focuses on firms' marginal investment in *depreciable physical capital* in response to changes in the *deductibility of investment* given existing *corporate income tax rates*; see Figure 1, Panel A.

The model in [Hall & Jorgenson \(1967\)](#) imposes three key assumptions that are not always met in the real world. To guide future research referencing the model, we briefly outline these assumptions in the following.

First, the model assumes that managers maximize the net present value of after-tax cash flows over a project's lifetime, in the absence of agency conflicts. However, there are to reasons that this assumption may not hold. First, many prior papers document agency issues, finding that decision-makers maximize private benefits rather than the highest NPV projects (for example, [Edwards et al. \(2016\)](#), ?). Second, this assumption relies on managers being aware of – and optimizing across – tax incentives. This may not hold to the extent that there are competing tax incentives with uncertain benefits or that decision-makers do not correctly estimate the monetary value of these incentives ([Graham et al. 2017](#)).

Second, the theory models one single representative firm, focusing on steady, or consistent, responses across firms. However, theory and prior work show that the effects of tax savings on investment should be pronounced among financially constrained and smaller firms in which cash tax savings are particularly valuable (e.g., [Domar \(1953\)](#), [Zwick & Mahon \(2017\)](#)).⁶

Third, standard theory ignores policy uncertainty, assuming that the investment response is unaffected by managers' probabilistic assumptions around future tax policy changes. However, real options theory shows that firms exhibit smaller or slower responses to tax incentives when tax policy is uncertain. As a result, firms prefer to “wait and see” rather than make costly investments with uncertain consequences ([Pindyck 1988](#), [Bloom et al. 2007](#)).⁷

Beyond these three assumptions, the model also incorporates a number of other assumptions, such as decreasing (concave) returns to investment, price-taking firms, perfect competition, and constant output prices that may not hold in empirical settings.

In sum, even if researchers study the traditional outcomes predicted by the model – marginal physical investment responses to changes in the timing of investment cost deductions – these assumptions must be evaluated in the particular empirical setting.

⁶[Zwick & Mahon \(2017\)](#) show that investment responses can be larger than the standard theory predicts if investment inputs are long-lived.

⁷[Alvarez et al. \(1998\)](#) provide a theoretical model of tax rate policy uncertainty and corporate investment. [Mumtaz & Surico \(2018\)](#) discuss and show aggregate negative investment effects of tax policy uncertainty. [Baker et al. \(2016\)](#) develop a measure of tax policy uncertainty, and [Hassan et al. \(2019\)](#) propose a methodology to measure firm-level exposure to tax policy uncertainty.