

Tax Avoidance and Multinational Firm Behavior

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Abstract: In this chapter we review, and at times extend, the literature on multinational corporate income tax avoidance and its consequences. It is first important to note that multinational corporations pay a substantial amount of taxes, both direct and indirect. Yet, it is also the case that there is evidence 1) of tax avoidance, including cross-jurisdictional income shifting, 2) that tax avoidance is increasing over time, and 3) that the location of ‘real’ items such as investment, debt, and employment are sensitive to taxation. In addition, in certain cases the altering of structures to avoid taxation necessitates more changes to ‘real’ activity. We observe that while there is evidence of income shifting, the literature is not settled on the extent to which this occurs. We briefly touch on the financial accounting and reputational incentives and disincentives for tax avoidance. We end with a short discussion of the early research following recent tax regime changes.

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1. Introduction

In this chapter we review, and at times extend, research that examines tax avoidance by multinational corporations (MNCs) and how MNCs' investing, financing, accounting, and other practices are influenced by taxes and by tax avoidance behavior. In the process of this exercise, we also review existing tax avoidance literature as it relates to purely domestic firms to the extent that comparisons of domestic and multinational firms are informative, or in circumstances where evidence has not been compiled separately for both types of firms.

By operating in multiple jurisdictions with distinct tax policies, MNCs have unique opportunities to structure activities strategically across international borders in such a way that tax obligations are reduced. In addition, countries often compete via tax policy to attract multinational firms. Governments worry that tax avoidance activities, coupled with tax competition among countries, is causing their existing tax bases to erode, and they have lamented their inability to impose taxes on multinational firms in the modern business environment. These concerns have become much more acute in recent years with growing coverage of corporate tax avoidance issues in the popular press, which in turn has heightened political awareness of multinational tax avoidance issues. The Base Erosion and Profit Shifting initiatives of the G-20 and the OECD, the U.S. Senate investigations into tax avoidance, and European Union reactions to alleged illegal state aid are recent examples. In addition, worldwide and government actions to combat tax avoidance seem to be increasing given the breadth of the recent proposed Global Anti-Base Erosion Proposal (GloBE) by the OECD.¹

For purposes of this chapter, we define corporate income tax avoidance (hereafter, tax

¹ See <http://www.oecd.org/tax/beps/> for information about the OECD base erosion and profit shifting initiative, <https://www.hsgac.senate.gov/subcommittees/investigations/hearings/offshore-profit-shifting-and-the-us-tax-code> for information about the U.S. Senate investigations on tax avoidance, and http://europa.eu/rapid/press-release_IP-18-6889_en.htm for an example of the European Union's actions on illegal state aid.

avoidance for simplicity) as anything that reduces cash income taxes paid relative to pretax financial accounting income. This is the same definition adopted in numerous studies that require a firm-specific measure, including Dyreng, Hanlon, Maydew (2008) and Hanlon and Heitzman (2010). Admittedly, not all research uses this definition; but having such a working definition makes an evaluation and summary of tax avoidance research as it applies to multinational firms more tractable. We recognize that our definition of tax avoidance involves a broad set of both 1) actions taken by the firm to lower taxes and 2) outcomes of tax laws established by governments. In other words, tax avoidance as we define it captures both aggressive tax avoidance and also statutorily intended avoidance such as accelerated depreciation deductions and research tax credits. However, it is important to recognize that our measure does not capture all tax planning because it will not capture tax planning that reduces both taxes and reported accounting income (known as conforming tax avoidance). We discuss these issues in more detail below.

We begin by examining data on how much taxes U.S. MNCs pay. Despite many articles in the press that highlight specific situations where MNCs payed very little or even no taxes at all, the facts are that MNCs pay billions of dollars in income taxes. For example, between 2009-2018, publicly traded U.S. multinational corporations paid, in aggregate, over \$2.7 trillion in income taxes to governments around the world.² These same firms reported an aggregate of about \$10.7 trillion in pretax earnings during that same time period, suggesting that, in aggregate, about 25% of pretax earnings were paid in income taxes around the world during that 10-year time period. Near the end of the chapter, we discuss other taxes MNCs pay, and note that these so-called indirect taxes are also substantial. While there are examples of some firms significantly reducing their tax

² We calculate \$2.7 trillion by summing the value of income taxes paid (Compustat data item TXPD) on Compustat for all U.S. incorporated firms with non-missing beginning assets (Compustat data item AT), revenues (Compustat data item SALE) greater than zero, and non-missing pretax income (Compustat data item PI) from 2009-2018.

liabilities, the totality of the evidence suggests that multinational firms face significant operational and/or reputational constraints on tax avoidance, a narrative that is often missing in portrayals of tax avoidance in the media that focus on a few specific examples. In light of this, we discuss questions and related research about 1) the extent to which firms can avoid tax, 2) the variation in tax avoidance, 3) characteristics associated with tax avoidance, 4) the pervasiveness of tax avoidance, 5) the costs that deter tax avoidance, and 6) the consequences of tax avoidance.

We review and extend the literature that measures and quantifies tax avoidance at the firm level. Similar to prior research, we provide evidence consistent with considerable cross-sectional variation in tax avoidance, with some firms appearing to pay taxes at rates significantly less than the statutory tax rate, while other firms appear to pay taxes at rates that are higher than the statutory tax rate. Even when we measure effective tax rates over long periods of time to reduce the influence of unusual years or one-time shocks, the variation in tax avoidance remains high. For example, when measured over a 10 year period, about 17% of observations have cash effective tax rates below 20%, while 15% have a cash effective tax rate higher than 50% (during years when the U.S. statutory tax rate was between 34-35%). Consistent with prior research, we find that when we measure firm-specific cash effective tax rates over longer horizons, the distribution tightens.³

We then review and extend the literature that examines how tax avoidance has changed over time. Consistent with Dyreng, Hanlon, Maydew, and Thornock (2017), we find that tax avoidance has increased over the last thirty years. Contrary to the conventional wisdom that multinational firms have more tax avoidance opportunities than purely domestic firms, and thus benefit from tax-based cost advantages, the evidence suggests that tax avoidance has increased (i.e., cash effective tax rates have decreased) at purely domestic firms as much as at multinational

³ We discuss the effects of changes in the sample below.

firms over the past 30 years. In addition, looking at the level of rates, purely domestic firms have lower cash effective tax rates than multinational firms over the entire 30-year time period we examine. Moreover, following the recent U.S. tax reform, known as the Tax Cuts and Jobs Act (TCJA) of 2017, purely domestic firms experience a much sharper decline in cash effective tax rates than multinational corporations. This is consistent with expectations because all of a purely domestic firm's income is subject to the U.S. tax rate (which the TCJA dropped from 35% to 21%) and because some international provisions in the TCJA may increase the taxes multinationals pay.

Researchers have devoted substantial resources to understanding the determinants of tax avoidance. We review the findings from these studies and conclude that, despite some progress, the field still cannot explain a large portion of the variation in tax avoidance. The unexplained variation arises in part because 1) idiosyncratic business models and idiosyncratic business managers engender idiosyncratic tax avoidance opportunities and varying proclivities to take those opportunities that are unlikely to be explained by traditional regression techniques, and 2) because tests that include all known tax avoidance factors simultaneously are difficult to design. We discuss a few of the factors associated with tax avoidance beyond traditional firm characteristics (industry and size) that have been recently studied including financial accounting incentives, reputation, and the identity of the people in the C-suite.

We devote part of the chapter to a discussion of the techniques multinational firms use to avoid taxes, including income shifting. This is a difficult task because many techniques are highly technical and context specific. Additionally, the specific structures employed by many firms are proprietary or not widely known. Where possible we highlight information that has been revealed publicly in court cases, congressional testimonies, academic literature, and investigative reports in the popular press. Nevertheless, for much of our discussion we omit the technical details and

intricate nuances of these strategies in favor of describing more generalizable patterns. One of the most common techniques multinational firms use to avoid taxes is to shift income from one jurisdiction to another. Because income shifting is impossible to directly observe, researchers use a variety of econometric techniques to generate estimates of the phenomenon. We review this literature, and note, as others have, that the economic magnitudes of income shifting estimated in these studies are wide-ranging and at times seem implausibly large when compared to other data.

Finally, we turn our attention to the literature that examines how taxes and tax avoidance affect other decisions such as investment location, corporate capital structure, and employment. For example, the evidence is consistent with jurisdictions with low tax rates attracting investment, all else constant. Further, we note that it is, at times, difficult to identify whether taxes or tax avoidance affects these decisions. For example, firms may choose to shift income to a low-tax jurisdiction, which might only be possible if some real production activities are performed in the low-tax jurisdiction (or at least performed outside of the U.S.). Prior to the TCJA, the income recognized in the low-tax jurisdiction could have become ‘trapped’ abroad as the company could not repatriate the earnings to the U.S. without paying incremental U.S. taxes. Research suggests that companies with trapped foreign earnings engaged in relatively more investment in foreign jurisdictions and relatively more domestic borrowing, creating a situation where tax avoidance seemed to affect foreign investment, which opened the door for more tax avoidance.

We note that we focus on U.S. MNCs for most of the chapter. However, when practical, we describe insights from studies that examine foreign MNCs. In addition, we primarily discuss research that was conducted under the U.S. tax regime between the Tax Reform Act of 1986 and ending before the TCJA was effective in 2018. At the end of the chapter, we briefly discuss some very recent research about the effects of the TCJA.

2. Do Multinational Firms Pay Taxes?

Despite many articles in the popular press providing anecdotes to the contrary, many U.S. multinational firms pay substantial income taxes. In addition, some companies disclose and discuss the amount of taxes they pay. For example, Lee Scott, President and CEO of Wal-Mart, wrote in his annual letter to shareholders:

I also will report that Wal-Mart paid \$4 billion in U.S. federal income taxes in fiscal year 2004. To borrow a page from my friend Warren Buffett's annual report letter to the shareholders of Berkshire Hathaway, this means that if 446 other taxpayers paid the same amount as Wal-Mart, no other business or individual in the United States would have had to pay federal taxes last year (based on 2003 U.S. federal tax receipts of \$1.782 trillion).

To estimate, in a large sample, how much firms pay, we use information from financial statements throughout much of this chapter. Thus, it is important to understand what is reported and disclosed in financial statements with respect to taxes before we proceed. The most crucial distinction to make and understand is the difference between income tax expense on the income statement and cash taxes paid.

The income tax expense on a firm's income statement is computed using the accrual method of accounting (like everything else on the income statement). Thus, income tax expense is not equal to cash taxes paid. At a high level, the total income tax expense in a particular reporting period reflects taxes that have been and will be paid on the accounting earnings reported on that income statement for the same reporting period. In simple terms, the income tax expense is matched with the current year pre-tax earnings, or alternatively stated, tax expense captures future tax costs and benefits incurred in the current period. The accounting income tax expense amount consists of two parts – current tax expense and deferred tax expense.⁴ Each of these expense

⁴ Deferred tax expense is the expense related to changes in deferred tax assets and liabilities. A discussion of this is beyond the scope of this paper. For those wanting more information about the accounting for income taxes see any intermediate accounting textbook.

amounts is disclosed by broad jurisdiction – U.S., International, and State (generally). The current tax expense is the portion of the expense that most closely mirrors cash taxes paid. However, it is not exactly cash taxes because the current tax expense will include some accruals as well (e.g., tax expense recorded for changes in contingent tax liabilities arising to account for possible future taxes assessed by the tax authorities). In our sample of multinational firms, the correlation between cash taxes paid and total current tax expense is 92%.

In contrast to tax expense, cash taxes paid is the amount of cash firms remitted to all governments around the world for income tax payments, net of any refunds received. Cash taxes paid is not disclosed by jurisdiction. Cash taxes paid could be related to this year's income or could include such things as payments made as a result of a tax audit or settlement for a prior tax year. In other words, cash taxes paid is literally just that: the amount of cash taxes paid for income taxes.⁵ Because cash taxes paid is not disclosed by jurisdiction, we use current tax expense as a proxy for cash taxes paid when we need by-jurisdiction amounts.

In Figure 1, Panel A, we report the aggregate amount of income taxes paid to all governments by publicly traded U.S. multinational companies each year over the past 30 years in the line labeled Cash Taxes Paid. In the figure, we report that these companies paid a total of \$64 billion in income taxes to governments around the world in 1988. The amount rises to as much as \$332 billion in 2015, and is \$259 billion in 2018, the year immediately after the passage of the TCJA. In Figure 1, we also report the federal current tax expense each year for the last 30 years in the line labeled Federal Current Tax Expense. In 1988, publicly traded U.S. multinational firms

⁵ Computstat data items for the items discussed are as follows: cash taxes paid (TXPD), total income tax expense (TXT), federal current income tax expense (TXFED), foreign current income tax expense (TXFO) and state current income tax expense.

reported \$34 billion in federal current tax expense, and most recently in 2018 reported \$167 billion in federal current tax expense.⁶

Though the amount of taxes paid is large, it is difficult to interpret without context. In 2014, the most recent data available, the Internal Revenue Service collected just over \$336 billion in corporate income taxes, which accounted for about 11% of U.S. revenue. In 2014, publicly traded U.S. multinational firms reported \$187 billion in current federal tax expense, or about 56% of all U.S. federal corporate income taxes (assuming that current tax expense is a reasonable proxy for cash taxes paid in aggregate for such purposes).

In addition to comparing the amount of taxes paid by publicly traded multinational firms to the total amount of corporate tax collected in the U.S., is it also informative to examine the amount of taxes paid relative to measures that capture the scale of the economy. In Figure 1, Panel B, we plot cash taxes paid divided by U.S. GDP and federal current tax expense divided by U.S. GDP. As can be seen in the figure, we find that worldwide cash taxes paid hovers between one and two percent of GDP. As might be expected, federal current tax expense captures a smaller fraction of GDP, and hovers between about half a percent and one percent of GDP.

In sum, the results we have just discussed, juxtaposed against the common narrative that large public multinational corporations pay very little income tax, suggest that the reality of the corporate income tax is nuanced and difficult to convey in a single statistic or simple conclusion. Indeed, it is clear that many multinational corporations pay substantial income tax, while it is undeniable that other companies pay relatively little income tax. We discuss the wide variation in

⁶ Note that in Figure 1 there is a spike in current Federal tax expense in 2017 but no corresponding spike in cash taxes paid. This is an example of where the two can differ. In 2017, with the passage of the TCJA, for financial accounting purposes companies were required to accrue the tax expense for some provisions in the TCJA, for example, the mandatory deemed repatriation tax (the transition tax) on unrepatriated foreign earnings (Section 965(a) inclusion). However, the tax did not need to be paid in 2017, but could be paid over an eight-year period following the TCJA.

income tax burdens throughout the remainder of the study. In addition, as mentioned earlier, although we focus on income taxes throughout the study, we note that multinational corporations also pay other types of taxes, including property taxes, employment taxes, value added taxes, excise taxes, tariffs, and other indirect taxes. We briefly discuss these taxes in Section 9.

3. Corporate Tax Planning and Avoidance

Research on corporate tax planning and corporate tax avoidance dates back many decades. In the economics literature, foundational work by Hall and Jorgensen (1967) established that tax policies could affect investment and other corporate decisions. Similarly, Modigliani and Miller (1963) argued that corporate taxes could affect corporate financing policies. Over the ensuing years, researchers have devoted substantial efforts to understanding how tax policies affect investment and financing policies. In effect, the fact that corporate taxes influence so many corporate actions is evidence of tax planning. If firms simply blindly complied with tax laws without any tax planning at all, taxes would have no effect on corporate tax policies.

Myron Scholes and Mark Wolfson provided significant structure to the literature on corporate tax planning in the 1980s and published what has become a seminal textbook in 1992. In the wake of the Scholes and Wolfson textbook, research on tax planning and tax avoidance began to grow in the 1990s. Moreover, the rise of corporate tax shelters became more widely documented in the late 1990's, due in part to a white paper by the U.S. Treasury (1999) and substantial media coverage (e.g., Novack and Saunders, 1998). In an influential review of the tax literature, Shackelford and Shevlin (2001) made a call for research on the determinants of tax aggressiveness, while Weisbach (2002) identified the 'undersheltering puzzle' where he questions why it is that tax avoidance (sheltering in his paper) is not more pervasive. Additionally, Slemrod (2004), Chen and Chu (2005), and Crocker and Slemrod (2005) developed the theoretical

foundation of corporate tax avoidance within an agency framework. The combination of these factors, and undoubtedly others, has led to a recent explosion of corporate tax research.

3.1 What is corporate tax planning?

For purposes of this chapter, we use the term “tax planning” to refer to any alteration of corporate activity relative to a zero-tax world. We assume that the objective of a representative firm is to maximize after-tax returns. For example, tax planning might consist of altering investments, finances, operations, employment, mergers and acquisitions, or any other of myriad corporate activities such that the after-tax return on those activities is maximized, even though the choices might be suboptimal in a zero-tax world. Thus, the definition of tax planning is consistent with Scholes and Wolfson (1992) who argue that "effective tax planning involves considering the role of taxes when implementing the decision rule of maximizing after-tax returns."

As a practical matter, tax planning is impossible to observe directly because we cannot observe the world absent taxes. Corporate tax planning is sufficiently broad to encompass every type of tax that might affect a corporation either directly or indirectly. Thus, firms maximize profits after taking into consideration both explicit taxes, which are taxes that are paid directly to the government, and implicit taxes, which are taxes that are not directly paid, but economically borne because the returns on tax-favored projects might be lower than the returns on non-tax-favored projects. Firms maximize income after taking into consideration not only corporation income tax, but also corporation sales taxes, property taxes, value added taxes, etc. Furthermore, and at least in theory, firms maximize returns by taking into consideration shareholder investment taxes (although the empirical evidence on this is not strong). In other words, effective corporate tax planning requires firms take into account all parties, all taxes, and all costs (Scholes and Wolfson, 1992).

3.2 *What is corporate income tax avoidance?*

For purposes of this chapter, we define corporate income tax avoidance (hereafter referred to as tax avoidance for simplicity) as anything that reduces cash income taxes paid relative to pretax financial accounting income.⁷ This is the same definition adopted in numerous studies, including Dyreng, Hanlon, and Maydew (2008) and Hanlon and Heitzman (2010), and represents a common usage of the term in the academic literature. Not all research uses this definition; nevertheless, without a working definition, an evaluation and summary of tax avoidance research as it applies to multinational firms is difficult to pursue.

Our definition of tax avoidance is sufficiently broad to capture activities as egregious as tax evasion, where earnings are simply not reported to the taxing authorities, or aggressive forms of avoidance that might be technically legal but push the boundaries of the tax law. The definition also encompasses benign activities that reduce taxes, such as investments in municipal bonds that generate tax-exempt interest income, and the effects of statutory provisions such as accelerated depreciation or research and development tax credits. Importantly for our purposes in this chapter, the definition of tax avoidance we employ encompasses most common tax planning strategies employed by multinational firms, including shifting income to low-tax foreign jurisdictions using strategically set transfer prices, or intercompany debt, as well as decisions that generate tax savings such as establishing manufacturing, research and development, or sales operations in low-tax foreign jurisdictions.

Despite the fact our definition of tax avoidance encompasses a wide range of activities, there are some forms of tax planning that are missed. Because avoidance is defined as taxes paid relative to pre-tax accounting earnings, any actions a firm takes that reduces both taxes and pretax

⁷ We note that tax planning and tax avoidance are sometimes used interchangeably in extant literature.

accounting earnings will not fall within the scope of tax avoidance as we measure it. For example, interest payments on most forms of debt are tax deductible, and reduce both cash taxes paid and pretax financial accounting earnings.⁸ Tax planning that reduces pre-tax financial accounting earnings and cash taxes paid is sometimes referred to as “conforming tax avoidance,” while our definition of tax avoidance might be more precisely referred to as “non-conforming tax avoidance.”⁹

3.3 *Estimating corporate tax avoidance*

Following Dyreng, Hanlon, and Maydew (2008), we empirically measure corporate tax avoidance using the cash effective tax rate by summing cash income taxes paid over some period of time (usually one, five, or 10 years), and dividing by pretax earnings summed over the same time period, as follows:

$$CASH\ ETR = \frac{\sum_t CASH\ TAX\ PAID_t}{\sum_t PRETAX\ INCOME_t} \quad (1)$$

Although data necessary to calculate *CASH ETR* is available on an annual basis for publicly traded U.S. multinational firms, we prefer relatively long-run versions of the measure because it minimizes the effect of several problems. First, *CASH ETR* is difficult to interpret when *PRETAX INCOME* is negative, and increasing the length of the period over which the measure is calculated reduces the fraction of observations with negative *PRETAX INCOME* because fewer firms have cumulative losses over a long period than a short period. Second, because both *CASH TAX PAID* and *PRETAX INCOME* can be volatile for many reasons, summing over a long period allows random fluctuations to wash out, thereby creating a more stable measure. Third, because the numerator is cash-based, but the denominator is accrual-based, summing over a long period allows

⁸ See Hanlon and Heitzman (2010) for their discussion of interest expense.

⁹ Conforming means accounting and taxable incomes are conformed to the same with respect to that transaction.

for many of the accruals in pretax earnings to reverse, creating a better (though still not perfect) match between numerator and denominator.¹⁰ Fourth, using a cash-based number in the numerator removes the effect of tax accruals, which can sometimes significantly alter the tax expense relative to cash taxes paid.

In Figure 2 we use data from Compustat between 1988 and 2017 to plot the distribution of *CASH ETR* calculated over various horizons for all publicly traded non-financial, non-utility MNCs and Domestic-only corporations (DOCs) with total assets greater than \$10 million and pretax income greater than zero.¹¹ Following Dyreng, Hanlon, and Maydew (2008), if *CASH ETR* is greater than one, we reset it to one, and if it is less than zero, we reset it to zero.¹²

In Panel A of Figure 2 we provide histograms of one-year *CASH ETR* (i.e., where the numerator and denominator are annual measures). We also present the number of observations, the moments of the distribution, and values of various quantiles of the distribution in the first row

¹⁰ Note that the measure could be affected by management in attempts to manipulate earnings to achieve certain earnings benchmarks such as analyst forecasts of earnings. Imagine a company ‘manages income upward’ but does not pay tax on that income. The measured tax rate will fall. This should be less of a concern over the long-run as some portion of the earnings management will reverse. In addition, this is still considered tax avoidance under our broad-based definition because the company avoided paying tax on the managed earnings.

¹¹ The sample attrition from deleting firm-years with negative pretax income varies with the horizon over which the *CASH ETR* is calculated. For one-year *CASH ETR*, 34.8% of observations are deleted because of negative pretax income, for five-year *CASH ETR*, about 31.0% of observations are deleted because of negative five-year pretax income, for ten-year *CASH ETR*, about 23.6% of observations are deleted because of negative ten-year pretax income, and for thirty-year *CASH ETR*, about 8.5% of observations are deleted because of negative thirty-year pretax income.

¹² In Panel A of Figure 2, about 3.7% (4.1%) of the multinational (domestic) observations were below zero, and thus reset to zero; about 4.3% (3.3%) of the multinational (domestic) observations were greater than one, and thus reset to one. In Panel B, about 1.4% (1.7%) of the multinational (domestic) observations were below zero, and thus reset to zero; about 4.7% (4.6%) of the multinational (domestic) observations were greater than one, and thus reset to one. In Panel C, about 0.5% (0.7%) of the multinational (domestic) observations were below zero, and thus reset to zero; about 4.8% (5.2%) of the multinational (domestic) observations were greater than one, and thus reset to one. In Panel D, none of the observations were below zero; about 3.0% (2.9%) of the multinational (domestic) observations were greater than one, and thus reset to one. In Panel E, about 2.6% (4.5%) of the multinational (domestic) observations were below zero, and thus reset to zero; about 2.9% (2.9%) of the multinational (domestic) observations were greater than one, and thus reset to one. In Panel F, about 4.0% (9.2%) of the multinational (domestic) observations were below zero, and thus reset to zero; about 4.2% (2.0%) of the multinational (domestic) observations were greater than one, and thus reset to one.

of Table 1 Panel A for MNCs and Table 1 Panel B for DOCs. The mean of the distribution for MNCs (DOCs) is 0.292 (0.258), about five or six (eight or nine) percentage points below the statutory tax rate during the sample period of 34 or 35 percent. As can be seen by looking at Panel A of Figure 2, there appear to be more firm-years in the lower ranges of *CASH ETR* than in the higher ranges. For example, for both MNC and DOC firm-years, 70% have *CASH ETR* below the statutory tax rate (i.e., 35%), but only 30% have *CASH ETR* above the statutory tax rate. Moreover, 37% (45%) of MNC (DOC) firm-years report *CASH ETR* below 20%. With both groups, a relatively large number of observations have *CASH ETR* very near 0%, and this is particularly obvious in the sample of DOC firm-years, suggesting many of these observations have zero or negative cash taxes paid, despite earning profits during the year. These observations can often be attributed to unusual or extreme earnings or tax realizations, including losses in prior years that result in large tax loss carryforwards. For example, if a firm records a loss in year $t-1$, that observation would be excluded from the sample in year $t-1$ because *CASH ETR* is difficult to interpret when pretax earnings are negative. If the same firm records a profit in year t , *CASH ETR* might be very low or even zero because the firm might be able to use the loss in year $t-1$ to reduce or eliminate taxes in year t , thus reducing the numerator of *CASH ETR* to zero, over a positive denominator of *PRETAX INCOME*.

In Panel B of Figure 2, we present a histogram of five-year *CASH ETR* (i.e., where the numerator and denominator are separately summed from $t-4$ to t , then divided), and the associated characteristics of the distribution are reported in the second row each of the two panels of Table 1. As can be seen in Table 1, the mean of the distribution rises several percentage points relative to the one-year *CASH ETR*, for both MNCs and DOCs achieving a value of 0.338 for MNC firm-years and 0.329 for DOC firm-years. Both of these values are lower than the statutory tax rate, but

is higher than the mean of one-year *CASH ETR*. The distribution of five-year *CASH ETR* remains asymmetric, with more mass in the left side of the distribution, but less asymmetric than one-year *CASH ETR*. In addition, there are fewer extreme observations so that the masses at the ends of the distribution are smaller, a fact that is particularly visible for DOC observations.

In Panel C of Figure 2, we present histograms of ten-year *CASH ETR* (i.e., where the numerator and denominator are separately summed from $t-9$ to t , then divided), and the associated characteristics of the distributions are reported in the third row the two panels of Table 1. Once again, the mean of the distribution rises a few percentage points relative to one-year *CASH ETR* and five-year *CASH ETR*, with a value of 0.356 (0.362) for MNC (DOC) firm-year observations. The distribution also becomes more symmetric and even fewer extreme observations are reset to zero from below or to one from above so the abnormal masses at the ends of the distribution are smaller. Even though the distribution become more symmetric, we find that 16% (19%) of MNC (DOC) observations have cash effective tax rates below 20%.

Panel D of Figure 2 contains histograms of thirty-year *CASH ETR* (i.e., where the numerator and denominator are separately summed from $t = -29$ to $t = 0$, then divided), which covers our entire sample period from 1988 to 2017. The associated characteristics of the distributions are reported in the fourth row of each panel of Table 1. This panel reports data from 567 firms (429 MNCs and 138 DOCs), each with only one observation because the sample comprises 30 years of data. The mean thirty-year *CASH ETR* is 0.35 (0.35) for multinational (domestic) firms, relatively close to the statutory tax rate of either 34 or 35% during the sample period. The standard deviation of this distribution is relatively tight, and the extreme tails continue to shrink. Nevertheless, even when calculated over a 30-year period, 11 (six) MNCs (DOCs) had a *CASH ETR* less than 10%, and 37 (12) had a *CASH ETR* less than 20%.

Obviously, because data is required for 30 consecutive years when calculating thirty-year *CASH ETR*, only firms with long histories as publicly traded companies appear in the figure. To determine if the shape of the distribution is driven by the calculation of thirty-year *CASH ETR*, or whether it is driven by special characteristics of firms that survive for thirty years, we re-examine one-year *CASH ETR*, but only for firm-years that correspond to the 567 firms with a non-missing thirty-year *CASH ETR*. The resulting histograms are in Figure 2, Panel E, and the 5th row of Table 1 Panel A and Panel B. Even though all of the observations in this figure are derived from firms that survive the full 30 years of the sample period, the distributions are asymmetric and have significant extreme values, similar to the distributions plotted in Panel A for all available firm-years. This confirms that in any given year, *CASH ETR* might be unusually low or high because of random fluctuations in earnings or taxes, unusual corporate events (e.g., mergers), changes in tax policies, tax enforcement actions, or other short-lived factors.

Finally, in Figure 2, Panel F we present one-year *CASH ETR* for the year 2018. Although the distributions appear similar to the distributions we present in Panel A, which covers firm-years between 1988-2017, the mean of each of the distributions in Panel F is lower than the corresponding distributions in Panel A. This can be easily seen by comparing the values in the sixth row of Panels A and B of Table 1 with the values on the first rows of Panels A and B of Table 1. For MNC (DOC) firm-years, we find that the mean of one-year *CASH ETR* was 0.238 (0.155) in 2018 compared to 0.292 (0.258) in 1988-2017. In addition, more firms bunch in the bar close to zero for DOCs – nearly 40% of the sample of DOCs are in the bar nearest zero for 2018 versus a roughly 27% in 1988-2017. These effects are likely due to the TCJA, which lowered the statutory tax rate from 35% to 21% and allowed for immediate expensing of qualified assets.

Overall, we note five key observations related to Figure 2. First, the distribution of *CASH*

ETR tightens as the time horizon lengthens. Second, even when calculated using a 30-year horizon, there is still variation in the distribution of *CASH ETR* (though the mean rises to 35%). Third, the distribution is asymmetric – fewer firms have *CASH ETR* higher than the statutory tax rate than below the statutory tax rate. Fourth, there are a substantial number of firms that achieve *CASH ETR* lower than 20% even over longer-run periods (but again, the percentage of firms that can do this does decline as the horizon lengthens).¹³ Fifth, the mean value of *CASH ETR* appears to have dropped significantly in 2018 after the TCJA, consistent with the corporate statutory tax rate being lowered from 35% to 21%.

Overall, the data we present in this section using *CASH ETR* provides evidence that some firms pay taxes at rates lower than the U.S. statutory tax rate, over the period 1988-2017, and this is the case for both multinational entities and purely domestic firms. Later in the chapter, we describe some of the common mechanisms firms use to achieve these relatively low tax rates, with a special focus on strategies employed by multinational firms.

3.4 *Trends in tax avoidance*

Over the past 31 years, firms have become increasingly multinational, and this trend is readily apparent in the data using any number of measures. One of the simplest measures of multinationality used in the literature is whether a firm reports any foreign earnings or foreign taxes in its annual report (as we used above). In Figure 3, Panel A, we replicate and extend Figure 1 from Dyreng, Hanlon, Maydew, and Thornock (2017), the data reveal that about 34% of firm-years in Compustat reported evidence of foreign earnings or foreign taxes in their annual reports in 1988, and that this fraction has steadily grown to about 69% in 2018.

¹³ Rather than classifying firms in the distribution, other approaches include subtracting the firm's rate from a cross-sectional constant/benchmark of some type, for example, the statutory U.S. tax rate or an industry average.

Dyreng, Hanlon, Maydew, and Thornock (2017) study profitable firm-years on Compustat, and require other conditioning variables. One possible concern with the trend observed in Figure 3, Panel A, is that the trend toward multinationality might be biased because perhaps older, surviving firms are more likely to become multinational. To investigate this possibility, in Figure 3, Panel B, we examine whether rates of multinationality are systematically different for relatively young versus relatively old firms.¹⁴ In 1988, we see that about 14% of firms between one and 10 years old have multinational operations, while the fraction is about 32% of firms between 21 and 30 years old. This suggests that older firms are more likely to have multinational operations and this is true in each of the other years we examine, 1998, 2008, and 2018. The results reveal that a larger fraction of older firms have multinational operations than younger firms in every decade of the sample studied. However, the figure also shows that firm-years in both age groups, young and old, are more multinational in each successive decade, consistent with globalization trends beyond firms simply getting older.

Not only has the fraction of U.S. public corporations that report foreign earnings or foreign taxes grown, but the number of unique countries in which U.S. multinationals report significant operations has also increased over time. The SEC requires publicly traded U.S. firms to disclose a list of their significant subsidiaries each year.¹⁵ As can be seen in Figure 3, Panel C, among firms that disclose at least one significant foreign subsidiary, the number of distinct countries in which the mean firm has a material foreign subsidiary has grown from 6.78 in 1996 to 11.79 in 2018.

¹⁴ The sample for this analysis is all U.S. incorporated firm-years in Compustat with positive values of total assets and sales.

¹⁵ The disclosure is Exhibit 21 of Form 10-K. We recognize that there is some selective disclosure in Exhibit 21, though Dyreng, Hoopes, Langetieg, and Wilde (2019) find that most disclosures are accurate. Moreover, we gather data using text search algorithms that may miss or misclassify subsidiaries (for example, if the company includes the name of the country in the subsidiary name, the subsidiary might be double-counted). In addition, Exhibit 21 requires disclosure of the country of incorporation, but many tax structures rely in differences in incorporation location and the location of management and control (e.g., an Irish incorporated subsidiary managed in Bermuda), and Exhibit 21 does not have information on the location of management or control.

Moreover, among this same set of firms, the mean firm had a significant subsidiary in 1.27 tax haven countries in 1996 compared to 2.52 tax haven countries in 2018.

Over this same period, foreign countries (and the U.S. in 2018) have lowered statutory corporate tax rates. In Figure 4, we plot the average corporate statutory tax rate of OECD countries — the average statutory corporate tax rate was about 44% in 1988, and has declined steadily to about 24% in 2018. In addition, many countries have enacted tax holidays, granted special negotiated tax rates, or provided tax incentives for specific types of investment (e.g., patent box regimes), that have further reduced the tax burden faced by corporations in many countries.¹⁶

Combining the facts of increasing multinationality and decreasing corporate tax rates around the globe, a natural question is whether and to what extent has tax avoidance increased among multinational firms over time. Dyreng, Hanlon, Maydew, and Thornock (2017) provide evidence on this question by examining the trends in corporate tax avoidance for U.S. multinational firms compared to purely domestic firms. Consistent with expectations, the authors find that the cash effective tax rates of U.S. multinational firms declined substantially in the 25 years between 1988 and 2012. Surprisingly, however, the authors also find that purely domestic U.S. firms report similar declines in their effective tax rates. In Figure 5, we reproduce and extend Figure 3 from Dyreng, Hanlon, Maydew, and Thornock (2017). The figure provides evidence consistent with 1) the cash effective tax rates of U.S. multinational firms declining over time, and 2) the cash effective tax rates of purely domestic firms declining at a similar pace, which is somewhat surprising because the U.S. statutory tax rate was effectively constant between 1988 and 2017, rising only once from 34% to 35% in 1994. The trends of both types of U.S. companies

¹⁶ Clearly, statutory tax rates do not tell the whole story. Tax rate changes are often accompanied by other changes that affect the tax base or tax enforcement, as discussed in Kawano and Slemrod (2015). Moreover, some countries have imposed new taxes on multinationals to prevent profit shifting (e.g. the diverted profits tax in Australia and the UK).

merit further discussion.

First, the evidence in Dyreng, Hanlon, Maydew, and Thornock (2017) suggests that the declining effective tax rates of U.S. multinationals appears to be partially driven by 1) U.S. multinationals becoming more global, more intangibles-based, and reporting more foreign earnings (either via fundamental business purposes and/or via income shifting) and 2) foreign statutory tax rates declining over time. Prior to the TCJA, the U.S. had a worldwide tax system that allowed deferral of U.S. taxes on foreign subsidiary operating earnings until the time of repatriation. Thus, any earnings 1) recognized in a foreign subsidiary in a country with a relatively low tax rate, and 2) held abroad and not subject to immediate U.S. taxation (e.g., subpart F), lowered the firm's cash effective tax rate. As more operating earnings were reported in foreign jurisdictions (and not repatriated), cash effective tax rates declined.¹⁷

Second, the fact that domestic firms have declining cash effective tax rates is puzzling, and calls into question the conventional wisdom that multinational firms have a tax-based competitive advantage. Many believe that because purely domestic firms do not have opportunities to earn income in low tax jurisdictions, and cannot engage in strategic behaviors to recognize earnings in tax havens, their tax avoidance opportunities are limited. Nevertheless, the data reveal that their cash effective tax rates are lower and have been declining at the same pace as multinational firms.

Several researchers have proposed explanations for these two puzzles. Dyreng, Hanlon, Maydew, and Thornock (2017) speculate that one partial explanation resides in temporary statutory tax changes designed to stimulate the economy and encourage investment such as bonus

¹⁷ Depending on how a firm accounted for unremitted foreign earnings, the effective tax rate for financial reporting (known in the literature as the GAAP effective tax rate) may or may not have been affected. If a firm treated the earnings as temporarily reinvested, then the U.S. tax was accrued for financial reporting purposes and the GAAP effective tax rate was not be reduced. However, if the earnings were treated as indefinitely reinvested, then the U.S. tax was not accrued, and the GAAP effective tax rate was reduced.

depreciation in 2001-2004 and starting again in 2008 (now scheduled through 2026 in the TCJA), and special deductions like the domestic production activities deduction (now expired). Drake, Hamilton, and Lusch (2019) argue that purely domestic firms on average have larger tax loss carryforwards than other firms, and their low effective tax rates can be in part explained by the utilization of these tax loss carryforwards.

Thomsen and Watrin (2018) extend Dyreng, Hanlon, Maydew, and Thornock (2017) by comparing the effective tax rates of U.S. multinationals to European multinationals. They find that both groups of firms have effective tax rates that are declining over time, but that the European multinationals have declined more than the U.S. multinationals. They find that the downward trends of European multinationals is primarily driven by declines in statutory corporate tax rates around Europe. Dyreng, Hanlon, Maydew, and Thornock (2017) also find that the decline in foreign statutory tax rates (e.g., European tax rates) is a partial driver of the declining trend for U.S. multinationals. After presenting data on tax avoidance in the cross-section and over time, we now turn to literature on the factors associated with tax avoidance, methods of tax avoidance, and consequences of tax avoidance.

4. Characteristics and Factors Associated with Tax Avoidance

As noted earlier, there is wide variation in the distribution of tax avoidance.¹⁸ Over the past decade, researchers have published numerous studies in an attempt to explain this variation, with some progress being reported. Nevertheless, researchers typically report adjusted R-squared statistics between 5% and 20%, suggesting that the bulk of the variation remains unexplained. For example, even with a full set of firm and manager fixed effects, Dyreng, Hanlon, and Maydew (2010) report adjusted r-square of at most 10 percent when examining one-year *CASH ETR*, while

¹⁸ As shown earlier, *CASH ETR* displays significant variation. Other proxies for tax avoidance (e.g., GAAP ETR, book-tax differences, permanent book-tax differences) also display significant variation.

Chen, Chen, Cheng, and Shevlin (2010) in their study of family firms report adjusted r-square between 12% and 20%.

Despite difficulty explaining the variation in *CASH ETR* (and accounting ETRs or GAAP ETRs) overall, researchers have identified numerous factors that are correlated with *CASH ETR*.¹⁹ First, there are several studies that illustrate the effect of the executive compensation package on tax avoidance. Rego and Wilson (2012) report evidence consistent with a positive association between stronger equity risk incentives for the manager (designed to encourage the manager to take on risky projects) and tax avoidance, consistent with tax avoidance activities being risky investments. Phillips (2003) finds that compensating business unit managers on an after-tax basis is correlated with lower effective tax rates, and Armstrong, Blouin, and Larcker (2012) report that the tax director's incentive compensation is correlated with GAAP effective tax rates (rather than cash taxes paid), suggesting the importance of reported earnings numbers

Not only do explicit managerial incentives affect tax avoidance, so does the manager him/herself. In other words, it is not only the case that the firm provides incentives to act in a certain way with respect to tax by setting compensation packages, but the manager him/herself matters, separate from the firm, firm characteristics, and incentives. Dyreng, Hanlon, and Maydew (2010) find evidence consistent with individual managers affecting tax avoidance (i.e., a manager fixed effect for tax avoidance), but the authors cannot isolate any particular factor that explains why (e.g., age, education, power, etc). Subsequent research reports evidence consistent with some attributes of the executives mattering such as prior military service (Law and Mills, 2017), personal tax aggressiveness (Chyz, 2013), religious social norms (Dyreng, Mayew, and Williams 2012; Boone, Khurana, and Raman, 2013), civic mindedness (Hasan, Hoi, Wu, and Zhang, 2017), and

¹⁹ A GAAP ETR has tax expense rather than cash taxes paid in the numerator.

political preferences (Francis, Hasan, Sun, and Wu 2016).

Managers are also concerned with financial accounting earnings, and often appear to favor reporting high accounting earnings, even if this means paying more cash tax. For example, Erickson, Hanlon, and Maydew (2004) study firms that were accused by the SEC of overstating financial accounting earnings, and were subsequently required to restate their financial results to remove the overstatement. By comparing restated financial results to the original overstated amounts, the authors find that the average firm in their sample paid \$0.11 in cash taxes for an additional \$1.00 of overstated financial accounting earnings.²⁰ Graham, Hanlon, and Shevlin (2011) survey tax directors and report evidence consistent with 1) top management at public firms often placing more weight on GAAP effective tax rates than on cash taxes paid and 2) the impact on financial accounting income of repatriating foreign earnings being an important determinant in the repatriation decision. Blouin, Krull, and Robinson (2012) use archival data and report evidence consistent with Graham, Hanlon, and Shevlin (2011).

Additional firm characteristics have also been examined with respect to tax avoidance. For example, Badertcher, Katz, and Rego (2013) examine closely held firms and report evidence consistent with managers of closely held firms being more risk averse, and consequently avoiding less tax. This finding is consistent with Chen, Chen, Cheng, and Shevlin (2010) who examine family controlled firms and interpret their evidence as suggesting that family firms avoid less tax. In addition, McGuire, Wang, and Wilson (2011) study firms with dual-class ownership structures and find that as the wedge between voting rights and cash flow rights increases tax avoidance declines. However, the results need to be interpreted with care. The measures of tax avoidance employed in many of these studies were not designed to be employed across public and private

²⁰ For more on this issue see Shackelford and Shevlin (2001) and their review of the book-tax tradeoff literature, including accounting method choice decisions, disqualification of incentive stock options, and other firm decisions.

firms nor perhaps across firms with such different ownership structures. The measures are usually some type of effective tax rate – cash taxes paid or income tax expense divided by pre-tax accounting earnings. As discussed above, cash effective tax rates only capture non-conforming avoidance, meaning tax avoidance that lowers taxes paid but does not lower pre-tax accounting income. It is plausible that private firms and firms with otherwise lower capital market pressures would be willing to engage in conforming tax avoidance (i.e., the type that also lowers pre-tax accounting earnings). Thus, comparing effective tax rates across firms with different ownership structures, and thus, different capital market pressures cannot be interpreted in the same manner as comparing effective tax rates across a sample of publicly traded firms. Effective tax rates are likely not as good a measure of tax avoidance in private firms (Hanlon and Heitzman, 2010).

Rego (2003) examines economies of scale and multinationality as determinants of GAAP effective tax rates.²¹ Using data from 1990-1997, Rego (2003) finds that larger firms have higher GAAP effective tax rates, consistent with the political costs argument from Zimmerman (1983). Holding constant firm size, Rego (2003) also reports that firms with higher incomes have lower GAAP effective tax rates, consistent with the marginal benefit of tax avoidance increasing with profitability. Finally, Rego's results are consistent with multinational firms having lower GAAP effective tax rates than purely domestic firms, holding size and income level constant. In addition, Rego's evidence also suggests that multinational firms with more extensive foreign operations have lower GAAP effective tax rates than multinational firms with less extensive foreign operations, consistent with economies of scale for tax planning.²²

²¹ GAAP effective tax rates are calculated as income tax expense per the financial statements divided by pretax income per the financial statements, where the financial statements are computed according to Generally Accepted Accounting Principles (GAAP).

²² Interestingly, Rego motivates her study quoting Leblang's (1998) Tax Notes article which states that multinational corporations "...may have significantly greater opportunities to escape tax with respect to cross-border investments than with respect to strictly domestic investments." (page 181) and by quoting Collins and Shackelford's (1999) Tax Notes article which concludes that "...empirical findings in the area are insufficient and inconclusive and fail to

Markle and Shackelford (2012 and 2013) study multinational companies from around the world, not just the U.S. The authors document that Japanese and U.S. multinational corporations have the highest GAAP effective tax rates while multinationals based in tax havens have the lowest. However, they find little difference between the effective tax rates of domestic and multinational firms. They also find that entering a tax haven is associated with subsequent declines in effective tax rates, consistent with Dyreng and Lindsey (2009).

The overall findings are that firms with more financial leverage, higher research and development expenses, higher property plant and equipment, generally have relatively lower cash effective tax rates. Executives seem to matter though it is not clear what the executive does to lower rates. In terms of multinationality specifically, firms with more foreign earnings (especially in tax havens) are able to achieve relatively low tax rates and this effect is stronger when the firm is also more intangible in nature (e.g., more R&D spending). Nevertheless, the overall effect of multinationality on tax avoidance remains somewhat mixed as some studies find when compared to domestic firms, multinational firms have lower rates (Rego, 2003), have similar rates (Markle and Shackelford, 2012) or higher rates (Dyreng, Hanlon, Maydew, and Thornock, 2017).²³

Although researchers have documented that tax avoidance is correlated with a multitude of factors, significant issues remain unresolved. First, it is difficult, if not impossible, to simultaneously study all the factors that have been shown to be correlated with tax avoidance. Thus, researchers have difficulty understanding just how much total variation in the tax avoidance distribution can be explained. Additionally, researchers struggle to determine with confidence

support or undermine Leblang's assertions" (p. 131). While Rego (2003) was an important paper in trying to reconcile these views, the question still seems open today.

²³ We caution that these discrepancies could be driven by different time periods and differences in the research designs of the studies, and in particular driven by the fact that Dyreng, Hanlon, Maydew, and Thornock (2017) examine *CASH ETR*, while Rego (2003) and Markle and Shackelford (2012) examine GAAP effective tax rates.

which factors are the primary drivers of the variation in tax avoidance because it is difficult to control for all known determinants of tax avoidance in a single model. Second, researchers commonly face problems of endogeneity, including both simultaneity and omitted correlated variables, and have struggled to find satisfying identification strategies. For example, R&D is correlated with tax avoidance, but it unclear if the tax benefits of engaging in R&D per se causes lower *CASH ETR*, or if firms that engage in R&D also have a greater ability and/or propensity to shift income to low-tax jurisdictions resulting in lower *CASH ETR*. The reality is that both effects are probably occurring, but it is difficult for a researcher to identify which matters the most. To date, researchers have not identified a “silver bullet” that explains the cross-sectional variation in tax avoidance. To the extent that tax avoidance arises through actions beyond idiosyncratic personality traits or business models, we expect researchers will use advanced econometric techniques and identify clever natural experiments to improve our understanding of the cross-sectional variation in tax avoidance.

5. How do Firms Avoid Taxes?

Though there are many studies that identify characteristics of firms and managers that are correlated with corporate tax avoidance, researchers generally stop short of identifying the exact nature of the actions taken that caused fewer taxes to be paid. This is in part driven by the myriad options available when considering how to avoid income taxes as well as the lack of required public disclosures related to the firm’s tax situation. Indeed, as discussed above, when engaging in tax planning managers can do everything from take advantage of tax incentives that are clearly granted by statutory authority (e.g., accelerated depreciation deductions, interest deductions, tax exempt municipal bond interest) to illegal tax evasion (e.g., not reporting known taxable income), with many possibilities in between. In this section, we identify some of the known methods

managers use to avoid taxes.

5.1 Tax avoidance via provisions in the tax code

Some methods of tax avoidance are explicitly provided in the tax code. For example, firms can take accelerated depreciation deductions on many types of capital assets, claim deductions for interest paid on most types of interest, receive tax credits for certain research or experimentation activities, investments in solar or wind energy (or the provision of equity by financial institutions to solar and wind developers), and investments in low income housing, among hundreds of other tax breaks. Each year, the U.S. Department of Treasury identifies the cost associated with these tax breaks in a report on tax expenditures. In 2015, the government identified 169 different types of corporate tax breaks, with deferral of tax on foreign earnings, research and experimentation credits, domestic production activities deductions, and low-income housing investment credits among the largest.

One of the largest statutory tax deductions is interest deductibility.²⁴ Firms that choose to use debt financing instead of equity financing can reduce tax payments using deductions for interest payments. Researchers have long debated just how significant this tax break is in terms of corporate capital structure and other corporate behaviors. Early researchers hypothesized that firms with non-debt tax shields (e.g., depreciation deductions) would employ less leverage, but they often found the opposite because firms with high non-debt tax shields were often firms with high financing needs (large physical capital assets drive both large amounts of depreciation and large needs for capital financing).

In the 1990's, researchers made progress in estimating firm-specific marginal tax rates (Shevlin, 1990; Graham, 1996) which led to significant progress in terms of documenting a relation

²⁴ Notably, the government does not include interest expense deductions on the list of corporate tax breaks.

between debt and taxes (Graham, 1996; Graham, 2000).²⁵ However, some questions remain because estimating marginal tax rates is notoriously complicated and fraught with measurement error (e.g., Shevlin, 1990; Graham, 1996a; Blouin, Core, and Guay, 2010), and because separating the effect of the marginal tax rate from other correlated factors can be difficult. For example, firms with low marginal tax rates are also more likely to be firms with existing or future losses, and these same firms are likely to face higher bankruptcy costs and other frictions that make borrowing difficult. In addition, measuring leverage can be complicated. For example, financial reports do not capture some economic liabilities and other liabilities can be ‘off-balance sheet’ for financial accounting but deductible for tax purposes (e.g., Mills and Newberry, 2005).²⁶ However, overall, the evidence is consistent with there being an association between debt and taxes; but how important taxes are in corporate capital structure (i.e., what order effect) is still an open question.

Some companies have also significantly reduced their cash effective tax rates by using stock-based compensation. Until 2004, companies were not required to record a financial accounting expense for stock option compensation, but received tax deductions for the intrinsic value (market price less the strike price) of the compensation at exercise.²⁷ This created situations where tax liabilities were reduced significantly, but financial accounting income was not affected, resulting in very low *CASH ETRs* for some firms.²⁸ Since 2004, firms are required to record financial accounting expense for share-based compensation in the amount of the ‘fair value’ of the

²⁵ Shevlin (1990) and Graham (1996) focus on deriving firm specific marginal tax rates in contrast to the prior literature at the time. Auerbach (1983) estimated marginal tax rates on the earnings of corporate investments in plant and equipment. In addition, Altshuler and Auerbach (1990) examine and clearly describe the restrictions on the ability of firms to utilize tax losses and credits. Shevlin (1987, 1990) and Graham’s work (starting with the 1996 paper) incorporate the insights and details about loss carryovers and credit utilization from Auerbach (1983) and Altshuler and Auerbach (1990) in developing the firm-specific marginal tax rates.

²⁶ See Hanlon and Heitzman (2010) and Graham (2008) for more complete reviews.

²⁷ This same amount is taxable to the employee as compensation in the same reporting period.

²⁸ But the GAAP ETRs were not affected – see Hanlon and Shevlin (2002) for an explanation of the prior accounting for income taxes when options were not expensed for financial accounting.

compensation on the grant date, with the financial accounting expense typically being recorded over the vesting period. Even with this expensing, during some years with high stock market appreciation, the deduction for stock compensation can be significantly larger than the financial accounting expenses recorded, such that some firms still report a very low *CASH ETR*. In addition, while the prior accounting standards did not require the book-tax difference for options to be accounted for in income tax expense (instead the excess tax benefits were recorded in equity), current rules require the recording of a temporary difference related to the amount expensed for financial accounting and a permanent difference for any amount in excess of the compensation expense for financial accounting. As a result, income tax expense is now also lowered by any excess (for tax relative to book) deductions for stock options. Such an excess deduction for stock option compensation was likely the major factor that reduced Amazon's Federal current tax expense to zero in 2018.²⁹

Just because the aforementioned tax breaks are explicitly listed in the tax code, does not mean that they are without controversy. For example, there are significant grey areas that arise when determining what qualifies as an interest payment (and therefore deductible) versus a dividend payment (and therefore not deductible) – for example, in hybrid debt-equity investments. Likewise, there is substantial room for disagreement over what qualifies as a research or experimentation expenditure that might qualify for a tax credit instead of a less valuable deduction. With almost every codified tax deduction, there is some scope for disagreement leading to opportunities for companies to reduce taxes by aggressively interpreting the law. Moreover, some countries (and states) negotiate directly with companies and grant special tax rates or tax holidays.

²⁹ See <https://www.wsj.com/articles/does-amazon-really-pay-no-taxes-heres-the-complicated-answer-11560504602> for further information about Amazon. The deduction lowered tax payments for many companies in the 1990s during the dot com bubble but these reductions were not reflected in income tax expense (see Hanlon and Shevlin (2002) and Graham, Lang, and Shackelford (2004)).

Chow, Hoopes, and Maydew (2018) report that about 9.7% of U.S. public multinational firms reported participating in at least one tax holiday. Some special tax deals have recently been scrutinized, for example, the illegal state aid case brought by the European Union against Ireland and Apple.³⁰

5.2 *Tax avoidance via ‘tax shelters’*

In addition to favorable tax legislation, and the discretion allowed within those rules, companies also use clever interpretations of the tax law to reduce tax payments. In the 1990s, some companies engaged in what became known as ‘corporate tax shelters’ with colorful names and acronyms such as COLI (Corporate Owned Life Insurance), LILO (Lease-in, Lease-out) BOSS (Bond and Option Sales Strategy), etc. These strategies were technically legal but widely viewed as being contrary to the intent of the law. Often they were sold to clients by law firms, accounting firms, or investment banks. Many have described and examined these shelters – prior research (Bankman, 2004; Graham and Tucker, 2006; Hanlon and Slemrod, 2009; Wilson, 2009; and Brown, 2011), the U.S. Treasury (Treasury, 1999), investigative reporters in the popular press (Byrnes and Lavelle, 2003; Novack and Saunders, 1998), and there have been books written about them (e.g., Perfectly Legal (Johnson, 2005)). While the nuances of these shelters is beyond the scope of this chapter, we note that most of these transactions have been curtailed in recent years through increased penalties for taxpayers and advisors, and through more thorough reporting to the IRS and to the public in required financial reports.

5.3 *Tax avoidance via income shifting*

Income shifting is high on the menu of tax avoidance options available to multinational

³⁰ See https://europa.eu/rapid/press-release_IP-16-2923_en.htm for a press release by the European Commission related to the case, and https://en.wikipedia.org/wiki/EU_illegal_State_aid_case_against_Apple_in_Ireland for a summary of events.

firms.³¹ This method of tax avoidance for MNCs has garnered the most attention, thus we spend more time on this method including a discussion of the various magnitude estimates.

Firms shift income by strategically using intercompany transactions to recognize earnings in low-tax jurisdictions. These intercompany transactions generally involve payments for goods and services, known as transfer prices, or intercompany interest payments on internal debt. Transfer prices and intercompany interest rates are subject to strategic manipulation by companies because the same decision makers control both sides of the transaction.

Governments around the world recognize that intercompany transactions require transfer pricing yet also create opportunities for income shifting. Current rules require intercompany transactions take place at an arm's-length price i.e., a price that would have been used if the parties to the transaction were unrelated. In practice, however, the arm's length price is difficult to enforce because open-market prices are difficult to observe or simply do not exist for many goods, services, and financing transactions. For example, when an internet user in France clicks on an advertisement delivered by Google, it seems reasonable for Google's French subsidiary to pay a royalty for use of the Google search algorithm and other intellectual property; after all, the algorithm was likely developed by engineers located outside France. But, an open market does not exist for search algorithms, and hence an arm's length royalty rate is unobservable and essentially nonexistent. Without an observable market price, Google necessarily makes assumptions about what the price should be, but those assumptions are influenced by Google's incentives, including the tax incentives. Thus, the theory of requiring an arm's-length price is sound, but at times perhaps not an effective means of mitigating income shifting in practice.

Recognizing the limitations of arm's length pricing in controlling tax-motivated income

³¹ Income shifting has, at times, been important for other cross-jurisdictional tax avoidance, for example across states in the U.S. We focus on cross-country income shifting in this chapter.

shifting, countries have erected a wide variety of additional barriers, known as base erosion prevention mechanisms. These barriers include limitations on interest deductibility, withholding taxes on dividends, royalties, and interest payments, taxes on passive income, and many others (including the base erosion and anti-abuse tax (BEAT) in the U.S. in the TCJA). These base erosion prevention mechanisms increase the costs of income shifting, thereby reducing its prevalence.

Because tax rules are generally created at the individual country level, and different countries seek different objectives with their tax systems, the existing international tax landscape is disjointed and extremely complicated.³² Some countries tax earnings of resident companies regardless of where earned. Other countries tax only the earnings generated within the home country. Some countries define residence as the location of management while other define it as the location of incorporation. Some countries have wide bilateral treaty networks that enable tax efficient movement of capital, earnings, and goods and services between the two countries; others do not have large treaty networks.³³ The ultimate outcome of the uncoordinated nature of the international tax landscape is that opportunities exist for companies to create complex structures and clever intercompany transactions that cause these tax systems to interact unexpectedly in the company's favor.

Anecdotal evidence of income shifting is pervasive, and we use a few of those anecdotes to illustrate several common strategies used by U.S. multinational companies to shift income.³⁴ First, many U.S. multinational companies with valuable intangible assets such as patents, copyrights, or trademarks arrange their global organizations such that the intangible asset is owned

³² Efforts around the world are currently underway to improve coordination of tax rules among countries, and thus change how global income is allocated and taxed.

³³ Many countries have made substantial changes to their international tax rules during the sample period we study.

³⁴ There are variations on the structures we discuss. For example, the foreign subsidiary may not own the intangible asset but rather license it from the parent company in some cases. We present only the relatively simple case for the transactions for ease of discussion.

by a subsidiary in a low tax country.³⁵ The transfer of ownership (or some ownership rights) usually requires a taxable payment by the low-tax subsidiary to the high-tax entity at a ‘fair-market’ arm’s length price. Thus, firms have an incentive to transfer ownership of intangible assets early in their life when their market value is low, or when market values are difficult to determine. For example, Uber transferred the rights to many of its intangible assets to foreign subsidiaries in the Netherlands in early 2013, shortly before a new round of venture capital financing increased the value of the company from \$330 million to about \$3.5 billion.³⁶ Firms also seek advanced pricing agreements with the IRS or other taxing authorities to reduce the risk of the transactions. Once the low-tax subsidiary owns or controls the asset, it licenses the right to use it to other subsidiaries of the company that are located in other countries. Subsidiaries in these other countries (often with higher tax rates) pay royalties, license fees, or other compensation to the low-tax subsidiary each time they engage in economic activities that use the intangible asset owned by the low tax subsidiary. As the value of the intangibles grows and they generate more income, these payments from the operating companies to the entity in the low-tax country grow. The payments to the entity in the low-tax country are generally tax deductible in the high-tax countries, thereby lowering, or even eliminating, the taxes owed to high-tax countries by entities in the high tax countries. For example, Starbucks was accused of shifting income out of the UK by compelling its UK subsidiary to pay royalties for the Starbucks brand and business processes to its Dutch holding company. The net effect was that Starbucks reported no profits and paid no taxes in the UK, despite robust UK sales and claims by management to shareholders that UK operations were profitable. Like most of these cases, there are two sides to the story and the ‘truth’ is not clear-cut. Sales and

³⁵ In some instances, ownership is not transferred, but licensing rights are granted. In the text that follows, we use “owned” for simplicity, but recognize that actual transactions can take many forms.

³⁶ See <https://fortune.com/2015/10/22/uber-tax-shell/> for additional details.

financial accounting profitability do not determine tax liabilities; but rather the tax rules of the jurisdictions determine taxation. Starbucks claimed the tax planning was legal and they did not technically owe UK tax. Some argued that the case was brought on moral, not legal, grounds. Regardless of whether Starbucks' actions were legal or moral, it falls within our definition of tax avoidance. Additionally, the case illustrates that when the apparent economics do not line up with taxation, the media and regulators notice. Indeed, reporters and regulators have raised similar accusations against other well-known companies. These accusations seem to be bringing about real change in the perception of tax avoidance and the regulations around the world.³⁷

Second, many U.S. multinationals have been accused of using intercompany lending arrangements to strip earnings out of high-tax countries and report it in low-tax jurisdictions. In these arrangements, a subsidiary located in a low-tax country lends to a subsidiary in a high-tax country. The entity in the high-tax country pays interest on the loan, which is tax deductible in the high-tax country. The interest payments are taxable in the country where they are received, but because the lending subsidiary is generally located in a low-tax country, the overall company's tax bill is reduced. A recent example of a U.S. MNC involved in income shifting using intercompany debt is Hess, Inc. Hess's Norwegian subsidiary borrowed from Hess's Dutch subsidiary at an unusually high interest rate. The high interest rate reduced income in Norway and increased income in the Netherlands where it was taxed at a lower rate than it would have been taxed in Norway. In 2017, the Norwegian government determined that the interest rate was not arm's-length, and disallowed some of the interest deductions that the Norwegian subsidiary had claimed.

In many situations, complicated corporate structures are necessary for income shifting. Consider structures such as the Double Irish, or the Double Irish with the Dutch Sandwich that

³⁷ For more on both sides of the Starbucks issue see Kleinbard (2013) and Worstall (2014) and Lawson (2012).

have been implemented by U.S. companies (via Ireland) for the purpose of generating untaxed foreign earnings that is not immediately subjected to U.S. taxation.³⁸ In general, the strategy involves what is known as a cost-sharing agreement where the low-tax jurisdiction foreign subsidiary acquires IP from the U.S. parent company (either through a purchase or a licensing agreement).³⁹ The foreign subsidiary then shares in the cost to further develop the IP or to develop the market for the sales of the IP in other jurisdictions. As the foreign subsidiary bears risks and costs, it is entitled to the income from the sales of the product, effectively ‘shifting’ the income (revenue and the shared costs) to the low-tax jurisdiction. This transaction is described in detail in Kleinbard (2011). Often in such strategies the foreign earnings were ultimately recognized in other haven nations in the Caribbean; giving rise to terms like the “Bermuda Black Hole” to describe the final destination of international profits of U.S. multinational firms.

The examples above illustrate how international tax rules can incentivize firms to form complicated chains of ownership and intercompany transactions. Many of the structures require various subsidiaries and a series of intercompany contracts and payments. While many income-shifting anecdotes such as those described above have been identified in the popular press and by academic researchers and policy makers, researchers have struggled to systematically study income shifting on a large scale. By nature, directly observing income shifting is impossible because the counterfactual, i.e., what income would have been absent the income shifting, is not reported (or otherwise observable). As such, researchers must first estimate (using observable data) what earnings would have been had they not been shifted, and then compare this estimated quantity

³⁸ For discussions of these, see Kleinbard (2011) and Drucker (2010) for the Double Irish and Double Irish Dutch Sandwich. The Double Irish is no longer allowed but Ireland has replaced it with the Single Malt. See Coyle (2017) for a description of the Single Malt. The Capital Allowances for Intangible Assets (CAIA) (also known as the Green Jersey) is another strategy used in Ireland (for a description of the CAIA see (E&Y (2017))).

³⁹ This initial transfer of ownership or control is a taxable transaction, with tax liability based on the purchase price or royalty payment of the transfer.

to reported income to infer shifted income. Thus, income shifting research is largely an exercise in estimating what earnings would have been if income were determined by economic factors of production, and testing to see whether the difference between actual earnings and estimated “as-if” earnings varies predictably with tax incentives to shift income.

Overall, it is important to be cognizant that there are many reasons companies expand and operate overseas that have nothing to do with taxes (location of customers, labor costs, natural resources, etc.). At the same time, the evidence is consistent with tax rates playing a significant role in location decisions and income reporting. In addition to the academic studies we discuss below, governmental reports provide evidence that is consistent with income shifting. For example, the Government Accountability Office (GAO) reported in 2008 that foreign operations of U.S. multinationals in low-tax countries have income shares significantly larger than their share of other measures such as physical assets, compensation, and employment; the relation was the opposite for most of the operations in high-tax foreign locations. Furthermore, Treasury in a study of transfer pricing rules examined the relation between CFC profitability and the statutory tax rate of the jurisdiction in which the CFC is located. Using tax filing data, the Treasury found an inverse relation between pre-tax profitability and tax rates. The evidence that some shifting likely occurs is pervasive. However, evidence that firms income shift does not necessarily mean they are doing any illegal tax planning. Many of the estimates, as described above (and below), measure income relative to what one would expect based on the location of the factors of production. However, the tax laws do not compute taxation based on the factors of production (or formulary apportionment).

There is a large academic literature on income shifting, including some early seminal work, that we cannot fully cover in this chapter (e.g., Altshuler and Grubert, 2001; Altshuler, Grubert, and Newlon, 2001; Grubert, 2003; Harris, 1993). Grubert and Slemrod (1998) and Grubert (2003)

were early papers that recognized the importance of intangible assets for income shifting. For example, Grubert (2003) uses Treasury corporate tax return files for 1996 and finds that income derived from research and development based intangibles account for about half of the income shifted from high-tax to low-tax countries. Grubert (2003) also reports that R&D intensive subsidiaries engage in more intercompany transactions and thus have more opportunities to income shift. We primarily focus on more recent studies that attempt to quantify the shifting and also the studies that examine the determinants and the consequences of income shifting.

5.3.1 *Estimating income shifting using macroeconomic data*

In one line of studies, researchers use macroeconomic data to estimate income shifting. One early example is Hines and Rice (1994). They aggregate data at the country level and estimate variations on a model that takes the general form of

$$\log \pi_z = \beta_1 + \beta_2 \log L_z + \beta_3 \log K_z + \beta_4 \log A + \beta_5 \tau_z + v_z, \quad (2)$$

where π_z is the sum of profits of all non-bank subsidiaries of U.S. parent firms in country z , L_z is labor input in country z , K_z is capital input in country z , A is a measure of the productivity of economic activity in country z , and τ_z is the country's tax rate. If reported earnings arise through the application of economic factors of production (i.e., capital, labor, and country productivity), and taxes are not an economic factor of production, then the tax rate should not affect earnings. However, taxes might explain reported earnings if firms report income in jurisdictions different from where it was economically generated by strategic use of intercompany transactions. Hines and Rice (1994) conclude that high tax rates reduce reported profits and that firms strategically shift earnings to low-tax countries in an effort to reduce the tax bill.

Other researchers have studied income shifting using macroeconomic data, including most recently Clausing (2019), Wright and Zucman (2018), and Torslov, Wier, and Zucman (2019).

Clausing (2019) uses data from the Bureau of Economic Analysis on direct investment earnings to infer income shifting. She first provides evidence consistent with direct investment earnings being sensitive to the tax rate on those earnings (higher tax rates are correlated with lower direct investment earnings). Clausing (2019) estimates that income shifting by U.S. multinationals reduced tax revenue collections by about \$114 billion in 2015. As mentioned above, estimating income shifting is important work but very difficult to do, and there is no consensus in the literature as to the economic magnitude of the problem. In recent work, for example, Blouin and Robinson (2019) argue that recent estimates of income shifting and revenue losses using macroeconomic data from the BEA are overstated due to double counting of some earnings. Moreover, based on a simple back-of-the envelope calculation, the estimate of \$114 billion seems high. Consider that the sum of all foreign profits of publicly traded U.S. multinational firms in 2015 was \$429 billion.⁴⁰ Thus, if publicly traded U.S. multinational firms paid no tax at all on their earnings to foreign governments in 2015, then an upper bound of lost tax revenue would be \$429 billion * 35%, or about \$150 billion. But, it is also the case that those same firms paid about \$99 billion in income tax to foreign governments during that same year, meaning that ignoring any foreign tax credit limitations, about \$51 billion in tax revenue was lost (\$150-99). While it is possible that the discrepancy could be accounted for by recognizing that private firms could also be shifting income to low-tax foreign jurisdictions, it seems unlikely that the discrepancy could be so large.

Using a different approach, Torslov, Wier, and Zucman (2018) compare the profit-to-wage ratio of foreign firms to those of local firms. They estimate that 40% of the foreign profits of multinational firms are shifted to tax havens in 2015. In a related study, Wright and Zucman (2018)

⁴⁰ \$429 billion was calculated by summing all pretax foreign income (Compustat data item PIFO) of U.S. incorporated firms with positive values of assets at the beginning of the period, positive revenues, and nonmissing values of cash taxes paid, pretax income, pretax foreign income, and foreign current tax expense (Compustat data items TXPD, PI, PIFO, and TXFO, respectively).

argue that 60% of the foreign profits of U.S. multinational firms are located in tax haven affiliates in 2015. This estimate also seems very high when compared to data derived from publicly available financial reports. As discussed above, publicly traded U.S. multinational firms recorded pretax foreign income of \$429 billion in 2015. Applying the Wright and Zucman (2018) estimate that 60% of foreign income (or \$257 billion) was recognized in a tax haven (where presumably the tax rate is zero or very low), the remaining 40% (or \$172 billion) would have been taxed at a rate of 58% to account for the \$99 billion in taxes paid by these firms to foreign governments, a far higher rate than the OECD average statutory tax rate of about 25% in 2015. While it is plausible that a few companies recognized very large profits in tax havens, it seems unlikely that 60% of the foreign earnings of the typical U.S. multinational firm were recognized in a tax haven. In sum, while the evidence based on macroeconomic data suggests there is income shifting, the extent of the issue and magnitude of the income shifted is very much an open question.

5.3.2 Estimating income shifting using microeconomic data

Because there are inherent limitations to research on income shifting using macroeconomic data, researchers have also employed firm-level data to estimate the magnitude of income shifting and study the factors with which it is associated.⁴¹ Early work by Collins, Kemsley, and Lang (1998) examines the foreign profits of U.S. multinational firms relative to the same firms' consolidated worldwide profits. During their sample period, some foreign countries had higher corporate tax rates than the U.S. corporate tax rate. The authors report evidence consistent with

⁴¹ When using macroeconomic data to estimate income shifting, researchers face limits on the conclusions they can draw. For example, macroeconomic data series are often difficult to compare across countries because variation in calculations driven by cultural or political climates, researchers can struggle to make precise estimates of income shifting. Moreover, because the data arises at an aggregated level, researchers using macroeconomic data are unable to determine the characteristics of companies that are associated with income shifting, how many companies shift income, and what organizational or operational consequences might follow the choice to shift income.

abnormally high U.S. profits for firms that have relatively high foreign tax rates. The authors interpret the evidence as being consistent with tax-motivated income shifting into the U.S. Their estimates imply that for each percentage point difference between the foreign tax rate and the U.S. tax rate, one percent of income is shifted for tax purposes. Using essentially the same methodology, Klassen and Laplante (2012) estimate that in 2005-2009, U.S. multinational firms shift income \$10 billion more per year out of the U.S. than in the period 1998-2002.

Huizinga and Leaven (2008) extend Hines and Rice (1994) by applying the Hines and Rice (1994) method to firm-level data (usually from public sources concentrated in Europe) instead of country-level data. In addition, the authors develop a new proxy for the tax incentives to shift income that takes into account all of the statutory tax rates of the firm's subsidiaries simultaneously, and varies for each of the firm's subsidiaries each year (but includes only subsidiaries and tax rates of countries of subsidiaries included in their data). Huizinga and Laeven (2008) primarily study the economic magnitude of income shifting and find that a decrease of the statutory tax rate of one percentage point increases reported profits in the country by less than one percent in many countries, a semi-elasticity that is similar to that reported by Collins, Kemsley, and Lang (1998). Overall, they report an average semi-elasticity of about 1.31, but the estimate varies significantly depending on the empirical specification.

Dharmapala and Riedel (2013) use a different approach to identify income shifting. They first identify exogenous shocks to the income of parent firm, and trace the shocks through to affiliates of the firm. They find evidence that shocks to income at the parent firm are more likely to manifest in higher reported profits in low-tax affiliates than in high-tax affiliates, suggesting tax-motivated income assignment. Davies, Martin, Parenti, and Toubal (2018) examine French firm-level data on export prices to both related affiliates and to unrelated third parties. The authors

report evidence consistent with tax avoidance through transfer pricing being large in magnitude and the data reveal that the activity is concentrated – most of it is driven by exports of 450 firms to ten tax havens.

Despite the fact that many recent income-shifting studies use affiliate-level data, the data used have some weaknesses. First, publicly available datasets (e.g., data from the Bureau van Dijk Amadeus database) generally do not contain detailed affiliate-level data on the financial results of the entire firm. Instead, information about some parts of the firm exist in reasonable levels of detail (e.g., European subsidiaries), while information about other parts of the firm is almost non-existent (e.g., Asian subsidiaries, tax havens outside of Europe (Caymans, Bermuda, etc.)). This leads to a situation where the researcher is compelled to make estimates by examining only a fraction of the firm's geographic footprint that is not randomly selected, but possibly is correlated with key variables such as a country's tax status. An example of this problem is highlighted by Torslov, Wier, and Zucman (2019). Torslov, Wier, and Zucman (2019) discuss micro data and its problems to motivate their use of macro data. They state that of the more than \$50 billion in consolidated profits reported by Apple in 2016, only about \$2 billion can be identified in Apple's subsidiaries using publicly available data sources commonly used to apply the Huizinga and Laeven (2008) model. This suggests that estimates calculated using publicly available micro-level data generate unreliable point estimates because the data cover such a small fraction of some firms. These concerns, however, are perhaps mitigated by the fact that privately available micro-data from the BEA is much more complete, and has been used by researchers to generate income shifting estimates that are comparable to those from private databases, and by the fact that researchers have developed clever techniques to minimize the effect of these problems (e.g., Dharmapala and Riedel, 2013).

Second, because data commonly used in firm-level income shifting studies only provide a partial view of the entire firm (i.e., data from the Bureau van Dijk Amadeus database), researchers cannot easily track the flow of funds. In principle, one advantage to firm-level data is that one could observe subsidiaries with abnormally low earnings and corresponding subsidiaries with abnormally high earnings, and thereby determine the flow of funds within the firm. Unfortunately, with such sparse data, such estimates are difficult. Indeed, most empirical designs do not constrain some subsidiaries to have abnormally low profits, and others to have abnormally high profits.

Third, some researchers have used consolidated public filings for U.S. multinational firms, which contain earnings numbers that are disaggregated to show domestic and foreign components (e.g., Dyreng and Markle, 2016; Klassen and Laplante, 2012). These data are advantageous because they include all of the firm's earnings, but come at a major cost in that these disclosures do not contain detailed information on the specific countries where the earnings were reported. Thus, using these data, researchers are forced to examine only shifting into or out of the U.S., but cannot examine shifting from one subsidiary to another within the same family group, nor can they identify which tax haven countries receive the shifted income.

The estimated magnitude of income shifting using firm-level data is generally smaller than the estimated magnitude using country-level data (Dharmapala, 2014). Indeed, Heckemeyer and Overesch (2013) systematically evaluated the elasticities estimated in 27 unique empirical studies, most of which used firm-level data, and found that the consensus elasticity is about 0.8, which is significantly smaller than the elasticities typically found in studies that use macroeconomic data. The Huizinga and Laeven (2008) approach has been widely adopted in recent years as researchers examine specific questions regarding the association of income shifting and other firm outcomes. As examples, Markle (2016) estimates that multinational firms subjected to territorial tax regimes

appear to shift more income than multinational firms subjected to worldwide regimes; Dischinger, Knoll, and Riedel (2014) report evidence consistent with firms being biased toward recognizing profits in the country of their headquarters; and De Simone, Klassen, and Siedman (2018) reports some evidence consistent with income shifting being negatively related to investment efficiency. In addition, De Simone (2016) provides evidence consistent with the adoption of International Financial Reporting Standards (IFRS) increasing estimated income shifting. The evidence suggests that a mechanism behind this result is that IFRS created cross-jurisdictionally comparable financial statements, and therefore allow firms to draw from a larger pool of observations when justifying profit margins to demonstrate compliance with arm's-length standards.

5.3.3 Summary of income shifting literature

The weight of the evidence is consistent with firms shifting income away from high-tax countries into low-tax countries. The evidence is consistent with this outcome across studies that employ public and private data, macro and micro data, and with a variety of techniques. Nevertheless, these same studies report widely varying estimates of the magnitude of the phenomenon; thus the extent to which income shifting occurs is still largely unknown. Moreover, because of data limitations, little is known about the consequences of income shifting. We anticipate that more work will be done on this dimension as additional data become available and by conducting tests as tax rules change (possibly through country-by-country reporting requirements if researchers obtain access), and as econometric techniques advance.

5.4 Tax avoidance via location decisions regarding investment, incorporation, and debt

Multinational firms can also reduce their tax bill through comprehensive tax planning that involves relocation of real production activities, beyond merely shifting reported income. Indeed, the two activities are not necessarily mutually exclusive. Firms make location decisions based on

many factors, taxes being one of them. Once an investment is made in a low-tax jurisdiction it is likely tax avoidance opportunities (e.g., income shifting) expand. In addition, if a firm engages in income shifting, sometimes structural changes (e.g., local investments) are required to support the income shifting (a type of feedback effect).

The most straightforward action is that firms will locate investment in low-tax jurisdictions. Indeed, the literature finds that a decrease in a country's tax rate leads to an increase in foreign direct investment in that jurisdiction. DeMooij and Ederveen (2003) conduct a meta-analysis and conclude that across the outcomes in the 25 studies they analyze, the median value of the tax elasticity is around -3.3; a 1% point reduction in the host-country tax raises foreign direct investment in that country by 3.3%.⁴²

Studies on the recent “innovation or patent box” regimes across the world report some evidence that firms change the location of patents and also capital expenditures (see Böhm, Karkinsky, Knoll, and Riedel, 2015; Bradley, Dauchy, and Robinson, 2015; and Bradley, Robinson, and Ruf, 2018, and others) when innovation box legislation becomes effective consistent with lower tax rates attracting investment.

Companies can also change their tax residence to a low-tax jurisdiction, sometimes known as tax inversions. The goal of an inversion is generally to escape U.S. taxation on foreign earnings and to strip income out of the U.S. via deductible payments from the U.S. entity to the new foreign “parent” (e.g., interest). There have been waves of inversions over time, in the U.S. and in other

⁴² DeMooij and Ederveen (2003) provide an excellent summary of the literature. Hines (1997 and 1999) reviews the U.S. literature and finds that a 1% higher tax rate on companies leads to a reduction in inbound investment of around 0.5% and 0.6%. See also Hassett and Hubbard (2002) a comprehensive review on taxes and investment. For some other important papers see Desai and Hines (1999), Barrios, Huizinga, Laeven, and Nicodeme (2012), Hebous, Ruf, and Weichenrieder (2011), Becker and Riedel (2012), Becker, Fuest, and Riedel (2012). Note, on the other hand, that the literature has, at times, had a difficult time documenting that aggregate investment responds to taxes, so much so that Hines and Park (2019) state that “The apparently small power of tax incentives to stimulate aggregate investment spending is one of the puzzles of the empirical investment literature.”

countries as well (specifically the UK before they became a more tax favorable jurisdiction). The U.S. has countered with increasingly strict tax rules that make inversions less beneficial.

There was a significant inversion wave in the late 1990s through 2001. Inverting firms during this time period would often state that part of the reason to invert is to save taxes. For example, Ingersoll-Rand stated that it expected to save \$40 million a year and Cooper Industries expected to save \$55 million a year in U.S. taxes (Cloyd, Mills, and Weaver, 2003). There was another wave of inversions in the mid-2010s. Pfizer tried to invert in 2015 (via merging with Allergan) but the U.S. government implemented specific rules to stop the transaction.

Seida and Wempe (2004) examine inverting firms' effective tax rates and show that they do indeed decline after inversions. There were also several studies about the market reaction upon the announcement of the inversion during the earlier wave (Cloyd, Mills, Weaver, 2003; Desai and Hines, 2002) and the evidence was somewhat mixed.

Finally, firms can locate financial debt capital in foreign locations to take advantage of tax treatment and tax rules and use debt location to shift income. Newberry and Dhaliwal (2001) provide evidence that U.S. multinationals allocate debt based on jurisdiction-specific tax loss carryforwards and foreign tax credit considerations. Furthermore, Huizinga, Laeven, and Nicodeme (2008), Egger, Keuschnigg, Merlo, and Wamser (2014), and Buettner and Wamser (2013) provide evidence of tax motivated income shifting via debt for European firms. Fuest, Hebous, and Riedel (2011) examine income shifting via debt in developing countries and provide evidence that the effects are larger than in developed countries.⁴³

Thus, firms can choose to locate their investment, place of incorporation, and debt in a tax advantaged manner across the globe that will save taxes. Setting up such structures often enables

⁴³ For other studies see Desai, Foley, and Hines (2004) and Buettner, Overesch, Schreiber, and Wamser (2012).

income shifting to occur and then sometimes income shifting requires a further commitment for ‘real’ investment offshore.

6. Consequences of Tax Avoidance

Beyond simply documenting the existence of tax avoidance (e.g., shifting income and changing real behavior to lower taxes), and attempting to estimate the economic magnitude of the phenomenon, researchers have examined many subsequent economic outcomes associated with tax avoidance. Below we discuss the research that has examined some of the significant consequences of tax avoidance by U.S. multinational firms.

6.1 Consequences: Lost revenues

The most obvious consequence of tax avoidance is lost revenue to the governments around the world. Estimates of just how much revenue is lost are difficult to compute with much reliability because, of course, we do not know the revenue that would be raised in a no-tax-avoidance world. In addition, with respect to tax incentives governments provide, one would have to take into account potential revenues raised by the provision’s economic effects. As part of the Base Erosion and Profit Shifting Project, the OECD published a headline estimate of \$240 billion (<https://www.oecd.org/tax/beps/>) for the global annual revenue loss due to income shifting. Likewise, the IMF reports that for the year 2013, over \$400 billion of tax was lost for OECD countries and \$200 billion for non-OECD countries (Crivelli de Mooij and Keen, 2016). In our discussion above of income shifting above, we reviewed the recent academic estimates of income shifting; many of which seem implausibly large.⁴⁴ While the overall magnitude is unknown, to the extent there is tax avoidance the first obvious consequence is a loss of tax revenues to governments.

⁴⁴ One question is whether tax avoidance by firms leads to sufficient (or any) additional investment or employment to offset any of the lost revenues.

6.2 *Consequences: Pre-TCJA “trapped cash” and its effect on corporate capital structure, payout policy, and investment*

As discussed above, many tax avoidance strategies of multinationals included moving operations and investments to low-tax jurisdictions and/or income shifting to low-tax jurisdictions. As investments were made in low-tax foreign jurisdictions and/or income was shifted to low-tax foreign jurisdictions, U.S. companies had earnings and cash in those jurisdictions that would be subject to the relatively high U.S. tax rate if repatriated to the U.S. As a result (at least in part due to the U.S. tax), U.S. multinationals had large and growing cash balances in foreign entities (Foley Hartzell, Twitman, and Twite, 2007). In other words, the companies had what came to be known as ‘trapped’ cash.⁴⁵

6.2.1 *Effect of ‘trapped cash’ on capital structure and payout policy*

Many anecdotes suggest that U.S. firms increased U.S. borrowing because they did not have access to their foreign cash. For example, even back in 1993 Apple Computer Inc. (now Apple Inc.) prepared to issue \$500 million in debt. The company stated they were considering the debt offering to pay for new research and development facilities. Analysts at the time noted that it was an unusual offering because Apple had more than \$1 billion in cash on hand and no long-term debt obligations. The investor relations spokesperson for Apple at the time, Bill Slakey, responded that Apple was reluctant to draw on its cash reserves because much of the cash was outside the United States and repatriating those assets would produce a significant tax bill (Weber, 1993). Potentially even more costly than raising debt capital, a few years later Apple considered merging or selling itself to Sun-Microsystems because its “financial condition was worsening” and noted

⁴⁵ Harford, Wang, and Zhang (2017) provide evidence consistent with shareholders valuing foreign cash less than domestic cash because the firm will face repatriation taxes on foreign cash, and because the agency costs of foreign cash appear to be higher than domestic cash.

that its board may have “decided a merger is the best way to save the company, which is facing a cash crunch to pay future restructuring charges and an upcoming debt payment.” An analyst from Brown Brothers Harriman said that although Apple had \$1.1 billion in cash, most of it was in foreign subsidiaries. He stated, “If they were to draw it out it would be subject to taxation. It’s liquid, but it’s like drawing money from a 401K (retirement plan) or something” (Poletti, 1996).⁴⁶ There are several academic studies that support the idea that many U.S. firms borrowed in the U.S. to fund U.S. operations and payout policy. For example, Graham, Hanlon, and Shevlin (2010) in a survey of tax executives report that nearly 45% of firms state they borrow money in the U.S. to avoid the repatriation tax. Beyer, Downes, and Rapley (2017) examine internal capital market inefficiencies (e.g., the repatriation tax) and how such inefficiencies affect payout policy and corporate leverage. The authors find that domestic cash is a typical determinant of payouts, but that for investment grade firms that can borrow to fund shareholder payout, increases in foreign cash are also significantly associated with shareholder payout. In a related paper, De Simone and Lester (2018) find that firms with large foreign cash balances have relatively high domestic debt.

6.2.2 *Effect of ‘trapped cash’ on investment*

Researchers have also examined the effects on investment due to tax avoidance behavior and trapped cash. Faulkender and Petersen (2012) find that firms that are financially constrained appear to forgo domestic investments because of the frictions repatriation taxes create in internal capital markets. Hanlon, Lester, and Verdi (2015) investigate the merger and acquisition activity (and capital expenditures and R&D) of firms with large amounts of ‘trapped’ cash due to the

⁴⁶ This example is taken from Graham, Hanlon, and Shevlin (2010). Apple issued another \$17 billion in debt in 2013 and again had to explain to the market why it was borrowing even though it had so much cash on its balance sheet. The WSJ (Burne and Cherney, 2013) stated “Apple has a huge cash stockpile, but much of its money is overseas. Raising cash in the bond market helps Apple avoid the big tax bill that would hit if the company brought its cash back to the U.S., executives said last week.”

repatriation tax. The authors examine whether the locked-out cash is associated with more foreign acquisitions (in other words, whether the cash is ‘burning a hole’ in managers’ pockets). They find that ‘locked-out’ cash is associated with a higher likelihood of foreign acquisitions (as well as foreign capital expenditures and R&D spending, but not domestic acquisitions and capital spending). The authors also document a negative association between ‘locked-out’ cash and the market reaction to a foreign deal, which they interpret as the market viewing those acquisitions as less value-enhancing. Similarly, Edwards, Kravert, and Wilson (2016) examine the market reaction upon foreign acquisitions and report evidence consistent with firms with high levels of ‘trapped cash’ making less profitable (measured as lower returns and lower return-on-assets after the transaction) acquisitions of foreign targets using cash consideration.

Bird, Edwards, and Shevlin (2017) examine acquisition behavior of foreign acquirers. The authors provide evidence consistent with foreign acquirers being tax-favored acquirers relative to U.S. acquirers when the target company has substantial ‘trapped-cash’. The hypothesis is that foreign firms can acquire U.S. targets and avoid the U.S. tax on the locked-out cash, whereas U.S. acquirers cannot avoid the tax. The authors’ results are consistent with their hypothesis.

Thus, the evidence suggests that investment and investment location are affected by tax avoidance behavior and the resulting ‘trapped cash’ of U.S. multinational firms prior to the TCJA.

6.3 *Consequences: Employment*

There is some evidence that employment bears some association with tax rates and there is recent evidence that tax avoidance affects employment and the location of employment as well. Much of this work is conducted using data at the state level in the U.S. For example, Giroud and Rauh (2019) use data from the U.S. Census Bureau to examine whether state-level business taxation affects employment and capital. Their research design leverages on testing the responses

of different organizational forms to different tax rates. Their data span 1977-2011 and they find that increases in the state corporate tax rates are associated with fewer establishments and fewer employees at corporations, but not at businesses not taxed as corporations. Moretti and Wilson (2014) examine state level subsidies for biotech employers and provide evidence that the adoption of such subsidies is associated with significant increases in the number of star biotech scientists in that state. They also estimate that much of the response is due to the relocation of the scientists across state lines.⁴⁷

The effect of tax incentives on labor in an international setting is even more lightly studied, likely due to the paucity of data. One example, however, is Williams (2018) who studies whether tax incentives explain job offshoring. He cites the Congressional testimony of Paul Oosterhuis (2013) that explains that under the then-current transfer pricing rules, in an arm's-length transaction the party that bears the costs and risks is entitled to the bulk of the return. Hence moving labor off-shore, in some cases, supports the rights to the income in the offshore location (in other words, manufacturing had to follow the income shifting). Oosterhuis in his testimony attributes much of the loss of manufacturing (investment and labor) the U.S. to these tax incentives/rules. Indeed, this outcome of manufacturing following income shifting was implied by the models presented in prior literature (e.g., Hines and Rice (1994), Grubert and Slemrod (1998), and Gordon and Hines (2002)). Williams (2018) uses data reported by the Department of Labor's Trade Adjustment Assistance (TAA) program that covers 80,000 offshored job during his sample period, 2003-2009. Williams finds a negative association between the number of jobs offshored to a country and the corporate tax rate in that country. He finds significant cross-sectional variation in

⁴⁷ However, see Gale, Krupkin, and Rueben (2015) for a counter view that the economic effects of state tax rate changes on labor and capital spending are small and thus, cuts in state income tax rates will not necessarily generate growth.

that firms where the jobs are kept within the worldwide firm are much more likely to be responsive to tax rates as compared to instances when the jobs are outsourced to a third party.

Fuest, Peichl, and Siegloch (2018) examine data on German municipalities to estimate the incidence of corporate taxes on wages (employing 6,800 tax changes). They conclude that workers bear about half of the total tax burden. The results suggest that wages are more sensitive to tax rates in more profitable firms, but at the same time, the wage effects are almost zero for very large firms, foreign-owned firms, and firms that operate in multiple jurisdictions. One possible explanation is that these firms can engage in more profit shifting to avoid the tax increase and thus there is no response by labor.

More recent evidence on the effects of tax provisions such as the domestic production activities deduction (DPAD) (Lester, 2019; Dobridge, Landefeld, and Mortenson 2019; Ohrn, 2018) are also informative. The DPAD was a provision enacted as part of the American Jobs Creation Act in 2004. The DPAD allowed firms to deduct a portion of income related to domestic production when determining their U.S. income tax liability; effectively equivalent to a 3.15 percentage point rate decrease on domestic manufacturing income. The evidence from the studies suggests that the DPAD increased capital expenditures by firms who claimed the deduction and that the increase in investment was greatest when the benefits of the tax provision were fully phased in.⁴⁸ In addition, the evidence suggests employment costs did not increase (and indeed decreased) after the tax cut in the DPAD. Thus, the targeted tax provision of lower tax rate on certain activities is associated with greater investment related to those activities and a substitution effect of capital for labor.

⁴⁸ Ohrn (2018) estimates that a one percentage point reduction in effective tax rates generated by the policy increases investment by 4.7 percent of installed capital, increases payouts by 0.3 percent of sales, and decreases debt by 5.3 percent of total assets.

6.4 *Consequences: Transparency and shareholder value*

Several studies examine the hypothesis that operating subsidiaries in tax haven countries reduces transparency and is a drain on shareholder value. Bennedson and Zeume (2018) argue that tax havens enable managers to derive private benefits at the expense of shareholders because operating in tax havens countries creates opacity that allows managers to hide information from shareholders.⁴⁹ They argue that when tax haven countries sign TIEAs, the transparency increases and shareholder value increases. They find that the value of firms with subsidiaries in tax haven countries that sign TIEAs increases by 2.5%, suggesting that the benefits of transparency accrue to shareholders. These findings are consistent with Balakrishnan, Blouin, and Guay (2018) who provide evidence that aggressive tax planning is correlated with lower corporate transparency, with Hope, Ma, and Thomas (2013) who find that managers that tax plan give less information about the location of their earnings in geographic segment disclosures, and with Durnev, Li, and Magnan (2016) who provide evidence that firms incorporated in tax havens trade at a discount.⁵⁰

7. Why Not? What are the Constraints on Tax Avoidance?

So far in this chapter we have we have presented data that in aggregate multinational firms pay a substantial amount of income tax. However, we have also presented evidence from the literature consistent with there being a significant amount of tax avoidance occurring, especially by firms with certain characteristics and managers and with tax avoidance increasing over time. A question that naturally arises is why firms do not avoid more taxes – what are the constraints on

⁴⁹ See also Desai, Dyck, and Zingales (2007) who examine the interaction between corporate taxes and corporate governance. The authors predict and find evidence consistent with the sensitivity to corporate tax changes varying with the quality of corporate governance.

⁵⁰ There are other effects examined in the literature as well. For examples, see Desai et al. (2003) who study direct versus indirect ownership and the sensitivity to tax and Dyreng, Lindsey, Markle, and Shackelford (2015) who study ownership chains.

tax avoidance?⁵¹ An easy answer is tax avoidance stops when the marginal costs exceeds the marginal benefits. But, what are the costs?

Some limited evidence is available in the literature on this question. For example, in their survey of tax executives in 2007, Graham, Hanlon, Shevlin, and Shroff (2014) asked the question “Has your company ever considered but decided not to implement a tax planning strategy proposed and/or marketed by an accounting, law, investment, or tax consulting firm?” For those that answered yes, the authors asked, “What factors were important in your company's decision not to implement the tax planning strategy that was proposed?” Admittedly this is more narrow and focused than the general question we pose in this section, but such an approach is necessary in survey questions and we think provides helpful insights nonetheless.

The responses are summarized in their Figure 1 and reproduced in our Figure 6. The data are presented separately in the figure for public firms and private firms. The factor garnering the most – 86% of the sample – “important and very important” responses (a rating of 3 or 4 on a Likert scale from 0 – 4) is that “the transaction lacked business purpose and/or economic substance.” Related, the factor that received the third most “important or very important” responses (62%) was “risk of detection by the IRS.” Thus, the validity of the tax planning, whether the company will be caught, and whether the tax planning benefits would be retained are among the most important costs considered by firms in tax planning. Such responses are likely consistent with most readers’ priors.

The factors that received the second and fourth most responses concern the company’s reputation. The second most important factor in limiting engaging in tax planning in the responses was “potential harm to your company reputation” (69.5% overall rated it important or very

⁵¹ See Weisbach (2002) for a discussion about the costs and benefits of tax shelters in particular.

important; of publicly traded companies 72.2% did). The fourth most important factor was “risk of adverse media attention (e.g., Wall Street Journal Coverage)” with 57.6% of companies (60% of public companies) stating that this factor was “important or very important” at their company in limiting tax planning. Thus, reputation effects seem to be a significant deterrent to engaging in tax planning strategies.⁵²

Another factor that garnered a high importance rating by at least a large minority of firms, was the financial accounting implications of tax planning. Figure 6 reveals that over 50% of publicly traded firms considered the possibility of having to restate accounting earnings when deciding on a tax planning strategy. In addition, over 40% of publicly traded firms responded that 1) a negative financial accounting effect (i.e., if financial accounting earnings had to be reduced to lower taxable income), and 2) and not being able to record the tax benefits for financial accounting (e.g., a deferral strategy or if the strategy was too risky) were important in their decisions not to engage in a tax planning strategy.

The authors asked another question in the survey to dig into the financial accounting constraint further. The survey asked respondents “At your company, when evaluating a tax planning strategy that saves cash taxes, how important is it that the tax planning strategy...(1) ...does not reduce earnings per share (EPS) and (2) ...leads to reporting a higher earnings per share (EPS).” Figure 7 presents the results from Graham, Hanlon, Shevlin, Shroff (2014; Figure 3). Of the respondents to the survey, 70% of the publicly traded firms responded that it was important or very important that the tax planning did not reduce earnings per share. Furthermore, over 50% of the publicly traded respondents stated that it was important or very important that the tax planning strategy increased earnings per share. As one would expect, the importance of financial accounting

⁵² For other studies on reputation and tax avoidance see Hanlon and Slemrod (2009) and Dyreng, Hoopes, and Wilde (2016).

is much lower for private firms.⁵³

Thus, based on these data, important constraints on tax planning are the risk of detection, reputation effects, and financial accounting concerns. There are certainly others; as mentioned above there must be significant constraints because we observe a substantial amount of taxes being paid by multinational corporations.

8. Early Evidence on BEPS and TCJA

Earlier we replicated and extended Dyreng, Hanlon, Maydew, and Thornock (2017) through 2018. One advantage of extending the trends is that we are able to examine the early effects of the TCJA, which lowered the corporate statutory tax rate in the U.S. to 21% beginning in 2018. As can be seen in Figure 5, both purely domestics and multinational firms have distinct drops in cash effective tax rates in 2018 (as also shown in Figure 2, Panel F). The decrease is particularly noticeable for purely domestic firms, probably because their entire incomes were subjected to the lower tax rates, while only a fraction of multinational firms' incomes benefit from the reduced rates, with the remaining fraction remaining subjected to the tax rates of the foreign countries in which they operate (and potentially subject to the new GILTI tax in the U.S.).

As can be expected, many researchers are studying the immediate effects of the TCJA. One early study by Hanlon, Hoopes, and Slemrod (2018) examined firm actions and firm disclosures about their actions with respect to the TCJA. The authors find that in their sample, 4% of firms disclosed worker bonuses or increases in wages and 22% disclosed that they would increase investment in response to the TCJA. The authors find an increase in share repurchases, but the increase (at that time) was concentrated in a small number of firms. Other studies examine the

⁵³ This differential between public and private firms demonstrates the importance of being careful in comparing public and private firms using measures such as an effective tax rate or cash effective tax rate or any similar measure that is a tax measure relative to an accounting measure. Private firms place much less weight on financial accounting earnings and thus the metrics are not comparable across the two types of firms.

following: the limitations on interest deductibility and the effect on corporate leverage (Carrizosa, Gaertner, and Lynch, 2019), the investment effects of the TCJA (e.g., Beyer, Downes, Mathis, and Rapley, 2019), compensation effects (Luna, Schuchard, and Stanley, 2019), stock repurchase behavior (Bennet, Thakor, and Wang, 2019) and many others. Many of these studies are not fully vetted yet and the post-TCJA time series of data is limited.

One area we can look to in thinking about what to expect is the experience of other countries, namely the UK and Japan when they lowered corporate tax rates and moved to territorial systems (though neither country adopted exactly the same rules as the U.S.). One paper that studies the move to territorial taxation by the UK is Liu (2019). Liu (2019) reports evidence consistent with the territorial tax reform increasing the investment rate of UK multinationals by almost 16 percentage points in low-tax countries. Liu tests investment in high tax countries by UK firms and investment within the UK by these same firms and find no statistically significant changes in either location. Thus, she concludes the change to a territorial regime led to more outbound investment by UK firms and more investment overall.

Hasegawa and Kiyota (2017) examine the repatriation effects of Japan's changes. They report evidence consistent with dividend repatriations increasing but in a heterogeneous manner – firms with large amounts of retained earnings were more responsive and increased repatriations more. Interestingly, the authors find that withholding tax rates on dividends became more important in the decision to repatriate after the law change.

Whether or not similar results will bear out of the U.S. experience remains to be seen. Identification in tests of the effects of the TCJA will be difficult as the TCJA affected all companies at once and many tax rules were changed at the same time. In addition, a plethora of other events were occurring roughly around the same time of the law change, such as tariffs and also

international tax rules from the OECD. Thus, identification of the effects from the TCJA will likely be a challenge.

9. Indirect Taxes

As mentioned above, our study focuses on income taxes but businesses pay substantial amounts in other taxes as well and we would be remiss not to mention those in this chapter. Some examples include payroll taxes, property taxes, customs and export duties, tariffs, and extractive taxes. In addition, employers are often responsible for collecting and remitting consumption taxes such as the retail sales tax at the state level in the U.S. and the value added tax or goods and services tax in many other countries.

Firms are not required to make substantial detailed disclosures about indirect tax payments, which makes them more difficult to study. A few companies, however, voluntarily disclose information about indirect taxes. In the Appendix, we present a few examples, including disclosures from Verizon and Exxon-Mobile. In Panel A of the Appendix, we provide Verizon's disclosure on income taxes, employment taxes, and property and other taxes. In 2017, taxes other than income taxes accounted for about 40% of the total taxes paid by Verizon. In 2018, indirect taxes constitute nearly 55% of total taxes paid, which reflects the decline in the statutory corporate income tax rate from 35% to 21%. In Panel B we provide Exxon's disclosure. Exxon reports income and "other taxes and duties" (i.e., indirect taxes) separately for those incurred in the U.S. and foreign countries. In 2016, the company reported U.S. income tax expense of about negative \$3 billion but positive U.S. indirect taxes of \$4.4 billion. In 2016, the company reported nearly \$27 billion in indirect taxes in non-U.S. jurisdictions constituting 91% of their total tax expense for the year. In 2018, the company paid nearly \$5 billion in indirect taxes to the U.S. and over \$30 billion to non-U.S. jurisdictions. Indirect taxes constitute 81% total U.S. tax expenses and 78% of

the total non-U.S. tax expenses.

As more companies provide Corporate Social Responsibility reports (CSR reports), Environmental, Sustainability, and Governance reports (ESG), and for the extractive industries reports provided as part of the Extractive Industries Transparency Initiative (EITI), somewhat more disclosures about various taxes are available. To exemplify, Freeport-McMorRan, a mining company, issues a report entitled “Transparency of Government Payments” as part of their disclosures via the EITI. Their table from this report is in Panel C of the Appendix.

A company that issues what is likely the most comprehensive set of disclosures is RioTinto, another mining company. The company issued a 33 page report in 2018 entitled “Taxes paid: Our economic contribution.” In this report, the company highlights that they paid \$6.6 billion in global taxes and royalties to various governments. They report a global effective income tax rate of 28.6% for 2018 and a global effective tax rate including all taxes and royalties paid to governments of 37.4%.⁵⁴

Indirect taxes can also affect foreign affiliate investments and output (Desai, Foley, and Hines, 2004), and cross-border merger activity (Herger, Kotsogiannis, and McCorrison, 2016). Moreover, indirect taxes can affect location decisions as was exemplified during Amazon’s recent search for HQ2 in the form of tax abatements for locating in a particular jurisdiction. Researchers have found that indirect tax benefits affect location decisions, and in some cases increase employment (e.g., Greenstone and Moretti, 2003).

In addition to affecting real investment decisions, researchers have also found evidence of firms attempting to avoid indirect taxes. Opportunities for tax avoidance arise because there are differences in the location of taxation – place of supply (destination) or place of incorporation

⁵⁴ The report is too large to reproduce, but can be found at https://www.riotinto.com/documents/RT_taxes_paid_2018.pdf for interested readers.

(origin) for different goods, services, at times, whether the sale is digital. Using value added taxes as an example, companies can channel sales through affiliates in low-VAT-tax countries and sell into higher VAT tax countries when the origin principle is applied. For example, Poniatowski, Bonch-Osmolovskiy, and Belkindas (2016) reported a “VAT Gap” (i.e., under payment of VAT) of EUR 159.5 billion in 2014. There is also evidence in the U.S. sales tax setting, that online retailers, in contrast to brick-and-mortar retailers avoid taxable nexus when consumption taxes increase (Bruce, Fox, and Luna, 2015).⁵⁵

In addition to avoiding these other taxes, it is possible that avoiding income taxes is affected by indirect taxes. In a recent working paper, Olbert and Werner (2018) examine value added tax rate changes and their effects on income tax planning. The authors infer from their data and tests that service firms report 0.5 percent less in sales in a country if consumption taxes increase by one percentage point. The authors conclude that consumption taxes place a constraint on corporate income tax planning - it is essentially another metric companies need to manage.

10. Conclusions

In this chapter we review, and at times extend, the literature on multinational firm tax avoidance and its effects. It is first important to note that multinational corporations pay a substantial amount of taxes, both direct and indirect. Nevertheless, there is 1) evidence of tax avoidance via income shifting and 2) evidence that real investment, debt, and employment are sensitive to taxation. Naturally, the two effects are not independent. As noted in Hines (2014), if shifting income were possible without accompanying real changes to investments, those real investments would be insensitive to taxation as the negative consequences of taxes could be

⁵⁵ There is evidence regarding the elasticities of goods and how this benefited online retailers such as Amazon. When online sales required a sales tax to be charged, households living in the states where the sales tax increased reduced Amazon purchases by over 9% and for large purchases by roughly 30% (Baugh et al., 2018).

eliminated by simply shifting income to a more favorable jurisdiction. Instead, firms face complex investment problems where the optimal solution often results in distorted real activities and accounting choices relative to a world without taxes. In addition, the fact that substantial taxes are paid by multinational firms suggests that there are constraints on tax avoidance behavior. Also, the data suggest that there is a great deal of variation in tax avoidance – meaning some firms seem to avoid taxes over a long period while others do not. Prior literature has identified some factors associated with this variation, but to date there has been no factor has been identified that is something akin to a ‘silver bullet’ in terms of really driving tax avoidance behavior.

A common method of tax avoidance available to multinational corporations relative to domestic only corporations is income shifting to low-tax jurisdictions. There is a plethora of evidence in the literature that income shifting occurs, but the extent to which it occurs is still an open question. It appears based on the evidence and many sources of data, that some of the estimates of income seem implausibly large. We look forward to future research that either invents new methods to test for income shifting, or the advent of new data to better estimate income shifting. This will be imperative if trying to evaluate the recent tax policies of the U.S., the EU, and the OECD (barring other research design issues).

Finally, most of our evidence is about U.S. multinational corporations and in the pre-TCJA tax regime in the U.S. In addition, the anti-BEPS initiatives by the OECD, EU, and G20 are very recent. However, in the time period over which most the studies in referenced in our chapter were conducted, the data suggests that tax avoidance begets more tax avoidance. Once a company sets up a tax avoidance structure, future behavior generally must fit within or support the structure. In addition, one consequence of tax avoidance in the pre-TCJA time period for a multinational firm was ‘trapped cash’ in foreign subsidiaries that led to more U.S. borrowing, more investment

(capital expenditures and M&A) in foreign locations, and at times a higher likelihood of having the subsidiary acquired by a foreign company.

What occurs post-TCJA and after the anti-BEPS initiatives remains to be seen. Presumably the rules will be tighter in terms of trying to mitigate tax avoidance. But, in general, it seems like we could expect firms to try to maximize shareholder value by lowering costs, including tax costs. However, there is a movement in motion to view firms via a stakeholder lens rather than a shareholder-only lens. This coupled with the large government deficits, alleged income inequality, and activist organizations and media pressure about taxes may lead less tax avoidance in the future. Separately identifying all these effects – rule changes, social changes, and political changes – will be challenging but important work.

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Appendix Disclosures of Non-Income Taxes

Panel A – Verizon Communications

The amounts of cash taxes paid by Verizon are as follows:

Years Ended December 31,	(dollars in millions)		
	2018	2017	2016
Income taxes, net of amounts refunded	\$ 2,213	\$ 4,432	\$ 9,577
Employment taxes	1,066	1,207	1,196
Property and other taxes	1,598	1,737	1,796
Total	\$ 4,877	\$ 7,376	\$ 12,569

Panel B – Exxon-Mobile

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

19. Income and Other Taxes

	2018			2017			2016		
	U.S.	Non-U.S.	Total	U.S.	Non-U.S.	Total	U.S.	Non-U.S.	Total
	<i>(millions of dollars)</i>								
Income tax expense									
Federal and non-U.S.									
Current	459	9,001	9,460	577	6,633	7,210	(214)	4,056	3,842
Deferred - net	518	(614)	(96)	(9,075)	754	(8,321)	(2,801)	(1,422)	(4,223)
U.S. tax on non-U.S. operations	42	-	42	17	-	17	41	-	41
Total federal and non-U.S.	1,019	8,387	9,406	(8,481)	7,387	(1,094)	(2,974)	2,634	(340)
State	126	-	126	(80)	-	(80)	(66)	-	(66)
Total income tax expense	1,145	8,387	9,532	(8,561)	7,387	(1,174)	(3,040)	2,634	(406)
All other taxes and duties									
Other taxes and duties	3,498	29,165	32,663	3,330	26,774	30,104	3,209	25,811	29,020
Included in production and manufacturing expenses	1,245	857	2,102	1,107	747	1,854	1,052	808	1,860
Included in SG&A expenses	153	312	465	147	354	501	133	362	495
Total other taxes and duties	4,896	30,334	35,230	4,584	27,875	32,459	4,394	26,981	31,375
Total	<u>6,041</u>	<u>38,721</u>	<u>44,762</u>	<u>(3,977)</u>	<u>35,262</u>	<u>31,285</u>	<u>1,354</u>	<u>29,615</u>	<u>30,969</u>

Appendix, continued
Disclosures of Non-Income Taxes

Panel C – Freeport-McMoRan

Cash Payments to Governments^a (\$ Millions)						
For the year ended December 31, 2018	U.S.	Chile	Peru	Indonesia	Other Countries ^b	Total
Corporate Income Taxes, Net of Refunds	\$ (3)	\$ 16	\$ 162	\$ 705	\$ 22	\$ 902
Withholding Taxes on Foreign Dividends	-	2	1	182	-	185
Employee Payroll Taxes ^c	309	11	83	54	23	480
Dividends	-	-	-	148	-	148
Royalties and Net Severance Taxes	24	1	41	214	-	280
Property Taxes	81	-	-	17	2	100
Other Taxes and Fees ^d	52	13	68	207	(26)	314
Total	\$ 463	\$ 43	\$ 355	\$ 1,527	\$ 21	\$ 2,409

a. This schedule reflects a voluntary effort by Freeport-McMoRan to capture its cash payments to governments (net of refunds).

b. Represents cash payments to governments by Freeport-McMoRan's other business groups that are located outside of the countries where Freeport-McMoRan conducts its primary operations.

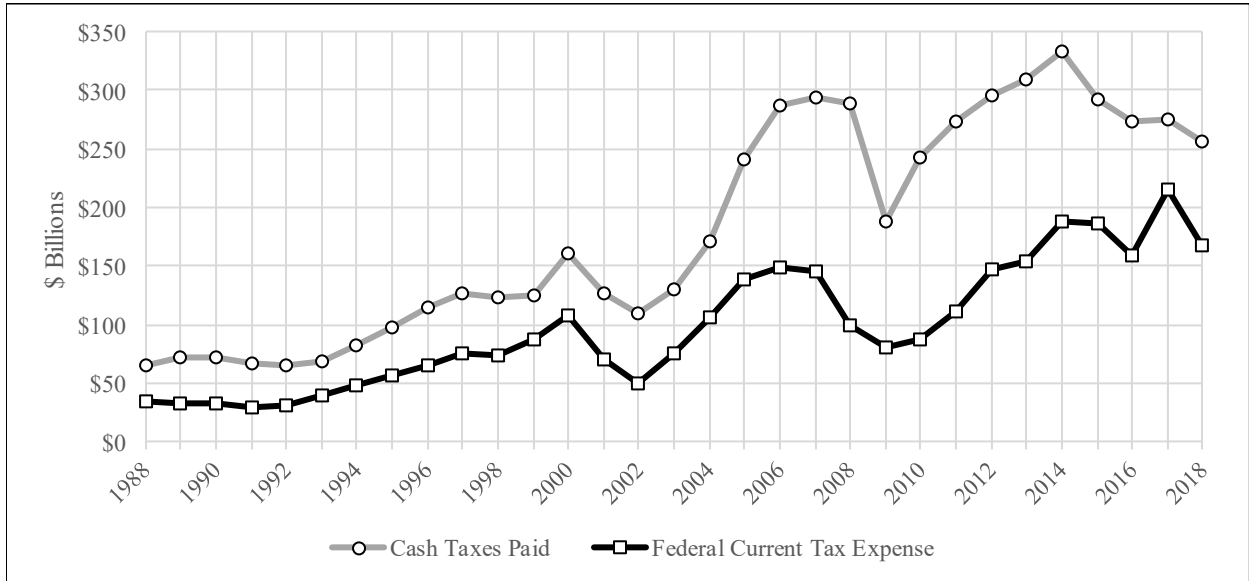
c. Includes payroll taxes collected on behalf of employees and paid to governments.

d. Includes customs and export duties, as well as withholding tax on foreign services.

Figure 1
Taxes Paid by Multinational Firms

Notes: The sample comprises all U.S. incorporated multinational firm-year observations in Compustat with beginning total assets (AT) of at least \$10 million. We define firm-years as multinational if they report non-missing values of pretax foreign earnings (PIFO) or foreign tax expense (TXFO, TXDFO). In Panel B, GDP data was gathered from www.bea.gov.

Panel A: Sum of Taxes Paid Each Year between 1988 and 2018



Panel B: Sum of taxes paid scaled by U.S. GDP each year between 1988 and 2018

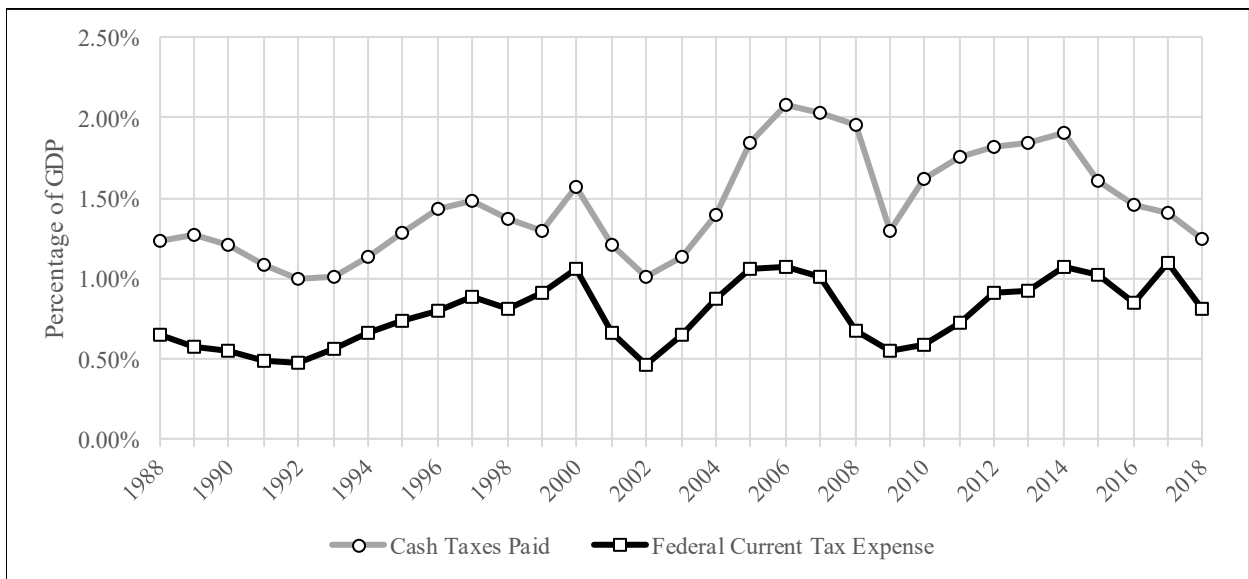
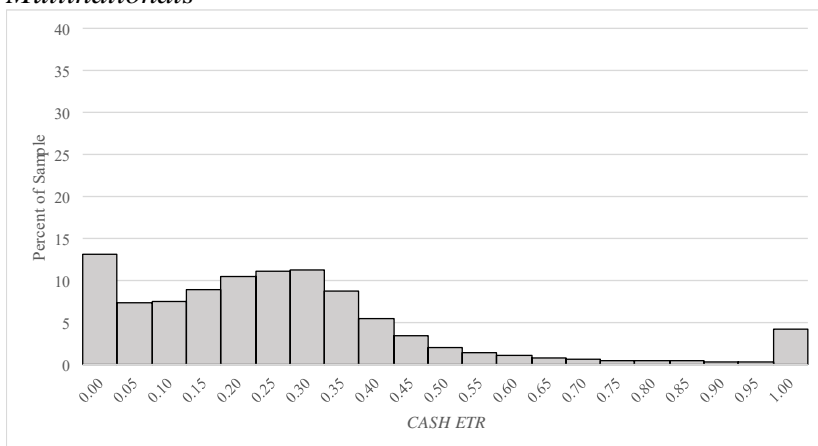


Figure 2
Distribution of CASH ETR for Multinational Firms over Various Horizons

Notes: The sample comprises all non-financial, non-utility U.S. incorporated Multinational and Domestic firm-year observations in Compustat (Compustat data pneumonics in parentheses with all caps) between 1988 and 2017 (Panel F includes the year 2018 only) with necessary data to calculate *CASH ETR*, defined as $\sum_t CASH TAX PAID_t / \sum_t PRETAX INCOME_t$, where *CASH TAX PAID_t* is cash taxes paid as reported by the firm in the financial statement footnotes (TXPD) and *PRETAX INCOME_t* is pretax income as reported by the firm in the income statement (PI). Observations where $\sum_t PRETAX INCOME_t$ is negative are deleted. Observations with *CASH ETR* > 1 are reset to 1, and observations with *CASH ETR* < 0 are reset to 0. In Panel A, we show the distribution of one-year *CASH ETR*, i.e., $t=0$. In Panel B, we show the distribution of five-year *CASH ETR*, i.e., $t=-4$ to $t=0$. In Panel C we present the distribution of ten-year *CASH ETR*, i.e., $t=-9$ to $t=0$, and in Panel D we show thirty-year *CASH ETR*, i.e., $t=-29$ to $t=0$. Panel E is the distribution of one-year *CASH ETR* for firms that have non-missing thirty-year *CASH ETR*. We define firm-years as multinational if they report non-missing values of pretax foreign earnings (PIFO) or foreign tax expense (TXFO, TXDFO) in any of the years necessary to compute the corresponding *CASH ETR*, domestic otherwise.

Panel A: One-year CASH ETR
Multinationals



Domestics

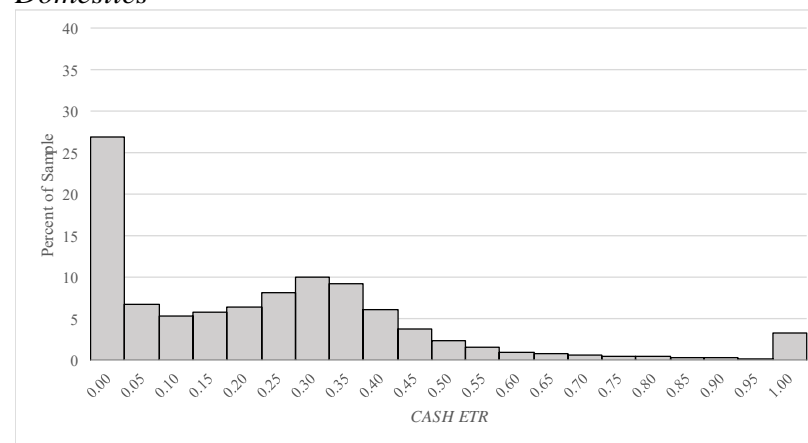
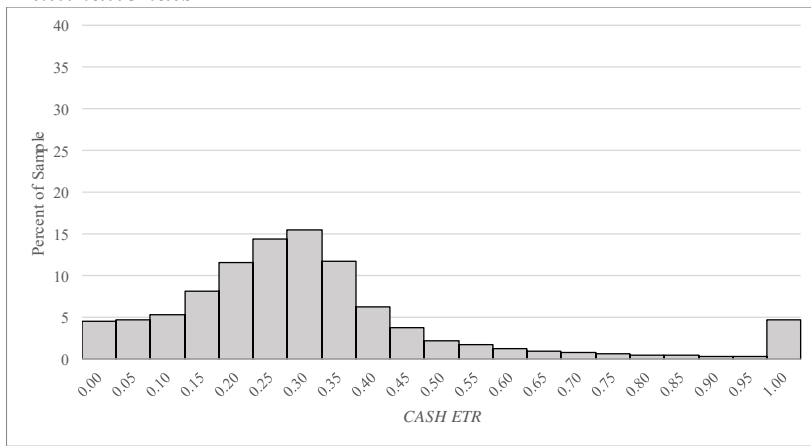
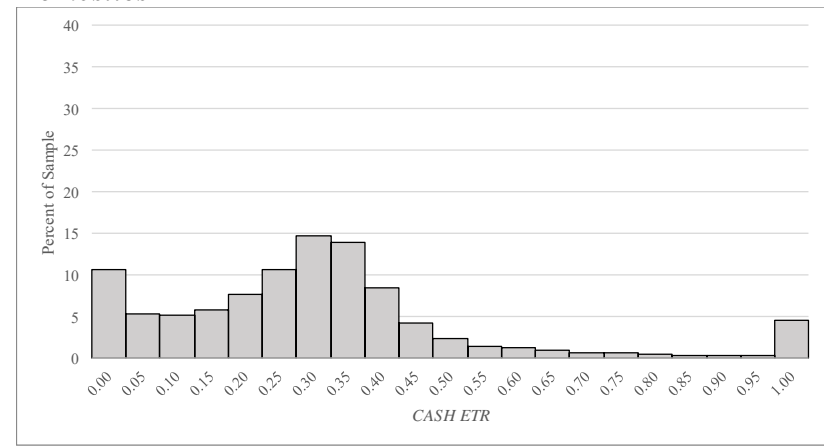


Figure 2 (continued)
Distribution of CASH ETR for Multinational Firms over Various Horizons

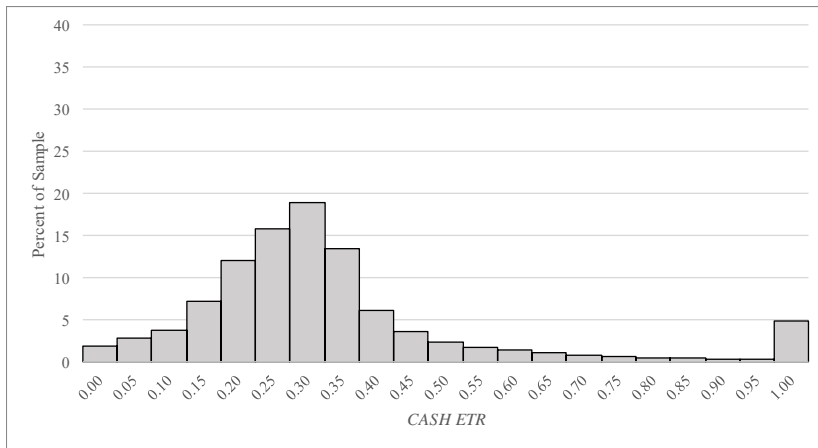
Panel B: Five-year CASH ETR
Multinationals



Domestics



Panel C: Ten-year CASH ETR
Multinationals



Domestics

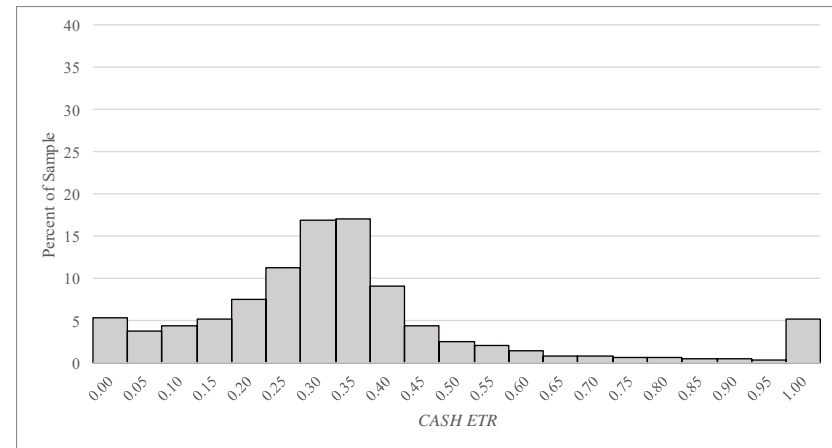
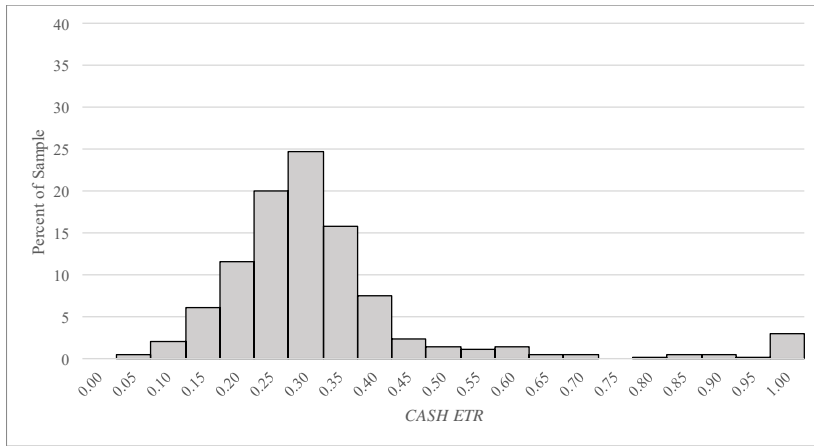
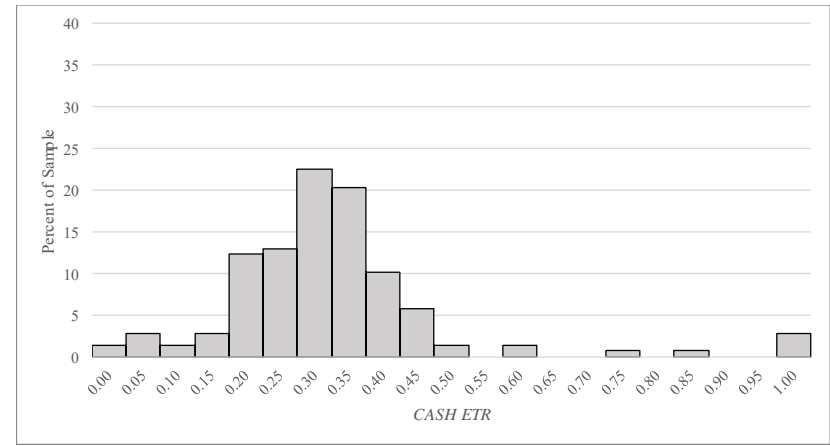


Figure 2 (continued)
Distribution of CASH ETR for Multinational Firms over Various Horizons

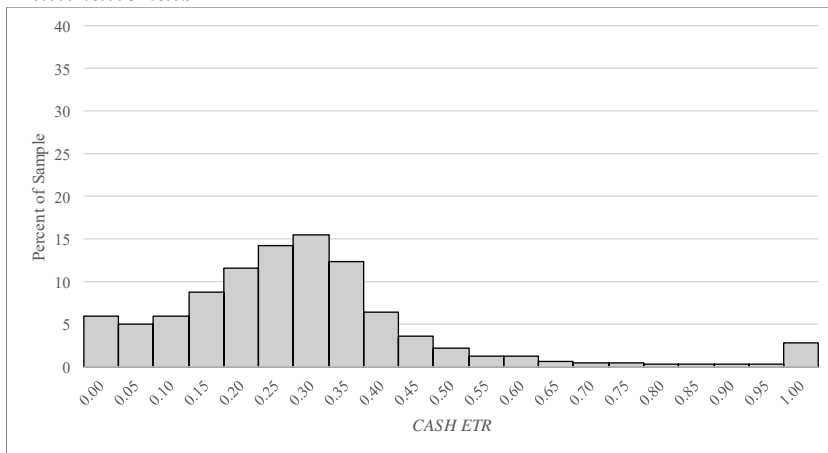
Panel D: Thirty-year CASH ETR
Multinationals



Domestics



Panel E: One-year CASH ETR for firms with non-missing Thirty-year CASH ETR
Multinationals



Domestics

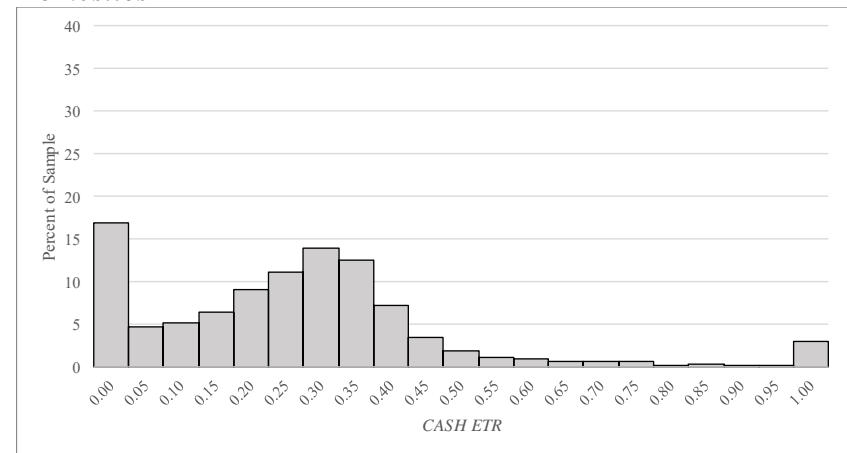
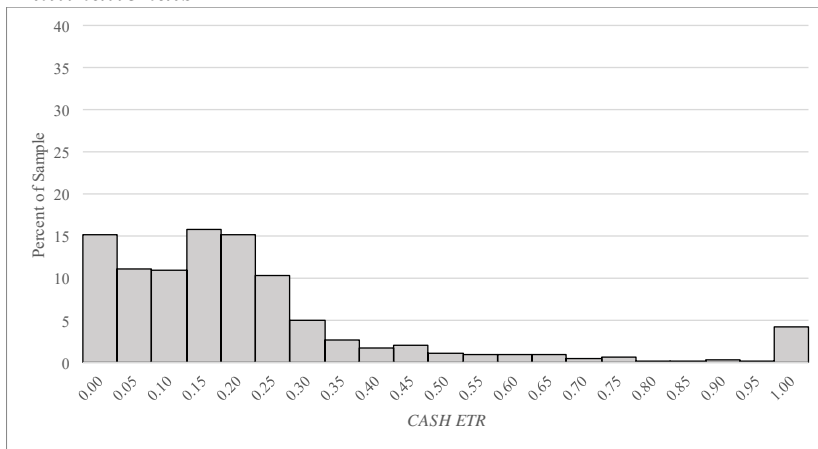


Figure 2 (continued)
Distribution of CASH ETR for Multinational Firms over Various Horizons

Panel F: One-year CASH ETR for 2018
Multinationals



Domestics

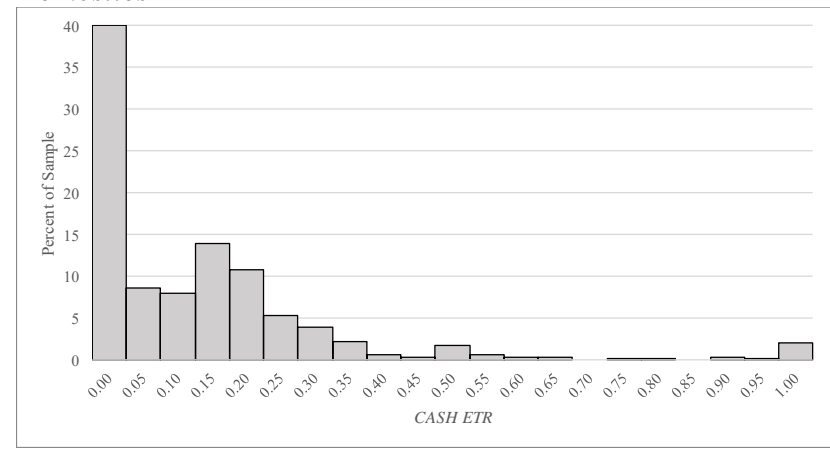
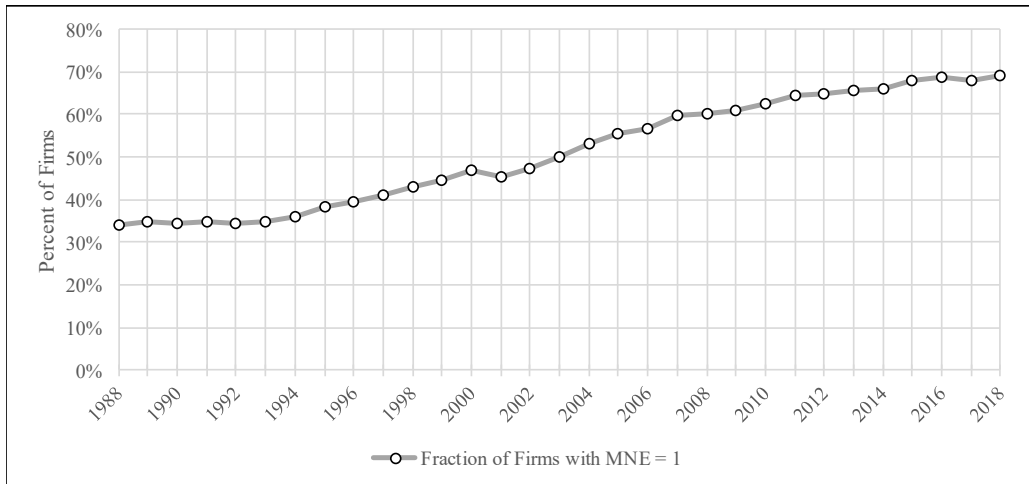


Figure 3
Multinationality over Time

Notes: MNE is equal to one if the firm has non-missing values of pretax foreign income (PIFO), current foreign tax expense (TXFO), or deferred current tax expense (TXDFO), zero otherwise. In Panel A, the sample selection follows Dyreng, Hanlon, Maydew, and Thornock (2017), and requires firms to be incorporated in the U.S. in non-financial, non-utilities industries, have positive pretax income (PI) and sales (SALE), and nonmissing values of cash taxes paid (TXPD) and total assets (AT) and the beginning and end of the period. In Panel B, we relax the sample requirements by retaining all industries, and not requiring cash taxes paid (TXPD) or positive values of pretax income (PI). In panel C, we use all firms with Exhibit 21 from Form 10-K filed with the SEC (see Dyreng and Lindsey, 2009 and Dyreng, Hoopes, Langetieg, and Wilde, 2019 for additional details).

Panel A: Fraction of Profitable Firm-years with Evidence of Multinational Operations in Earnings and Tax Disclosures



Panel B: Fraction of Young and Old Firm-years with Evidence of Multinational Operations in Earnings and Tax Disclosures

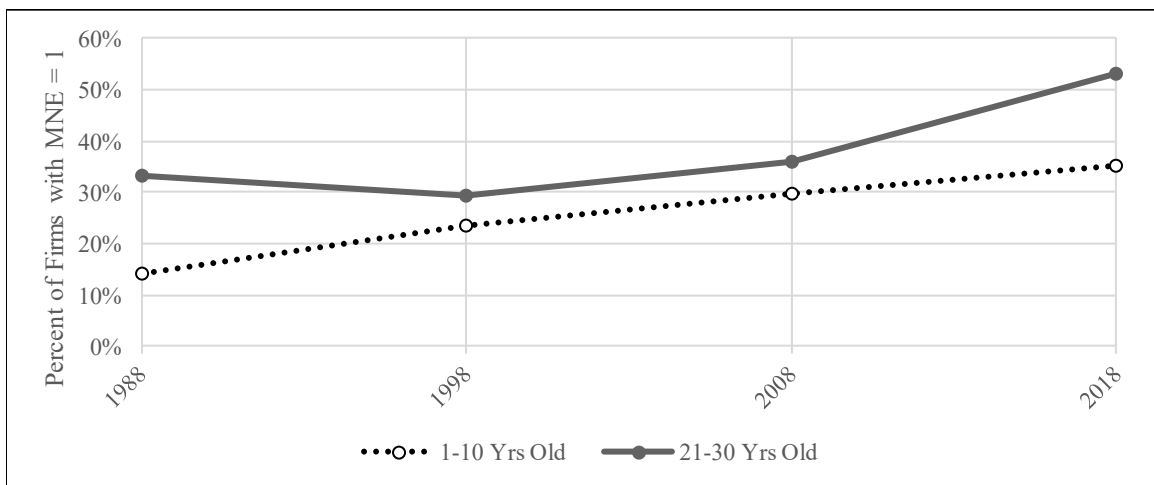


Figure 3, continued
Multinationality over Time

Panel C: Number of distinct countries hosting significant subsidiaries for the mean U.S. multinational firm

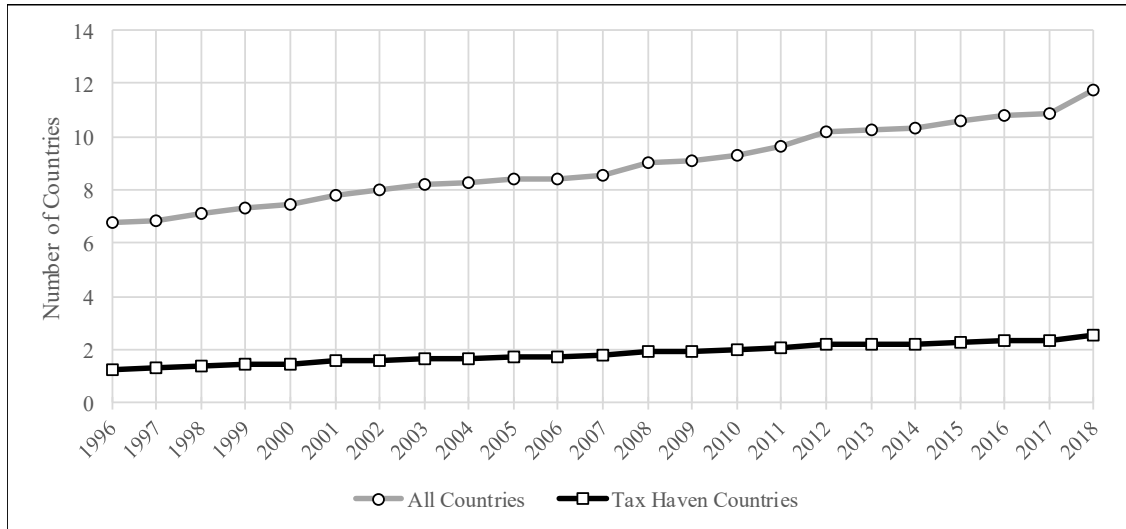


Figure 4
Statutory Tax Rate of OECD Countries over Time

Notes: This figure plots the average combined national and subnational statutory tax rate of OECD countries.
Source: <https://stats.oecd.org/>

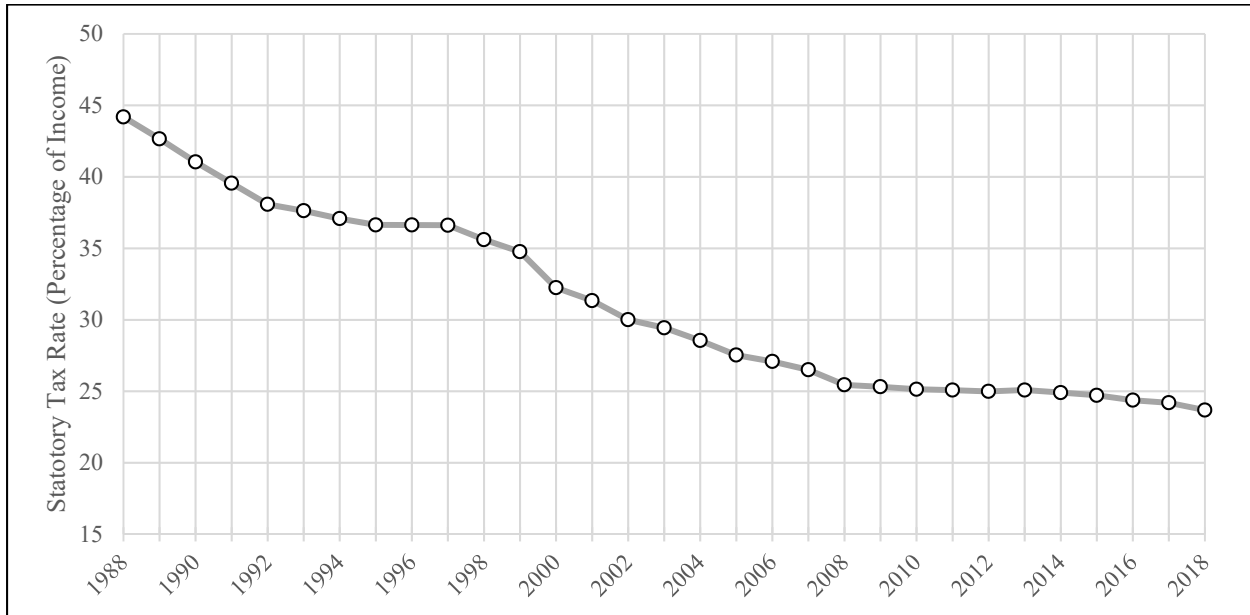


Figure 5
Mean CASH ETR over Time for U.S. Multinational and U.S. Domestic Firms

Notes: The sample comprises all non-financial, non-utility U.S. incorporated multinational firm-year observations in Compustat (Compustat data pneumonics in parentheses with all caps) between 1988 and 2018 with total assets greater than \$10 million and necessary data to calculate one-year *CASH ETR* (TXPD/PI). We define firm-years as multinational if they report non-missing values of pretax foreign earnings (PIFO) or foreign tax expense (TXFO, TXDFO).



Figure 6 Incentives and Disincentives to Tax Plan

Notes: This figure is taken from Graham, Hanlon, Shevlin, and Shroff (2014) where data are analyzed from 600 tax directors' responses to survey questions about tax planning (and other topics). The figure is Figure 1 in the Hanlon Shevlin and Shroff (2014) paper. The figure presents the responses to the survey question "What factors were important in your company's decision not to implement the tax planning strategy that was proposed?" The survey provides a 5-point rating scale ranging from 0 to 4 with a rating of 0 labeled "Not at all important" and a rating of 4 labeled "Very important." This figure presents the percentages of respondents that gave a rating of 3 or 4 for each factor. The results are shown separately for public and private firms.

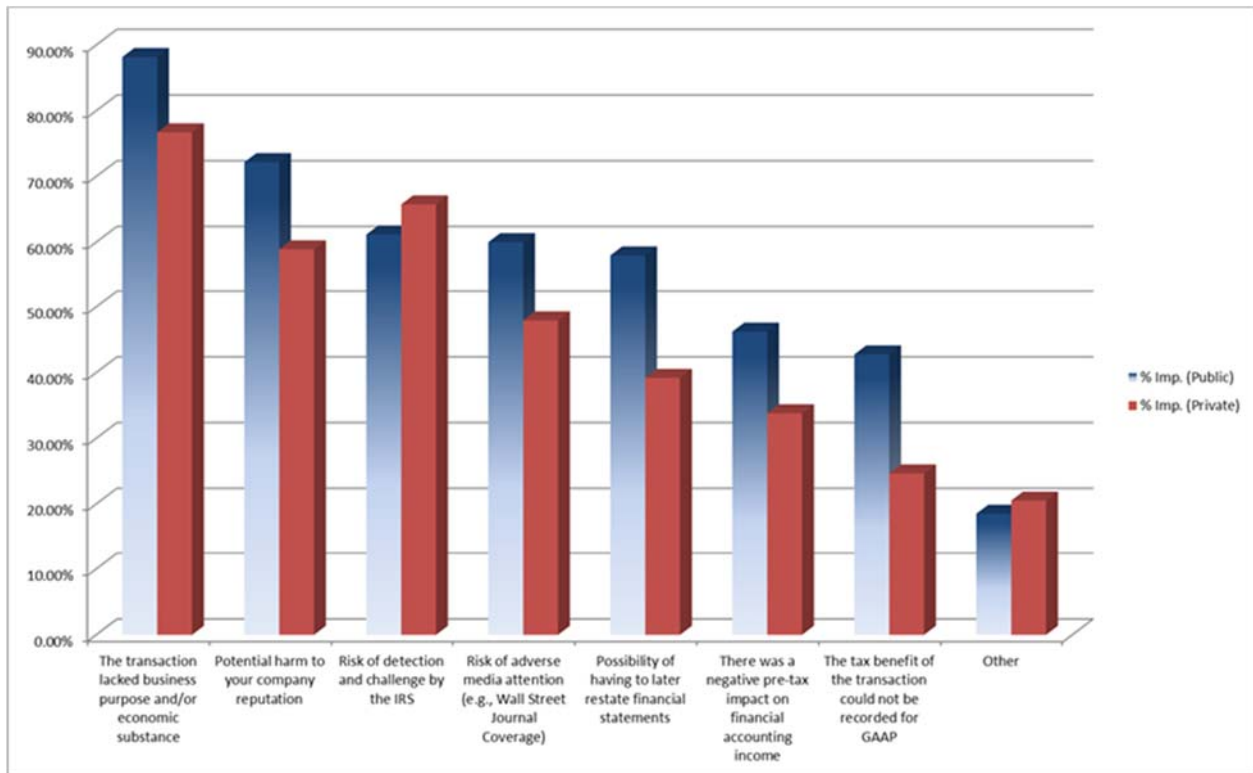


Figure 7 Financial Accounting Incentives for Tax Planning

Notes: Figure 7 is from Graham, Hanlon, Shevlin, and Shroff (2014; Figure 3). The figure presents the responses to the survey question “At your company, when evaluating a tax planning strategy that saves cash taxes, how important is it that the tax planning strategy...(1) ...does not reduce earnings per share (EPS) and (2) ...leads to reporting a higher earnings per share (EPS).” The survey provides a 5-point rating scale ranging from 0 to 4 with a rating of 0 labeled “Not at all important” and a rating of 4 labeled “Very important.” This figure presents the percentages of respondents that gave a rating of 3 or 4 for each factor. The results are shown separately for public and private firms.

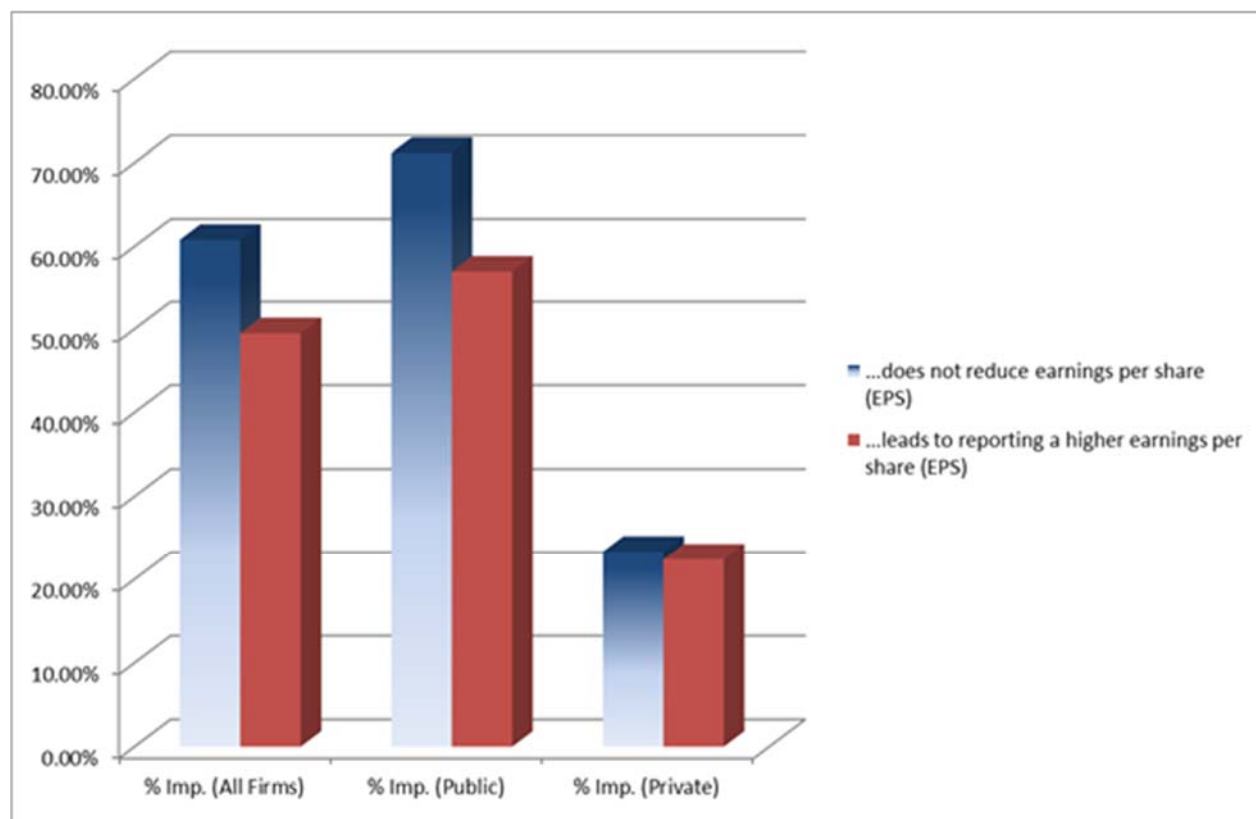


Table 1
Descriptive Statistics of CASH ETR over Various Horizons

Notes: The sample comprises all non-financial, non-utility U.S. incorporated firm-year observations in Compustat (Compustat data pneumonics in parentheses with all caps) between 1988 and 2018 with necessary data to calculate CASH ETR, defined as $\sum_t CASH TAX PAID_t / \sum_t PRETAX INCOME_t$, where CASH TAX PAID_t is cash taxes paid as reported by the firm in the financial statement footnotes (TXPD) and PRETAX INCOME_t is pretax income as reported by the firm in the income statement (PI). Observations where $\sum_t PRETAX INCOME_t$ is negative are deleted. Observations with CASH ETR > 1 are reset to 1, and observations with CASH ETR < 0 are reset to 0. The different rows in the table show the descriptive statistics for CASH ETR computed over various horizons, as labeled in the first column.

Panel A: Multinationals

Variable	N	Mean	StdDev	P5	p25	p50	p75	P95
One-year CASH ETR	37,478	0.292	0.233	2.062	0.131	0.262	0.377	0.891
Five-year CASH ETR	29,459	0.338	0.219	0.055	0.211	0.304	0.394	0.956
Ten-year CASH ETR	19,986	0.356	0.209	2.807	0.239	0.317	0.395	0.972
Thirty-year CASH ETR	429	0.350	0.165	6.749	0.264	0.320	0.373	0.700
One-year CASH ETR*	11,685	0.312	0.197	3.240	0.196	0.295	0.381	0.707
One-year CASH ETR for 2018	1,128	0.238	0.226	3.782	0.093	0.189	0.281	0.789

*Only for firms with non-missing Thirty-year CASH ETR

Panel B: Domestic

Variable	N	Mean	StdDev	P5	p25	p50	p75	P95
One-year CASH ETR	40,576	0.258	0.240	0.000	0.040	0.240	0.378	0.763
Five-year CASH ETR	23,975	0.329	0.229	0.010	0.185	0.317	0.405	0.933
Ten-year CASH ETR	12,087	0.362	0.221	0.045	0.244	0.338	0.416	1.000
Thirty-year CASH ETR	138	0.350	0.165	0.106	0.275	0.336	0.396	0.632
One-year CASH ETR*	3,559	0.287	0.216	0.000	0.134	0.285	0.380	0.719
One-year CASH ETR for 2018	502	0.155	0.198	0.000	0.002	0.112	0.220	0.530

*Only for firms with non-missing Thirty-year CASH ETR