Valuation Implications of Socially Responsible Tax Avoidance:

Evidence from the Electricity Industry

Kerry Inger
Auburn University
Email: kki0001@auburn.edu

James Stekelberg
Colorado State University
Email: james.stekelberg@colostate.edu

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ABSTRACT

Prior literature provides mixed evidence regarding whether taxes and corporate social responsibility (CSR) act as complements or substitutes, and suggests that investors perceive CSR activities and corporate tax avoidance as inconsistent with each other when engaged in concurrently. However, these studies do not consider the fact that firms may have opportunities to avoid tax in socially responsible ways. We investigate the equity valuation implications of one form of socially responsible tax avoidance: claiming the renewable electricity production tax credit (PTC). We predict and find that investors more positively value tax savings generated from PTCs compared to other forms of corporate tax avoidance. Additionally, consistent with the role that CSR can play in enhancing a firm's social capital, we find some evidence of a spillover effect in which investors more positively value other sources of tax avoidance to the extent that the firm also reduces taxes in a socially responsible way.

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INTRODUCTION

On August 19, 2019, the Business Roundtable, an association of America's leading CEOs, issued a new Statement on the Purpose of a Corporation that commits the 181 signees to lead their companies for the benefit of all stakeholders, including customers, employees, suppliers, and communities (Business Roundtable 2019). This statement represents a shift away from a legacy of corporate leadership focused on shareholder primacy towards socially responsible leadership. The Business Roundtable Policy Perspective devoted to Tax and Fiscal Policy focuses on the promotion of tax policies that encourage innovation and opportunity for workers, communities, and job creators.[1] Additionally, in its Policy Perspective on Renewable Energy, the Business Roundtable lists tax benefits as a driver of growth in renewable energy investments.[2] These statements demonstrate the important role that tax policy can play in encouraging companies to undertake socially responsible activities.

Despite this potential for firms to undertake tax planning strategies that are consistent with socially desirable outcomes, several prior studies find that firms may bear reputational costs from engaging in tax avoidance (Hanlon and Slemrod 2009; Graham, Hanlon, Shevlin and Shroff 2014; Dyreng, Hoopes, and Wilde 2016; Austin and Wilson 2017; Dhaliwal, Goodman, Hoffman, and Schwab 2017; Chen, Schuchard, and Stomberg 2019). Relatedly, Inger and Vansant (2019) document that the market discounts the *joint* engagement in tax avoidance and

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[1] https://www.businessroundtable.org/policy-perspectives/tax-fiscal-policy
[2] https://www.businessroundtable.org/advancing-renewable-energy

corporate social responsibility (CSR), consistent with investors' concerns that tax avoidance diminishes the value of social capital generated from CSR. Notably, however, Inger and Vansant (2019) employ a broad measure of corporate tax avoidance that does not distinguish among the specific sources of firms' tax savings.

In this study, we investigate how equity investors perceive a method of reducing corporate tax payments in a *socially responsible* way. In particular, we examine the valuation implications of tax savings achieved by claiming the federal renewable electricity production tax credit (PTC). The renewable electricity PTC was enacted by Congress in 1992 to promote the development and use of renewable energy sources by providing tax breaks to companies generating and selling electricity from renewable sources, such as wind, to unrelated parties. The renewable electricity PTC represents an appealing setting to examine the valuation implications of socially responsible corporate tax avoidance because the PTC promotes social welfare through environmental benefits, and at the same time stimulates innovation and economic growth by incentivizing corporate investments in renewable energy technologies. Thus, we argue that the tension between shareholders' expectations of positive tax cash flows (Drake, Lusch, and Stekelberg 2019; Inger 2014; Wilson 2009) and negative reputational implications from avoiding tax evident in prior literature is not present in our setting. In contrast, socially responsible tax avoidance potentially generates positive expected cash flows and reputational benefits simultaneously. As such, we first hypothesize that investors will more positively value socially responsible tax avoidance generated from PTCs, as compared to other forms of corporate tax avoidance.

To test this hypothesis, we hand collect data on the percentage reduction in a firm's effective tax rate (ETR) attributable to renewable electricity PTCs from the income tax footnotes

of 642 profitable companies in the electricity industry over the years 2004-2018. Next, having

determined the firm's tax savings generated from PTCs, we follow the methodology in Inger

(2014) and identify all other forms of corporate tax avoidance as the difference between the top

annual U.S. statutory corporate tax rate and the firm's cash ETR, less the rate reduction derived

from PTCs. We then regress firm value, measured as Tobin's q, on these two variables capturing

the sources of firms' tax savings. Consistent with our hypothesis, using both our full sample

(including electricity companies that do not report claiming PTCs) and a reduced sample

consisting only of firms with nonzero PTC line items in their rate reconciliations, we find that

the coefficient on our measure of socially responsible tax avoidance is significantly greater

(more positive) than the coefficient on other forms of tax avoidance. Examining standardized

coefficients yields a similar conclusion: tax savings generated from PTCs have a greater positive

influence on firm value than do other forms of tax savings.

Having documented that investors more positively value socially responsible corporate

tax avoidance than they do other sources of tax avoidance, we next consider the effect of socially

responsible tax avoidance on investor valuation of a firm's *other* tax avoidance strategies. On the

one hand, research suggests that firms strategically engage in CSR to create social capital to

mitigate the impact of negative publicity or regulatory action (Davis, Guenther, Krull, and

Williams 2016; Godfrey 2005; Fombrun, Gardberg, and Barnett 2000). Further, empirical

research provides examples of social capital mitigating the effects of negative events (Godfrey,

Merrill, and Hansen 2009; Lins, Servaes, and Tamayo 2017; Hong, Kubik, Liskovich and

Scheinkman 2019), suggesting socially responsible tax avoidance could have positive spillover

effects on the perception of firms' other tax avoidance strategies. On the other hand, prior

research finds that investors distinguish among and differentially value various tax avoidance

strategies (Inger 2014; Koester 2011). The results of our hypothesis tests are generally consistent with the first view. Examining our full sample, we document a significantly positive coefficient in our valuation regression on an interaction term between our variables measuring PTC tax avoidance and other forms of tax avoidance. However, we do acknowledge that this result does not hold among our reduced PTC-only sample of firms. Therefore, our results suggest that when including firms that do not claim PTCs in the sample, socially responsible corporate tax avoidance may have a spillover effect that influences investors' perceptions of a firm's other tax avoidance strategies.

Our findings contribute to at least three distinct streams of research. First, this study contributes to the literature on the valuation and reputational implications of corporate tax avoidance. Prior research in this area finds that equity investors positively value tax avoidance in some settings (Drake et al. 2019; Inger 2014; Wilson 2009; Desai and Dharmapala 2009) and distinguish among the sources of firms' tax savings (Inger 2014; Koester 2011). Other work provides evidence that in certain contexts, tax avoidance may significantly impair corporate reputation (Chen et al. 2019; Austin and Wilson 2017; Dhaliwal et al. 2017; Dyreng et al. 2016; Graham et al. 2014). In contrast, our results suggest that socially responsible forms of tax avoidance may generate positive valuation and reputational consequences for firms.

Our study also contributes to the literature on taxes and CSR. Prior work in this area presents conflicting evidence as to whether tax payments and CSR act as complements in that the government uses tax payments to benefit society (Lanis and Richardson 2012, 2015; Hoi, Wu, and Zhang 2013; Huang, Sun, and Yu 2017) or substitutes in that tax payments reduce economic growth and innovation (Davis et al. 2016; A. Preuss and B. Preuss 2017). Other research suggests that investors perceive CSR activities and corporate tax avoidance as inconsistent with

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each other and counterproductive when engaged in simultaneously (Inger and Vansant 2019). However, to the best of our knowledge, our study is the first in this literature to empirically distinguish between the *sources* of firms' tax avoidance. We contribute to this literature by showing that whether tax and CSR act as complements or substitutes depends on the nature of the tax avoidance itself.

We also contribute to the broader CSR literature. Prior research in this area provides several examples of how environmentally friendly CSR activities generate positive outcomes for firms (e.g., Flammer 2013; Dogl and Holtbrugge 2014; Khojastehpour and Johns 2014). We demonstrate an additional benefit arising from a socially responsible activity that has not been explored in this literature: the "win-win" of socially responsible tax avoidance, resulting in positive implications for a firm's environmental reputation combined with an increase in firm value due to the premium equity investors place on this type of tax avoidance. Further, our results present an example of social capital from a CSR activity providing a reputational shield for a firm's other activities, consistent with social capital research in other areas (Godfrey et al. 2009; Hong et al. 2019; Lins et al. 2017). Specifically, our findings suggest that, from an investor's perspective, socially responsible tax avoidance increases the value of firms' other tax planning strategies.

Finally, our study provides important practical insights for managers and policymakers. We show that socially responsible tax strategies should be regarded as an important aspect of a firm's tax planning portfolio because investors place a valuation premium on tax benefits that are achieved while simultaneously promoting environmentally friendly business practices, thereby benefiting two groups of a company's stakeholders: shareholders and the communities affected by environmental issues. Further, tax policymakers should consider the potential appeal of

socially responsible forms of tax avoidance to firms as tax-related reputational costs become more prominent (e.g., Ernst & Young 2016; PwC 2013), particularly in light of the fact that the PTC is a non-permanent tax credit that has been extended multiple times, often at year-end or retroactively following a lapse.

The remainder of this paper proceeds as follows. The next section provides institutional background on the renewable electricity PTC, reviews related literature on taxes and CSR, and develops our hypotheses. Subsequent sections describe our research design and report the results of our empirical tests. The final section concludes.

BACKGROUND AND RELATED LITERATURE

Institutional Details on the Federal Renewable Electricity Production Tax Credit

Although the primary objective of a tax system is to raise governmental revenue, legislators can also use the tax law as a tool to encourage certain behaviors viewed as desirable from a public policy perspective. Therefore, the use of the tax law to promote sustainability and environmentally friendly business activities results in opportunities for firms to avoid tax in socially responsible ways. We focus this study on one particular method of what we term *socially responsible* corporate tax avoidance: the federal renewable electricity production tax credit (PTC), enacted by Congress in 1992 to promote the development and use of renewable energy sources (H.Rpt. 102-474 Committee Report [to accompany H.R. 776], U.S. House. Comprehensive National Energy Policy Act). The following paragraphs provide institutional background on the mechanics of the PTC.

Pursuant to Internal Revenue Code (IRC) §45(a), the renewable electricity PTC is calculated as the kilowatt hours of electricity produced within the first 10 years of operations at a qualifying facility and sold to an unrelated taxpayer during the year, multiplied by 1.5 cents,

indexed for inflation. In 2018 and 2019 the credit rate is 2.5 cents per kilowatt hour for wind,

closed-loop biomass and geothermal facilities and 1.2 cents per kilowatt hour for open-loop

biomass, small irrigation, landfill gas, trash hydropower, and marine and hydrokinetic facilities.

(IRS Notice 2018-50, I.R.B. 2018-22; IRS Notice 2019-41, I.R.B. 2019-28). IRC §45(b) outlines

limitations and adjustments, including a phase-out of the credit if electricity prices exceed a

particular threshold (IRC §45(b)(1)), a reduction for federal, state, or local governmental grants,

credits, and other subsidies (IRC §45(b)(3)), and varying limits to the credit period based on

energy type (IRC §45(b)(4)). IRC §45(c) enumerates and defines qualifying energy resources. Of

these resources, wind energy currently accounts for the majority of the credits claimed; the Joint

Committee on Taxation projects that of the $25.6 billion in total renewable electricity PTCs

expected to be claimed over fiscal years 2018 to 2022, $24 billion will be due to wind energy

credits (JCT 2018).[3]

      Since its inception, the renewable electricity PTC has been extended 10 times. The PTC

has an active legislative history including temporary lapses, retroactive extensions, addition and

removal of certain energy resources, and other modifications (Sherlock 2018). The credit was

most recently extended by P.L. 116-94, the Taxpayer Certainty and Disaster Tax Relief Act of

2019, on December 20, 2019, allowing PTCs for projects with construction beginning before

2021 and in service prior to January 1, 2022. The extension kept the 40 percent credit rate for

projects begun 2019, increased the rate to 60 percent for projects begun in 2020, and

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[3] This discussion of PTC eligibility requirements offers insight into why not all electricity companies take advantage of the tax benefits afforded by the credit. In particular, a firm must first be located in a geographic area that allows it to avail itself of renewable resources. For instance, the U.S. Energy Information Administration notes that in 2018 just five states with favorable geographic characteristics accounted for 57 percent of U.S. wind energy production (https://www.eia.gov/energyexplained/wind/where-wind-power-is-harnessed.php). Second, such a firm must then incur significant expenses constructing a qualifying renewable energy-generating facility, which is an investment that not all firms may be willing or able to undertake.

retroactively extended the credit for certain non-wind projects that had expired at the end of 2017. Given the 10-year period over which firms may claim the credit, firms will continue to realize tax savings from the renewable electricity PTC for an extended period of time even if the credit is eventually allowed to permanently expire.

Congress perceives the renewable electricity PTC as important to the continued development of renewable energy infrastructure in advancement of the United States' environmental and energy policy goals (JCT 2001, 2013). Stokes and Breetz (2018) recognize the PTC as a critical element in the growth of U.S. wind energy development. Metcalf (2010) empirically examines investments in periods the credit is available compared to periods of credit lapse and concludes that the PTC plays a substantial role in wind energy investment. Frazier, Marcy, and Cole (2019) model various scenarios and find the largest long-term reduction in carbon dioxide occurs with the extension of the Production and Investment Tax Credits, with the price of natural gas having a large influence on the effect size. Relatedly, the U.S. Environmental Protection Agency (EPA) indicates that greenhouse gas contributions from the electric power sector have been decreasing consistently since 2005, with the electricity sector recently falling behind transportation as the largest source of U.S. greenhouse gas emissions (EPA 2019). Notably, although not mentioning the PTC specifically, the EPA attributes at least part of this reduction to the increased use of renewable energy in the electric power industry.

Literature Review

Prior Research on Valuation and Reputational Consequences of Corporate Tax Avoidance

Shareholder theory posits that the duty of the corporation is to maximize profits accruing to its shareholders (Freidman 1970). Under shareholder theory, as with any positive net present value activity, investors should positively value corporate tax avoidance to the extent the benefits

of tax avoidance exceed any related costs (Scholes, Wolfson, Erickson, Hanlon, Maydew, and Shevlin 2015). Several prior studies provide empirical evidence that corporate tax avoidance is positively associated with firm value in various settings (Drake et al. 2019; Inger 2014; Wilson 2009; Desai and Dharmapala 2009).

Studies also find that the association between firm value and corporate tax avoidance is context specific. One line of this research examines the effect of the characteristics of the tax avoidance itself on its association with firm value. For instance, Drake et al. (2019) find that tax risk (measured as the volatility of annual ETRs) reduces the positive valuation of tax avoidance. Other work shows that the tax planning method also influences investors' valuation of tax avoidance. In particular, Hanlon and Slemrod (2009) document a negative market reaction to news of corporate tax shelter involvement, suggesting aggressive tax avoidance is not positively perceived by investors when the strategy is made public. Inger (2014) identifies differential valuation of specific tax avoidance methods, suggesting investors distinguish among tax reduction strategies based on varying risk profiles, permanence of tax reduction, planning costs, implicit taxes, and disclosure variation. These studies highlight the importance of considering the particular tax planning strategies a firm undertakes when examining the association between corporate tax avoidance and firm value.

Closely related to the literature on investor valuation of tax avoidance is research on the reputational consequences of corporate tax avoidance. Studies in this area provide mixed evidence as to whether firms bear reputational costs from tax avoidance. In one study, Gallemore, Maydew, and Thornock (2014) do not find evidence of long-term negative reputational consequences for firms (or their executives) that were caught engaging in a tax shelter. In contrast, in a survey of corporate tax executives, Graham et al. (2014) report that

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potential reputational impairment influences the decision not to engage in a tax planning strategy for over half of the executives surveyed. Chen et al. (2019) show that firms with GAAP ETRs below the U.S. statutory rate are more likely to experience negative media coverage of corporate taxes, with the degree of negative coverage increasing in cash tax avoidance. Austin and Wilson (2017) find that firms with valuable brands engage in less tax avoidance than other firms because of their increased potential exposure to consumer reputational damage. Dyreng et al. (2016) document that public scrutiny from an activist group led firms to reduce their reliance on tax haven subsidiaries. Finally, Dhaliwal et al. (2017) provide evidence that firms engaging in a high degree of tax avoidance were subjected to negative media sentiment, resulting in reductions in firm value, surrounding the 2011 period comprising Occupy Wall Street and other similar social protest movements. These studies suggest firms may bear significant reputational costs from avoiding tax.

Prior Research on Valuation and Reputational Consequences of CSR

In contrast to shareholder theory, Freeman (2010) posits that firms should consider all stakeholders in corporate decision making. According to Freeman, Wicks, and Parmar (2004), under stakeholder theory economic value is created when managers cooperate to improve the circumstances of all of a corporation's constituents, suggesting that socially responsible corporate behavior can increase firm value. Several prior studies identify a positive association between overall CSR performance and firm value (Margolis, Elfenbein, and Walsh 2009; Malik 2014; Huang and Watson 2015; Jain, Jain, and Rezaee 2016). Specific to environmental CSR, defined as natural resource utilization and climate responsibility, Flammer (2013) finds that investors react positively (negatively) to news of responsible (irresponsible) environmental behavior. Other research specifically investigates the use of renewable energy on corporate

reputation. For instance, Khojastehpour and Johns (2014) highlight that environmental CSR has a positive effect on corporate reputation. Dogl and Holtbrugge (2014) document that the use of green technology and products, including the investment in and use of renewable energy, is positively associated with a firm's environmental reputation. These findings suggest that corporate engagement in renewable energy activities can have positive reputational consequences for firms.

Prior Research on Taxes and CSR

Prior literature has examined the association between CSR and tax payments with mixed results. Several studies provide evidence that CSR and tax payments act as complements in that the government uses tax revenue to promote social welfare (Lanis and Richardson 2012, 2015; Hoi et al. 2013; Huang et al. 2017). Other studies find that CSR and tax payments act as substitutes in that tax payments are perceived to reduce overall social welfare through reduced growth and innovation (Davis et al. 2016; A. Preuss and B. Preuss 2017). Still other research documents that the association between CSR and tax payments is more nuanced and context specific. For example, research finds the association is affected by firm performance (Watson 2015) and outside directors (Lanis and Richardson 2018).

Results of several experimental studies suggest that the characteristics of a firm's tax avoidance and CSR portfolio can have reputational consequences. For instance, Hardeck and Hertl (2014) find that aggressive corporate tax strategies have a negative effect on corporate reputation and purchase intention among consumers, whereas tax strategies that comply with legislative intent without pursuing all means of tax minimization have a positive effect. Hardeck, Harden, and Upton (2019) show that CSR perceptions influence consumers' responses to tax avoidance in regards to reputation. Davis, Moore, and Rupert (2017) document that investors

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place a price premium on firms in which CSR performance is high and taxes are effectively managed.

Most closely related to our study, Inger and Vansant (2019) provide empirical evidence that while equity investors positively value both tax avoidance and CSR, the interaction of tax avoidance and CSR is negatively associated with firm value. This finding suggests that shareholders view investments in CSR as relatively low yielding uses of firm resources, including tax savings, compared to other investment opportunities and believe the potential costs of tax avoidance will not be offset by the returns on CSR investments. Inger and Vansant (2019) also posit that from an equity investor's perspective, CSR and corporate tax avoidance are inconsistent with one another in terms of maximizing long-term firm value because tax avoidance damages the reputational value gained from CSR.

Hypotheses Development

To summarize the above discussion, prior research documents that corporate tax avoidance is positively associated with firm value on average, and that this positive association is context specific based upon the particular tax strategies undertaken by the firm. Other research finds that in some contexts, corporate tax avoidance can have negative reputational consequences to firms, whereas evidence suggests that environmental CSR can be reputation-enhancing. Our study extends this literature by empirically examining how equity investors perceive a specific method of reducing corporate tax payments in a *socially responsible* way.

The renewable electricity PTC is an appealing setting to examine the valuation implications of socially responsible corporate tax avoidance because the PTC promotes social welfare through environmental benefits, and simultaneously stimulates innovation and economic growth by encouraging corporate investments in renewable energy technologies. Therefore, we

argue that the tension between the complementary and substitutive views of taxes and CSR found in prior studies is not present in our setting. Additionally, in the case of the PTC, the firm's investment in renewable energy provides tax savings while at the same time generating positive future returns from the sale of electricity derived from renewable sources to customers. Consequently, although Inger and Vansant (2019) conclude that CSR and tax avoidance are inconsistent with each other in terms of maximizing firm value, we argue that compared to other forms of tax avoidance, socially responsible tax avoidance may generate tax savings with more *positive* reputational implications, as well as signaling investments that will lead to better future financial performance. This discussion leads to our first hypothesis:

Hypothesis 1: Socially responsible corporate tax avoidance is more positively associated with firm value than are other forms of tax avoidance.

We next consider the effect of socially responsible tax avoidance on investor valuation of a firm's *other* tax avoidance strategies. On the one hand, firms may strategically engage in CSR to create social capital that can act as insurance-like protection, mitigating adverse consequences when negative events occur (Fombrun et al. 2000; Godfrey 2005). Several studies provide empirical evidence in support of this proposition. For example, Godfrey et al. (2009) show investors' response to negative legal and regulatory actions is mitigated when firms have engaged in positive CSR activities, suggesting social capital preserves firm value. In other work, Lins et al. (2017) find that firms with high social capital, measured by high CSR ratings, had significantly higher crisis-period stock returns during the Enron and 2008 financial crises. The authors attribute their results to social capital building stakeholder trust, suggesting that stakeholders may have greater confidence in firms' other tax avoidance strategies when social capital is generated from socially responsible tax avoidance. Finally, Hong et al. (2019) find that

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firms with higher CSR scores receive lower sanctions for violating the Foreign Corrupt Practices Act, consistent with high social capital increasing bargaining power through favorable jury perception and receiving the "benefit of the doubt" from prosecutors. The results of this study suggest social capital derived from socially responsible tax avoidance may increase a firm's bargaining power with the tax authority in regards to its other tax avoidance strategies.

Relatedly, Davis et al. (2016) argue that firms also engage in CSR to reduce the negative reputational and regulatory ramifications of aggressive corporate tax practices. The authors acknowledge (but do not test) that not all tax avoidance is associated with negative consequences, citing as an example a General Electric press release attributing an investment in new wind turbines to the 2013 renewal of the PTC. Col and Patel (2019) find that firms increase CSR activity after opening an affiliate in a tax haven, suggesting firms believe CSR can create social capital to offset negative consequences from aggressive forms of tax planning. Thus, engagement in socially responsible tax avoidance may lead to an overall valuation premium on the firm's tax planning strategies that is not limited to the socially responsible forms of corporate tax avoidance.

On the other hand, prior research finds that investors distinguish among various tax avoidance strategies. In particular, Inger (2014) documents that investors differentially value specific tax planning strategies, with tax avoidance from stock options being positively associated with firm value, tax avoidance from the deferral of U.S. tax on foreign earnings being negatively associated with firm value, and tax avoidance from accelerated depreciation not significantly associated with firm value. Koester (2011) shows that investors value permanent uncertain tax avoidance, but do not value temporary uncertain tax avoidance that will eventually reverse, thereby increasing future taxable income. These studies suggest that investors may

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positively value socially responsible tax avoidance in isolation, but that the positive effects of socially responsible tax avoidance will not spill over and impose a value premium on other forms of corporate tax avoidance.

As there are conflicting arguments regarding whether the positive valuation of socially responsible corporate tax avoidance will affect the valuation of a firm's other tax planning strategies, we state our second hypothesis in the null as follows:

Hypothesis 2: Socially responsible corporate tax avoidance does not affect the valuation of other tax avoidance activities undertaken by the firm.

RESEARCH DESIGN

Sample Selection and Composition

To test our hypotheses, we focus on a sample of firms in the electricity industry because such firms are more likely to engage in activities that qualify for the renewable electricity PTC than are firms operating in other industries. Therefore, we begin our sample selection procedure by identifying 956 firm-year observations, representing 91 unique companies, in the electric services (SIC code 4911) and electric and other services combined (SIC code 4931) industries with fiscal years within the 15-year period from 2004 to 2018, nonmissing pretax income and total assets reported in Compustat, and stock price and shares outstanding data available in CRSP.[4] From this initial sample we delete 89 firm-year observations with missing cash taxes paid. Consistent with prior tax research, we also delete 183 firm-year observations with negative cash taxes paid because negative ETRs are not interpretable. Finally, we delete 42 firm-year

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[4] We assess the robustness of our results to dropping the year 2018 due to the myriad tax law changes as part of the Tax Cuts and Jobs Act. All results reported below are similar when we end our sample period in 2017. Additionally, we include year fixed effects in all regressions, alleviating the concern of lack of comparability across different years of our sample period.

observations with negative pretax book income due to differences in valuation (e.g., Hayn 1995) and tax planning opportunities and incentives between profitable and unprofitable firms. These data restrictions yield a final sample of 642 firm-year observations, representing 85 unique firms, available for hypothesis testing. We summarize this sample construction procedure in Panel A of Table 1.

< INSERT TABLE 1 HERE >

In Panel B of Table 1 we present the number of observations available for each year of our sample period along with the number and percentage of observations that report claiming renewable electricity PTCs in that year. Most interestingly, we identify a steady increase in both the number and proportion of our sample firms that report claiming PTCs over time, from a low of 5.56 percent of firms in 2004 to a high of 37.84 percent of firms in 2018. In contrast, publicly available data from the IRS indicates that the number of PTC claimants remained relatively constant, and even declined slightly, over the 2008 (253 claimants) to 2014 (236 claimants) period.[5] Taken together, these findings suggest that firms may be increasing their disclosure of claimed PTCs in their effective tax rate reconciliations, perhaps due to perceived positive valuation implications.

Measuring Corporate Tax Avoidance

We measure corporate tax avoidance using the annual (one-year) cash ETR, calculated as cash taxes paid scaled by pretax income adjusted for the effect of special items. The cash ETR is commonly employed in the literature as a broad measure of corporate tax planning capturing both permanent and temporary tax avoidance strategies that is unaffected by tax accruals

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[5] See Form 8835 (Renewable Electricity, Refined Coal, and Indian Coal Production Credit) statistics at https://www.irs.gov/statistics/soi-tax-stats-corporation-income-tax-returns-line-item-estimates.

required pursuant to Generally Accepted Accounting Principles (Hanlon and Heitzman 2010). To alleviate the influence of extreme values on our findings, consistent with prior research we set the cash ETR equal to 100 percent for observations exceeding this maximum threshold. We then construct the variable *AVOID* by subtracting the firm's cash ETR from the top annual U.S. statutory corporate tax rate.[6]

We next identify to what extent the difference between the firm's cash ETR and the top U.S. statutory corporate tax rate is attributable to renewable electricity PTCs. To do this, we hand collect data from the annual reports of the 642 firm-year observations in our final sample. Of these 642 observations, 134 (20.87 percent) include a line item for PTCs in their effective tax rate reconciliations within the income tax footnote.[7] When this line item is reported in dollars, we convert it to a percentage by dividing the dollar effect of PTCs by pretax income. We define the variable *AVOID_PTC* as the percentage point reduction in the firm's ETR generated from renewable electricity PTCs.[8] If the firm does not report a rate reconciliation line item for PTCs, we set *AVOID_PTC* equal to zero.

Finally, having determined the firm's tax savings generated from renewable electricity PTCs, we follow the methodology in Inger (2014) and identify all other forms of corporate tax avoidance as *AVOID* less *AVOID_PTC*. We define this variable as *AVOID_OTHER*. This

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[6] The top U.S. statutory corporate tax rate for 2018 is 21 percent. For all other years of our sample period it is 35 percent. Non-calendar year-end firms must use a blended effective tax rate for the fiscal year containing January 1, 2018. This affects one firm-year observation in our sample.

[7] There is some diversity in naming conventions within the rate reconciliation. Most observations that report claiming PTCs define the line item as renewable electricity production credits, or simply production credits. Relatively fewer observations group PTCs with other tax credits. If the line item specifically notes that it includes PTCs (e.g., production and investment tax credits), we include it in our measure of taxes saved from PTCs. However, if the line item does not specifically identify PTCs (e.g., tax credits), we exclude it from our measure.

[8] Our sample includes three observations (all representing the same firm) where *AVOID_PTC* is greater than the top U.S. statutory corporate tax rate. To minimize the influence of these extreme observations, we reset these values to 35 percent. Our results are robust to excluding these observations instead.

variable measurement allows us to compare the relative valuation of a percentage reduction in the firm's cash ETR attributable to socially responsible forms of tax avoidance compared to other methods. Appendix A provides a detailed numerical example of how we calculate these tax avoidance variables (*AVOID*, *AVOID_PTC*, and *AVOID_OTHER*) using a firm's effective tax rate reconciliation.

Regression Models

It is common practice in the tax literature to delete firms in regulated industries, such as electricity companies, due to differing tax planning incentives compared to the general population of firms.[9] Therefore, before testing our hypotheses we first establish the comparability of our sample to the broader market by providing baseline evidence on the overall equity valuation of corporate tax avoidance for our sample firms. To do so, we estimate the following ordinary least squares (OLS) regression model (we omit firm and year subscripts for expositional clarity):

$$TOBINQ = \gamma_0 + \gamma_1 AVOID + \beta_1 ROA + \beta_2 LOSSES + \beta_3 SIZE + \beta_4 CAPEX$$

$$+ \beta_5 CASH + \beta_6 DEPRECIATION + \beta_7 DEBT + Year\ Indicators + \varepsilon \qquad (1)$$

As described above, our independent variable of interest *AVOID* is measured as the difference between the firm's one-year cash ETR and the top annual U.S. statutory corporate tax rate. Following several recent studies on taxes and firm valuation (e.g., Desai and Dharmapala 2009; Bryant-Kutcher, Eiler, and Guenther 2012; Inger 2014; Drake et al. 2019) we measure firm value using Tobin's q. In particular, we calculate our dependent variable *TOBINQ* as the ratio of the market value of assets (market value of equity plus total assets minus common equity) to the

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[9] For instance, one important consideration in the electricity industry is that utilities may be required to pass federal tax savings on to customers in the form of price reductions. We alleviate this concern of lack of sample comparability by focusing our analyses only on electricity companies who all face such requirements.

book value of assets. To ensure that investors have had adequate time to impound the information contained in a firm's annual report, we determine the market value of equity component of Tobin's q using stock price and shares outstanding data from CRSP four months after fiscal year-end, or the closest trading day thereafter. Based on prior literature suggesting that corporate tax avoidance is positively valued on average (e.g., Drake et al. 2019; Inger 2014), we expect a significantly positive coefficient on *AVOID*, i.e., $\gamma_1 > 0$.

In equation (1) above, and all subsequent regression models, we control for a number of firm characteristics that may affect the association between corporate tax avoidance and firm value. We briefly summarize these variables here and provide detailed variable definitions and data sources in Appendix B.[10] We first control for firm profitability using pretax return on assets (*ROA*). Relatedly, we include a control variable representing a count of the number of years the firm reported negative pretax income over the five years preceding year *t* (*LOSSES*).[11] We control for firm size (*SIZE*) using the natural logarithm of total sales.[12] We also control for capital expenditures (*CAPEX*), cash holdings (*CASH*), depreciation expense (*DEPRECIATION*), and total liabilities (*DEBT*), all scaled by total assets.[13] We winsorize *TOBINQ* and all control

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[10] We omit other common controls used in the tax avoidance valuation literature, such as research and development expense and advertising expense, because these variables are not populated in Compustat for our sample firms in the electricity industry. Additionally, we do not include a control for foreign operations or pretax foreign income because our sample of electricity companies is solely comprised of domestic-only firms.

[11] Extensive prior research on corporate tax avoidance includes controls for the presence of and/or change in tax loss carryforwards. This variable is not populated in Compustat for our sample firms in the electricity industry. The *LOSSES* variable we include should at least partially address the fact that firms may offset current taxable income with prior year losses.

[12] We use sales instead of assets as our control for size because total assets is a component of our dependent variable *TOBINQ*. However, our results are not sensitive to this research design choice.

[13] *CAPEX*, *CASH*, *DEPRECIATION*, and *DEBT* are important controls in our setting because they each may be indirectly affected by PTC tax avoidance. Specifically, to be eligible to claim the PTC, firms must construct qualifying renewable energy-generating facilities. These investments are likely to increase a firm's capital expenditures and resulting depreciation expense. Additionally, funding these new investments may require a firm to rely on internal cash and/or take out additional debt.

variables at the one and 99 percent levels.[14] Finally, we include year fixed effects and adjust for heteroscedasticity by clustering standard errors by firm (Peterson 2009) in all regression models.

To test our first hypothesis regarding the relative valuation implications of socially responsible corporate tax avoidance, we modify equation (1) above by separating *AVOID* into tax avoidance generated from renewable electricity PTCs and tax avoidance achieved through other methods, as follows:

$$TOBINQ = \gamma_0 + \gamma_1 AVOID\_PTC + \gamma_2 AVOID\_OTHER + \beta_1 ROA + \beta_2 LOSSES + \beta_3 SIZE$$

$$+ \beta_4 CAPEX + \beta_5 CASH + \beta_6 DEPRECIATION + \beta_7 DEBT + Year\ Indicators$$

$$+ \varepsilon \tag{2}$$

AVOID_PTC is the percentage point effect of the renewable electricity PTC on the firm's ETR, as reported in the firm's effective tax rate reconciliation. *AVOID_OTHER* is calculated as *AVOID* less *AVOID_PTC*. Control variables are discussed above. Based on our first hypothesis that investors more positively value socially responsible corporate tax avoidance compared to other forms of tax avoidance, we predict that the coefficient on *AVOID_PTC* is significantly greater (more positive) than the coefficient on *AVOID_OTHER*, i.e., $\gamma_1 > \gamma_2$.

Finally, to test our second hypothesis regarding the effect of socially responsible corporate tax avoidance on the valuation of other forms of tax avoidance, we modify equation (2) above by including an interaction between *AVOID_PTC* and *AVOID_OTHER* as follows:

$$TOBINQ = \gamma_0 + \gamma_1 AVOID\_PTC + \gamma_2 AVOID\_OTHER + \gamma_3 AVOID\_PTC*AVOID\_OTHER$$

$$+ \beta_1 ROA + \beta_2 LOSSES + \beta_3 SIZE + \beta_4 CAPEX + \beta_5 CASH + \beta_6 DEPRECIATION$$

$$+ \beta_7 DEBT + Year\ Indicators + \varepsilon \tag{3}$$

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[14] The control variables we include in our regression models are well populated for our sample firms. However, to maximize our sample size, we set *CAPEX*, *CASH*, *DEPRECIATION*, and *DEBT* equal to zero if missing.

If investors more positively value other forms of corporate tax avoidance to the extent the firm also avoids taxes in a socially responsible way, then the coefficient on $AVOID\_PTC*AVOID\_OTHER$ will be significantly positive, i.e., $\gamma_3 > 0$. On the other hand, if socially responsible tax avoidance does not have a spillover effect on investor valuation of other forms of tax avoidance, then the coefficient on $AVOID\_PTC*AVOID\_OTHER$ will be not be statistically different from zero, i.e., $\gamma_3 = 0$.

RESULTS

Descriptive Statistics and Correlations

Table 2, Panel A reports descriptive statistics for our sample. Of particular note, we find that mean (median) *AVOID*, representing the difference between the top statutory U.S. corporate tax rate and the firm's cash ETR, is 15.5 (21.4) percent. We also find that the mean firm in our sample (including zeros) generates a 1.1 percentage point ETR reduction by claiming PTCs (*AVOID_PTC*) and a 14.4 percentage point reduction through other methods of tax avoidance (*AVOID_OTHER*). Mean (median) Tobin's q is 1.185 (1.175). Unlogged mean (median) total assets is $20.9 billion ($11.5 billion) while mean (median) pretax return on assets is 4.5 percent (4.0 percent).

<center>< INSERT TABLE 2 HERE ></center>

Table 2, Panel B presents means, medians, and standard deviations, along with the statistical significance of the differences in means, after partitioning our full sample between the 134 observations that report a rate reconciliation line item for renewable electricity PTCs and the 508 observations that do not. Results indicate that firms claiming PTCs (i.e., excluding zeros)

<center>21</center>

obtain an average (median) 5.2 (2.3) percentage point ETR reduction from these credits.[15]

Interestingly, we find that the average tax savings generated from other sources of corporate tax avoidance is not statistically different at conventional levels between PTC and non-PTC firms (16.0 and 13.9 percentage points below the statutory corporate tax rate, respectively). Additionally, we find that mean PTC and non-PTC firm performance (*ROA*), firm size (*SIZE*), cash holdings (*CASH*), and depreciation expense (*DEPRECIATION*) are not significantly different from each other at conventional levels. However, the mean firm claiming the PTC has greater firm value (*TOBINQ*), fewer prior losses (*LOSSES*), greater capital expenditures (*CAPEX*), and less debt (*DEBT*) than does the mean non-PTC firm.

Table 3 reports Pearson correlation coefficients among our regression variables. Consistent with the positive valuation of corporate tax avoidance documented in prior research, we find that *AVOID* is significantly positively correlated with *TOBINQ*. Additionally, *AVOID_PTC* and *AVOID_OTHER* are significantly positively correlated with *TOBINQ*, with the correlation coefficient on *AVOID_PTC* being greater than that on *AVOID_OTHER*, consistent with our first hypothesis. We test our hypotheses in a multivariate setting below.

< INSERT TABLE 3 HERE >

Baseline Regression Results

Table 4 presents results of estimating baseline regression equation (1) above. Column 1 of Table 4 employs our full sample of 642 observations, while column 2 only includes the 134 firm-year observations that report claiming PTCs. Consistent with prior findings on the overall positive valuation of corporate tax avoidance observed in broader samples (Drake et al. 2019;

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[15] Multiplying this average rate reduction of 5.2 percentage points by the $1,081 million mean pretax income for the PTC subsample indicates that the average PTC firm realizes approximately $56.2 million in tax savings from this credit.

Inger 2014), in both columns we identify significantly positive coefficients on *AVOID* (coefficients of 0.140, $p < 0.10$, in column 1 and 0.187, $p < 0.05$ in column 2) when examining our sample firms in the electricity industry. Regarding control variables, *SIZE* and *ROA* are significantly associated with firm value in our full sample and PTC-only samples, respectively, while the coefficient on *CAPEX* is significant in both specifications. However, with the exception of *DEBT* in our full sample model, the coefficients on other control variables are not statistically significant at conventional levels. Additionally, the adjusted R^2 of our models (23.61 percent and 55.57 percent in columns 1 and 2, respectively) suggest a moderately high degree of explanatory power.

< INSERT TABLE 4 HERE >

Regression Results for Hypothesis 1

We now turn to the results of our hypothesis tests. Table 5 reports results of estimating regression equation (2) above to examine the relative valuation of corporate tax avoidance generated from renewable electricity PTCs compared to other forms of tax avoidance. Panel A employs our full sample of 642 observations. We find that the coefficient on *AVOID_PTC* is greater in both magnitude and statistical significance than the coefficient on *AVOID_OTHER* (coefficients of 1.146, $p < 0.01$ and 0.114, $p > 0.10$, respectively). An F-test on these coefficients reveals that this difference is highly statistically significant (F-statistic = 14.659, $p < 0.01$). As an alternative means of comparing the relative importance of these variables to the determination of firm value, we report standardized (or beta) coefficients in the last column of Table 5. Comparing the standardized coefficients of 0.167 and 0.112 on *AVOID_PTC* and *AVOID_OTHER*, respectively, indicates that socially responsible tax avoidance from PTCs has a greater positive effect on firm value than do other forms of tax avoidance in our model.

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< INSERT TABLE 5 HERE >

Panel B of Table 5 presents results only employing the 134 of our sample firms that report a nonzero PTC line item in their effective tax rate reconciliations. Consistent with our full sample results, we again find that that the coefficient on *AVOID_PTC* is greater than the coefficient on *AVOID_OTHER* (coefficients of 1.016, $p < 0.01$ and 0.197, $p < 0.05$, respectively). As in our full sample, this difference in coefficients is statistically significant (F-statistic = 5.907, $p < 0.05$), while the standardized coefficient on *AVOID_PTC* is larger than the standardized coefficient on *AVOID_OTHER* (0.324 compared to 0.163).

In summary, the results reported in Table 5 provide support for our first hypothesis that investors will more highly value corporate tax avoidance achieved via socially responsible means, as compared to other forms of tax avoidance. Therefore, whereas Inger and Vansant (2019) conclude that equity investors view CSR and corporate tax avoidance as inconsistent with each other when engaged in concurrently, we find that compared to other forms of tax avoidance, socially responsible tax avoidance generates tax savings while simultaneously having *positive* valuation implications for firms.

Regression Results for Hypothesis 2

Table 6 reports results of estimating regression equation (3) above to assess the effect of tax avoidance generated from renewable electricity PTCs on investor valuation of other forms of corporate tax avoidance. Examining our full sample in column 1, we find significantly positive coefficients on both the *AVOID_PTC* and *AVOID_OTHER* main effects (coefficients of 1.256, $p < 0.01$, and 0.129, $p < 0.10$, respectively). More importantly, we also identify a significantly positive coefficient on the interaction term *AVOID_PTC*AVOID_OTHER* (coefficient of 0.839, $p < 0.10$). This result is consistent with the hypothesis that investors will more positively value

other sources of tax avoidance, to the extent the firm also avoids taxes in a socially responsible way. When examining only the subsample of firms claiming PTCs in column 2, we continue to find significantly positive coefficients on both the *AVOID_PTC* and *AVOID_OTHER* main effects (coefficients of 1.016, $p < 0.01$, and 0.250, $p < 0.05$, respectively). However, the coefficient on the *AVOID_PTC*AVOID_OTHER* interaction term is no longer statistically significant at conventional levels. Considered together, these results provide evidence that socially responsible tax avoidance may have a spillover effect that influences investors' perceptions of a firm's other tax avoidance strategies, but only when including firms that do not engage in socially responsible tax avoidance in our sample.

< INSERT TABLE 6 HERE >

Additional Analysis: Controlling for Tax Risk

Besides reputational benefits, one potential alternative explanation for the positive valuation implications of socially responsible corporate tax avoidance that we document above is that investors perceive tax savings generated from renewable electricity PTCs to be less risky than other forms of tax avoidance. Drake et al. (2019) proxy for tax risk using the volatility of firms' annual cash ETRs, arguing that this measure captures the persistence of firms' tax planning strategies across multiple periods and the reversal of the benefits arising from firms' claimed tax positions following a tax authority audit in a subsequent year. Tax savings generated from PTCs may be more persistent than other forms of tax savings given the 10 year period over which firms may claim the credit. Moreover, these tax savings may be less susceptible to being overturned following an IRS audit due to the fact that the PTC is explicitly authorized by the Internal Revenue Code.

To attempt to rule out this alternative explanation, we follow Drake et al. (2019) by measuring tax risk using the standard deviation of firms' annual cash ETRs over the years t-4 to t (resetting values exceeding 100 percent to that threshold), and re-estimate all regression models above including this measure as a covariate.[16] Because this variable requires available data on cash taxes paid and pretax income over a five-year period, our sample is reduced to 410 observations for these tests. Within this sample, we find that ETR volatility is not significantly different between the 107 observations that report claiming the PTC (ETR volatility of 17.1 percent) and the 297 observations that do not (ETR volatility of 15.6 percent). Additionally, in untabulated results, our inferences remain unchanged across all tests when controlling for ETR volatility. That is, we continue to observe an overall positive valuation on corporate tax avoidance; that tax avoidance generated from renewable electricity PTCs is more positively valued than is other forms of tax avoidance; and that other forms of tax avoidance are more positively valued to the extent the firm also avoids taxes in a socially responsible way.

Additional Analysis: Environmental CSR Scores

Another alternative explanation for the positive valuation of tax savings generated from renewable electricity PTCs is the effect of expected positive future cash flows associated with the renewable energy project itself. As with any investment, future cash flows are an important consideration in valuing energy projects (Santos, Soares, Mendes, and Ferreira 2014). Investors may perceive PTCs as a signal of future cash flows from the project and reduced future tax payments from the credits, instead of viewing PTCs as a form of socially responsible tax

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[16] We acknowledge that we are unable to ascertain the extent to which a firm's ETR volatility is due to the persistence of tax savings generated from PTCs specifically. However, equity investors are also limited to inferring this information from the same publicly available financial statement data that we are, alleviating this concern in our valuation regressions.

avoidance. Although controlling for *CASH* provides some comfort that our results are not

attributable to cash flow effects, we further explore the reputational benefits of socially

responsible tax avoidance using CSR scores from the MSCI (formerly KLD) database of

environmental, social, and governance (ESG) ratings. The MSCI database is commonly used in

prior accounting research and determines CSR strengths and weaknesses across the following

categories: *Environment, Corporate Governance, Community, Diversity, Employee, Human*

Rights and *Product Quality and Safety.* In particular, we examine whether socially responsible

tax avoidance is associated with higher environmental CSR scores. Given that prior literature

shows that environmental behavior influences reputation (Flammer 2013; Khojastehpour and

Johns 2014; Dogl and Holtbrugge 2014), a positive association between environmental CSR

scores and tax avoidance generated from PTCs would suggest there are environmental

reputational benefits associated with socially responsible tax avoidance.[17]

Our results provide some evidence that claiming renewable energy PTCs is associated

with greater environmental CSR scores. First, in the univariate, we find that firms claiming the

PTC have significantly greater average environmental CSR scores compared to non-PTC firms

(0.400 compared to -0.114, $p < 0.01$). Notably, the differences in means on most other

dimensions of firms' CSR scores (community, diversity, employee, corporate governance, and

human rights) are not statistically different between these two sets of firms.[18] In the multivariate,

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[17] We use the MSCI environmental score as a proxy for environmental reputation because of data limitations for our sample for other commonly used reputation scores. For example, the Axios Harris Poll provides a reputation quotient ranking for the 100 most visible firms and the Reputation Institute provides the GlobalTrak 100 listing the 100 most reputable firms. Newsweek provides a Green Ranking each year of the 500 largest publicly traded firms, however only 22 electric utilities are included on the list.

[18] PTC firms also report significantly greater product CSR scores than non-PTC firms (-0.225 compared to -0.458, $p < 0.05$). The product CSR score could also be affected by firms' renewable energy efforts given that among other dimensions, this CSR category reflects a company's ability to reduce environmental costs through sustainable development.

we estimate a Poisson regression (Cameron and Trivedi 2013) with environmental CSR score as our dependent variable and an indicator variable set equal to one if the firm reports claiming a PTC as our dependent variable of primary interest. We also include a full set of controls based on Walls, Berrone, and Phan (2012) along with year fixed effects.[19] In untabulated results, we identify a positive but marginally statistically insignificant ($p < 0.14$) association between this indicator measure of PTC tax avoidance and environmental CSR performance. However, when controlling only for ROA, firm size, and year fixed effects the coefficient on this indicator variable becomes significantly positive ($p < 0.10$).[20] We obtain similar results when using our continuous measure of PTC tax avoidance (*PTC_AVOID*) as our independent variable of interest; in particular, when using a full set of controls, the coefficient on *PTC_AVOID* is positive but statistically insignificant ($p = 0.27$), and significantly positive when controlling only for ROA, firm size, and year fixed effects ($p < 0.05$). Finally, as a falsification test, we find that the coefficient on non-PTC tax avoidance (*OTHER_AVOID*) is highly insignificant across all specifications.

CONCLUSION

In this study, we investigate how equity investors perceive a specific method of socially responsible corporate tax avoidance: claiming renewable electricity PTCs. Examining a sample of profitable companies in the electricity industry and employing hand-collected data on the sources of firms' tax avoidance obtained from their effective tax rate reconciliations, we predict

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[19] Similar to our tax avoidance valuation models discussed above, these controls include variables capturing firm performance, size, growth, debt, and capital expenditures, along with year fixed effects. Following Walls et al. (2012), we include an additional control for sales growth in this specification. In addition to these controls, Walls et al. (2012) also include R&D expense and advertising expense as covariates. As noted earlier, these variables are not populated for our sample of electricity firms.

[20] We attribute this difference in results to lack of power in the fully controlled model. In particular, CSR score data is only available through the year 2016, and then only for a subset of our sample firms. Requiring this variable reduces our sample to 281 observations, of which 80 observations are PTC firms.

and find that tax savings generated from PTCs are more positively associated with firm value than are other forms of corporate tax avoidance. Additionally, consistent with the role that CSR can play in enhancing a firm's social capital, we find some evidence of a spillover effect in which investors more positively value other sources of corporate tax avoidance to the extent that the firm also reduces taxes in a socially responsible way.

Our study makes several important contributions to the literature. First, we contribute to the literature on taxes and CSR (e.g., Lanis and Richardson 2012, 2015; Hoi et al. 2013; Huang et al. 2017; Davis et al. 2016; A. Preuss and B. Preuss 2017). To the best of our knowledge, our study is the first in this stream of research to distinguish between the *sources* of firms' tax avoidance. Thus, whereas prior work in this area suggests that equity investors view corporate tax avoidance and CSR as inconsistent with one another, resulting in negative valuation consequences when engaged in concurrently (Inger and Vansant 2019), our findings suggest that investors differentiate between tax savings achieved in socially responsible ways and other tax avoidance strategies.

We also contribute to the literature on the valuation and reputational consequences of corporate tax avoidance. Prior research in this area finds that tax avoidance may impose significant reputational costs on firms (Dhaliwal et al. 2019; Austin and Wilson 2017; Dyreng et al. 2016; Graham et al. 2014). However, consistent with other work documenting that investors also appear to differentiate among the sources of firms' tax savings (Inger 2014; Koester 2011), our results suggest that taking advantage of opportunities to avoid taxes in a socially responsible manner may generate positive reputational implications for firms.

Finally, we contribute to the broader CSR literature examining the valuation and reputational consequences of environmental CSR (e.g., Flammer 2013; Dogl and Holtbrugge

2013; Khojastehpour and Johns 2014) by identifying an additional benefit associated with environmentally friendly corporate activity: a valuation premium placed on tax savings generated from renewable electricity PTCs. We highlight the importance of considering socially responsible tax avoidance as a feature of CSR that promotes renewable energy policies while at the same time increasing shareholder value. Finally, we present a specific example of a CSR activity providing a social capital shield, in that socially responsible tax avoidance increases the valuation of other types of corporate tax avoidance that may be perceived as less socially desirable.

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APPENDIX A

Corporate Tax Avoidance Variable Construction Example

This Appendix illustrates the construction of our corporate tax avoidance variables (*AVOID*, *AVOID_PTC*, and *AVOID_OTHER*), using the 2008 effective tax rate reconciliation from CH Energy Group's (ticker CHG) income tax footnote, as follows:

	2008	2007	2006
	(In Thousands)		
Net income	$ 35,081	$ 42,636	$ 43,084
Preferred Stock dividends of Central Hudson	970	970	970
Minority interest	103	(121)	(141)
Federal income tax	6,611	14,630	482
State income tax	1,285	1,919	63
Deferred federal income tax	12,403	4,636	20,108
Deferred state income tax	1,530	713	3,116
Income before taxes	$ 57,983	$ 65,383	$ 67,682
Computed federal tax at 35% statutory rate	$ 20,294	$ 22,884	$ 23,689
State income tax net of federal tax benefit	2,137	1,812	2,985
Depreciation flow-through	2,738	2,437	2,870
Cost of Removal	(1,432)	(1,185)	(1,139)
Production tax credits	(1,606)	(1,366)	(1,011)
Other	(302)	(2,684)	(3,625)
Total income tax	$ 21,829	$ 21,898	$ 23,769

We first obtain the firm's cash taxes paid from the statement of cash flows (not shown above) of $10,029,000. We then scale cash taxes paid by income before taxes of $57,983,000 to obtain CH Energy Group's 2008 cash ETR of 17.30 percent. *AVOID* is therefore equal to the 2008 top U.S. statutory corporate tax rate of 35 percent less CH Energy Group's cash ETR of 17.30 percent, or 17.70 percentage points.

We next determine the amount of tax savings CH Energy Group generated from renewable electricity PTCs in 2008 using the "Production tax credits" line item in its rate reconciliation above. Specifically, we convert the $1,606,000 dollar value of tax savings to a percentage point reduction by scaling this figure by CH Energy Group's income before taxes of $57,983,000. Thus, *AVOID_PTC* is equal to 2.77 percentage points. Finally, we calculate all other forms of tax avoidance by subtracting *AVOID_PTC* from *AVOID*. Therefore, *AVOID_OTHER* is equal to 14.93 percentage points.

Variable Definitions

Variable Name	Definition and Data Source (Compustat mnemonic unless noted otherwise)
AVOID	Top annual U.S. statutory corporate tax rate (21 percent for 2018; 35 percent for all other years) less the firm's annual cash effective tax rate adjusted for the effect of special items (TXPD / (PI – SPI)).
AVOID_OTHER	*AVOID* less *AVOID_PTC*.
AVOID_PTC	Percentage point reduction in the firm's effective tax rate due to claiming renewable electricity production tax credits (hand collected from the effective tax rate reconciliation within firms' income tax footnotes).
CAPEX	Capital expenditures scaled by total assets (CAPX / AT).
CASH	Cash scaled by total assets (CH / AT).
DEBT	Total liabilities scaled by total assets (LT / AT).
DEPRECIATION	Depreciation expense scaled by total assets (DP / AT).
LOSSES	Count of the number of years the firm reported negative pretax income (PI) over the five years preceding year *t*.
ROA	Pretax return on assets (PI / AT).
SIZE	Natural logarithm of total sales (SALE).
TOBINQ	Tobin's q, calculated as the ratio of the market value of assets to the book value of assets (((CRSP PRC * CRSP SHROUT / 1000) + AT – CEQ) / AT). Stock price and shares outstanding are measured four months after fiscal year-end or the closest trading day thereafter.

TABLE 1

Panel A: Sample Selection

Sample Criteria	Firm-Year Observations	Unique Firms
All firm-year observations in the electricity industry (SIC codes 4911 and 4931) from fiscal years 2004 to 2018 with nonmissing pretax income and total assets in Compustat and stock price and shares outstanding data in CRSP	956	91
Less: Firm-year observations with missing cash taxes paid	(89)	(3)
Less: Firm-year observations with negative cash taxes paid	(183)	(0)
Less: Firm-year observations with negative pretax book income	(42)	(3)
Final Sample	642	85

Notes: this table presents the sample selection criteria followed in this study.

TABLE 1

Panel B: Sample Composition

Fiscal Year	Total Firms	Firms Claiming PTCs	Percentage of Firms Claiming PTCs
2004	54	3	5.56%
2005	59	6	10.17%
2006	62	8	12.90%
2007	58	9	15.52%
2008	50	10	20.00%
2009	38	9	23.68%
2010	35	9	25.71%
2011	26	7	26.92%
2012	39	8	20.51%
2013	40	8	20.00%
2014	44	11	25.00%
2015	35	11	31.43%
2016	30	9	30.00%
2017	35	12	34.29%
2018	37	14	37.84%
Total	642	134	20.87%

Notes: this table presents the composition of our final sample by fiscal year.

TABLE 2

Descriptive Statistics

Panel A: Full Sample Descriptive Statistics

Variable	n	Mean	Median	Std. Dev.	25th Pctl	75th Pctl	Min.	Max.
TOBINQ	642	1.185	1.175	0.256	1.069	1.289	0.541	2.198
AVOID	642	0.155	0.214	0.223	0.079	0.318	-0.650	0.350
AVOID_PTC	642	0.011	0.000	0.038	0.000	0.000	0.000	0.350
AVOID_OTHER	642	0.144	0.200	0.224	0.070	0.306	-1.000	0.350
ROA	642	0.045	0.040	0.024	0.032	0.051	0.005	0.152
LOSSES	642	0.201	0.000	0.582	0.000	0.000	0.000	4.000
Total Assets (unlogged, in millions)	642	20,915	11,487	25,224	3,985	29,477	67	170,307
SIZE	642	9.196	9.349	1.404	8.290	10.291	4.999	11.705
CAPEX	642	0.065	0.063	0.026	0.047	0.079	0.000	0.143
CASH	642	0.020	0.010	0.028	0.003	0.024	0.000	0.146
DEPRECIATION	642	0.032	0.031	0.008	0.027	0.037	0.015	0.059
DEBT	642	0.696	0.703	0.081	0.666	0.742	0.412	0.899

Notes: this table presents descriptive statistics for our full sample. All variables are defined in Appendix B.

Descriptive Statistics

Panel B: Summary Statistics for PTC and Non-PTC Observations

Variable	PTC Observations (n = 134)			Non-PTC Observations (n = 508)			Diff. in Mean
	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	
TOBINQ	1.282	1.251	0.216	1.159	1.159	0.259	***
AVOID	0.213	0.252	0.168	0.139	0.197	0.233	***
AVOID_PTC	0.052	0.023	0.069	0.000	0.000	0.000	***
AVOID_OTHER	0.160	0.200	0.185	0.139	0.197	0.233	
ROA	0.043	0.041	0.015	0.045	0.040	0.026	
LOSSES	0.082	0.000	0.348	0.232	0.000	0.626	***
Total Assets (unlogged, in millions)	27828	12839	34826	19091	11401	21686	***
SIZE	9.186	9.460	1.655	9.198	9.341	1.331	
CAPEX	0.073	0.066	0.027	0.062	0.062	0.025	***
CASH	0.016	0.007	0.022	0.021	0.010	0.029	
DEPRECIATION	0.031	0.031	0.007	0.033	0.031	0.008	
DEBT	0.675	0.691	0.069	0.701	0.707	0.083	***

Notes: this table presents summary statistics, along with the statistical significance of the differences in means, for our subsamples of firms that report claiming production tax credits (PTC observations) and other firms (non-PTC observations). All variables are defined in Appendix B.

TABLE 3

Correlation Matrix (n = 642)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) *TOBINQ*	-										
(2) *AVOID*	**0.098**	-									
(3) *AVOID_PTC*	**0.119**	0.060	-								
(4) *AVOID_OTHER*	**0.078**	**0.986**	**-0.111**	-							
(5) *ROA*	-0.018	-0.002	**-0.113**	0.017	-						
(6) *LOSSES*	0.019	**0.069**	**-0.083**	**0.083**	0.045	-					
(7) *SIZE*	**-0.136**	**0.178**	-0.043	**0.185**	0.040	**-0.085**	-				
(8) *CAPEX*	**0.130**	0.064	**0.213**	0.027	0.033	**-0.080**	**-0.083**	-			
(9) *CASH*	**-0.088**	**-0.120**	-0.024	**-0.116**	**0.248**	**0.189**	**-0.069**	**-0.257**	-		
(10) *DEPRECIATION*	-0.034	**-0.170**	**0.108**	**-0.188**	0.004	**0.119**	**-0.162**	**0.196**	-0.032	-	
(11) *DEBT*	**0.185**	0.015	**-0.174**	0.044	**-0.341**	-0.040	**0.252**	0.004	**-0.326**	0.058	-

Notes: this table presents Pearson correlation coefficients for our primary regression variables. Correlations in **bold** are statistically significant at the 10 percent level or lower. All variables are defined in Appendix B.

TABLE 4

Valuation of Corporate Tax Avoidance in the Electricity Industry

Variable	(1) All Observations Coefficient	t-stat.	(2) PTC Observations Coefficient	t-stat.
INTERCEPT	1.054***	3.22	0.925**	2.81
AVOID	0.140*	1.92	0.187**	2.14
ROA	1.299	1.17	5.608***	6.07
LOSSES	-0.001	-0.01	0.109	1.47
SIZE	-0.058***	-3.08	-0.038	-1.7
CAPEX	1.469*	1.68	2.159**	2.21
CASH	0.306	0.36	0.529	0.47
DEPRECIATION	-2.907	-1.09	0.506	0.15
DEBT	1.052**	2.62	0.585	1.36
Fixed Effects	Year		Year	
SE Clustering	Firm		Firm	
n	642		134	
Adj. R^2	23.61%		55.57%	

Notes: this table presents results of estimating OLS regression equation (1) as follows: $TOBINQ = \gamma_0 + \gamma_1 AVOID + \beta_1 SIZE + \beta_2 ROA + \beta_3 LOSSES + \beta_4 CAPEX + \beta_5 CASH + \beta_6 DEPRECIATION + \beta_7 DEBT + Year Indicators + \varepsilon$. All variables are defined in Appendix B. The symbols *, **, and *** denote (two-tailed) statistical significance at the 10%, 5%, and the 1% levels, respectively.

TABLE 5

Relative Valuation of Socially Responsible Corporate Tax Avoidance

Panel A: All Observations

Variable	Coefficient	t-stat.	Standardized Coefficient
INTERCEPT	0.870***	2.69	0.000
AVOID_PTC	1.146***	4.41	0.167
AVOID_OTHER	0.114	1.58	0.112
ROA	1.523	1.40	0.152
LOSSES	0.007	0.18	0.012
SIZE	-0.053***	-3.03	-0.294
CAPEX	1.404*	1.81	0.118
CASH	0.226	0.27	0.029
DEPRECIATION	-3.948	-1.48	-0.109
DEBT	1.079***	2.70	0.371
AVOID_PTC > AVOID_OTHER	14.659***		
F-stat. (p-value)	(<0.001)		
Fixed Effects	Year		
SE Clustering	Firm		
n	642		
Adj. R^2	22.40%		

Relative Valuation of Socially Responsible Corporate Tax Avoidance

Panel B: PTC Observations

Variable	Coefficient	t-stat.	Standardized Coefficient
INTERCEPT	0.764**	2.11	0.000
AVOID_PTC	1.016***	3.11	0.324
AVOID_OTHER	0.197**	2.35	0.163
ROA	6.653***	6.62	0.454
LOSSES	0.167*	2.03	0.299
SIZE	-0.028	-1.47	-0.137
CAPEX	1.681*	1.80	0.201
CASH	0.301	0.30	0.030
DEPRECIATION	-2.712	-0.80	-0.120
DEBT	0.378	0.76	0.071
AVOID_PTC > AVOID_OTHER	5.907**		
F-stat. (p-value)	(0.015)		
Fixed Effects	Year		
SE Clustering	Firm		
n	134		
Adj. R^2	56.83%		

Notes: this table presents results of estimating OLS regression equation (2) as follows: $TOBINQ = \gamma_0 + \gamma_1 AVOID\_PTC + \gamma_2 AVOID\_OTHER + \beta_1 SIZE + \beta_2 ROA + \beta_3 LOSSES + \beta_4 CAPEX + \beta_5 CASH + \beta_6 DEPRECIATION + \beta_7 DEBT + Year\ Indicators + \varepsilon$. All variables are defined in Appendix B. The symbols *, **, and *** denote (two-tailed) statistical significance at the 10%, 5%, and the 1% levels, respectively.

TABLE 6

Effect of Socially Responsible Corporate Tax Avoidance on the Valuation of Other Forms of Tax Avoidance

Variable	(1) All Observations Coefficient	t-stat.	(2) PTC Observations Coefficient	t-stat.
INTERCEPT	1.039***	3.10	1.072***	3.13
AVOID_PTC	1.256***	4.18	1.016***	3.12
AVOID_OTHER	0.129*	1.82	0.250**	2.29
*AVOID_PTC*AVOID_OTHER*	0.839*	1.90	-0.436	-1.33
ROA	1.398	1.23	6.751***	6.48
LOSSES	0.002	0.05	0.168*	2.01
SIZE	-0.052***	-2.97	-0.020	-1.14
CAPEX	1.309	1.57	1.687*	1.76
CASH	0.177	0.21	0.169	0.16
DEPRECIATON	-3.767	-1.41	-2.520	-0.75
DEBT	1.125***	2.84	0.255	0.51
Fixed Effects	Year		Year	
SE Clustering	Firm		Firm	
n	642		134	
Adj. R^2	25.13%		56.60%	

Notes: this table presents results of estimating OLS regression equation (3) as follows: $TOBINQ = \gamma_0 + \gamma_1 AVOID\_PTC + \gamma_2 AVOID\_OTHER + \gamma_3 AVOID\_PTC*AVOID\_OTHER + \beta_1 SIZE + \beta_2 ROA + \beta_3 LOSSES + \beta_4 CAPEX + \beta_5 CASH + \beta_6 DEPRECIATION + \beta_7 DEBT + Year\ Indicators + \varepsilon$. All variables are defined in Appendix B. The symbols *, **, and *** denote (two-tailed) statistical significance at the 10%, 5%, and the 1% levels, respectively.