Risk, Reward, and Ratings: How Firms Use Tax Avoidance to Sustain Inflated Credit Ratings

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Abstract

We show that firms preserve inflated credit ratings through tax planning that improves capital and earnings. Rating inflation leads to greater tax avoidance, and this effect is stronger when firms engage in risky projects, consistent with rating inflation allowing high-risk firms to pool with low-risk firms (Goldstein and Huang 2020), and when managers have greater career concerns. When ratings are high but accurate, firms do not avoid more taxes, consistent with rating inflation being transitory. Tax avoidance reduces the likelihood of a rating downgrade over a three-year horizon, indicating that risky firms can successfully maintain inflated ratings with tax planning.

1. Introduction

Credit rating agencies have been criticized for assigning inflated credit ratings due to conflicts of interest that are driven by the "issuer-pays" business model. These conflicts of interest can result in an observed credit rating that is biased upward relative to the "true" rating implied by the firm's underlying, unobservable credit quality. Goldstein and Huang (2020) show that rating inflation allows risky firms to pool with low-risk firms by remaining in high rating categories, but that some of these risky firms are subsequently revealed as low quality. Because executives identify credit ratings as one of their highest concerns when making capital structure decisions (Graham and Harvey 2001; Graham 2022), and because credit rating downgrades, which can reveal a risky firm's quality, are costly (Dichev and Piotroski 2001; Kisgen 2006), it is plausible that some managers will take action to mitigate the likelihood of a rating downgrade when their rating is inflated. In this paper, we examine whether managers with inflated credit ratings increase tax avoidance to sustain their high rating and mitigate the likelihood of a downgrade.

While firms are likely to engage in several activities to maintain their inflated rating (e.g., gambling on high-risk investment strategies), tax avoidance provides a unique opportunity to shore up a firm's earnings and capital profile, decreasing the likelihood of a downgrade in subsequent periods. In other words, tax avoidance can enable otherwise risky firms to maintain the benefits of an inflated rating while waiting for the outcomes of longer payoff horizon investments such as R&D. Importantly, unlike earnings management activities, rating agencies are less likely to directly adjust ratings due to higher measured tax avoidance (Ayers, Laplante, and McGuire 2010) given it is difficult for rating agencies to evaluate risk associated with tax planning activities (Ganguin and Bilardello 2005; Bonsall, Koharki, and Watson 2017).

Therefore, managers can support their inflated rating through higher net income and cash flow without appearing to directly increase their credit risk profile.

We hypothesize that rating inflation leads firms to avoid more taxes when managers have concerns about subsequent downgrades, and that such tax avoidance allows firms to ultimately avoid a credit rating downgrade and thus maintain their inflated rating. However, while we hypothesize a link between rating inflation and tax avoidance, we do not expect that firms with high but *accurate* ratings will avoid more taxes. There is a risk-reward tradeoff firms face when avoiding taxes, and the benefits to increasing an already high rating (that is supported by underlying fundamentals) are unlikely to outweigh the risks to avoiding more taxes (which could include regulatory penalties). Absent a decline in fundamentals, a firm with a high and accurate rating can realize the benefits of its high rating without increasing tax planning. In contrast, because rating inflation is fundamentally transitory in nature, firms with inflated ratings have a strong incentive to immediately increase cash flows to maintain their high rating for subsequent periods. For these firms, the benefits of tax avoidance (maintaining their inflated rating in the near-term) outweigh the potential direct and indirect costs from tax avoidance.

Ex-ante, there are reasons why rating inflation would not necessarily lead firms to engage in more tax avoidance. First, tax avoidance results in a salient output (effective tax rate, or ETR) that external debtholders can observe with relative immediacy. This contrasts with the outcomes of risky capital projects or innovation, which may take several years to be fully realized and which can be more difficult for external stakeholders to observe. Therefore, firms may be hesitant to support inflated ratings via tax avoidance if debt holders are both aware of the rating inflation and observe the risk through tax avoidance (see Hasan et al. 2014 and Shevlin, Urcan, and Vasvari 2020 for evidence that debt holders require a risk premium for tax avoidance).

Second, inflated credit ratings are likely to *increase* firms' access to external capital, limiting the need to generate internal capital through cash tax avoidance (Edwards, Schwab, and Shevlin 2016). If this is the case, then an inflated credit rating can limit managers' incentive to accept direct and indirect costs from tax avoidance given greater access to external capital.

We follow Becker and Milbourn (2011) and instrument for credit rating inflation by interacting the share of credit ratings issued by the Fitch rating agency in a given industry-year with a firm's long-term S&P credit rating. This measure is motivated by the theoretical link between rating agency competition and rating inflation, which suggests that greater competition among rating agencies leads to greater rating inflation. The theory implies that the corporate bond ratings from incumbent rating agencies (e.g., S&P and Moody's) are more likely to be inflated when competition from Fitch is more intense.[1] Becker and Milbourn (2011) show that Fitch's market share within an industry is exogenous to industry characteristics such as credit growth, industry profitability and the difficulty of predicting default within the industry. Because competition from Fitch each industry-year is plausibly exogenous to firm-level tax avoidance, we can use this variation to identify a causal link between rating inflation and tax avoidance.

We begin by showing that rating inflation is associated with increased investment in capital expenditures (capex) and R&D in the following year. This is consistent with rating inflation unlocking new investment opportunities through a lower cost of capital. We also find evidence that rating inflation leads to new issuance of public debt as some firms seek to immediately realize the benefits of lower financing costs. Overall, these findings are consistent with ratings inflation leading to real changes to managers' investment and financing decisions (Bolton et al. 2012; Goldstein and Huang 2020).

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[1] This measure of rating inflation has also been used in the context of structured product markets. See, e.g., Cohen and Manuszak (2013) and Flynn and Ghent (2018).

Moving to our primary empirical analysis, we find that rating inflation is also associated with greater tax avoidance, as measured by reduced GAAP and cash ETRs, in the following year. Although Fitch market share is plausibly exogenous to tax avoidance, we address endogeneity concerns in two additional ways. First, we include a variety of controls such as leverage, pre-tax earnings, loss carryforwards, and investments that can affect observable tax outcomes. Additionally, in our primary model we control for changes in investment and debt issuance that are contemporaneous to tax avoidance, which suggests there is an increase in tax avoidance even on top of the increase to investment and debt issuance that are associated with rating inflation. As a second approach to addressing identification concerns, we match firms in high versus low Fitch market share industries by credit rating, size, debt, and investment. We find a significant increase in tax avoidance within the high Fitch market share group compared to the matched low Fitch market share group. This supports our inferences that observed changes to tax avoidance are not simply the result of other investment or capital structure changes, but from active tax planning decisions by management.

We also examine the robustness of our results to a variety of fixed effect structures, ranging from more limited industry fixed effects to more rigorous firm fixed effects that account for time invariant unobservable firm characteristics. Finally, while Becker and Milbourn (2011) show convincingly that Fitch's market share is exogenous to industry characteristics, in our most restrictive specification, we include both firm and industry-by-year fixed effects to further mitigate the concern that unobservable industry-time varying factors that may be correlated with our measure of rating inflation and tax avoidance (Bae, Kang, and Wang 2015).

In contrast to the impact of rating inflation, we find that a higher standalone (i.e., not inflated) rating level is not positively associated with tax avoidance in the following year. This is consistent with reduced financial constraints from higher *accurate* credit ratings limiting the net benefits of tax planning activities. Taken together, these results are consistent with firms perceiving rating inflation as short-term and transitory. If managers expect inflated ratings to revert down to their accurate levels over time, they have the incentive to try to maintain the elevated rating level through tax avoidance.

To more strongly establish that firms use tax avoidance to maintain inflated ratings, we next show that firms avoid taxes when they are more likely to be revealed as high-risk in future periods (i.e., the rating is more likely to be downgraded). Specifically, firms with high R&D spending relative to other firms with the same rating avoid taxes more when their ratings are inflated. Because R&D investment generally has more uncertain future payoffs than other investments, this is consistent with high-risk firms using tax avoidance to offset risky investment with immediate increases to earnings and operating cash flow. In contrast to R&D, firms with high levels of capital expenditure, which is a lower risk investment, do not avoid taxes more than low capex firms when ratings are inflated. Additionally, we find that the increase in tax avoidance is concentrated among firms that do *not* issue new public debt following rating inflation. This result is consistent with a tradeoff between quickly exploiting rating inflation to issue debt and taking action to maintain the inflated rating. Overall, our findings are consistent with tax avoidance occurring among risky firms as they attempt to maintain inflated ratings so that they can continue to pool with lower risk firms (Goldstein and Huang 2020).

Next, we expect managers to take action to maintain their inflated credit ratings when they would benefit more from maintaining or increasing their rating. We examine this in two ways. First, we proxy for incentives to improve ratings by identifying where a firm's rating lies relative to its industry peers. We argue that if firms are rated below other firms in their industry, managers have greater incentive to improve their rating. Consistent with this channel, we show that rating inflation leads to more tax avoidance when firms are rated below their industry median rating. Second, we expect that rating improvement incentives are stronger when managers have greater overall career concerns. Credit rating downgrades can lead to negative consequences for managers because downgrades are associated with negative stock returns (Dichev and Piotroski 2001) that reduce CEO wealth and increase bankruptcy likelihood, and these outcomes can result in CEO termination and reputation costs.[2] Consistent with this career concerns channel, we find that the effect of credit rating inflation on tax avoidance is stronger when firms have lower measures of CEO power. This finding is also consistent with Li et al. (2022) who find that CEOs with greater career concerns avoid more taxes when the cost of losing their job is higher. In other words, rating inflation is more strongly associated with tax avoidance when CEOs are less powerful and have plausibly greater career concerns.

We next examine whether the tax avoidance that follows rating inflation ultimately reduces the likelihood of future downgrades. First, consistent with theory, we find that riskier firms with inflated ratings are more likely to be downgraded than less risky firms (Goldstein and Huang 2020). Next, we show that when these risky firms increase their tax avoidance, it reduces the likelihood that they are subsequently downgraded. This finding is consistent with managers increasing tax avoidance to mitigate the likelihood of being subsequently revealed as having low quality. This indicates that greater tax planning activities can enable firms to successfully maintain their inflated rating level.

Finally, we conduct a series of additional analyses to support our findings. First, we examine alternative measures of tax avoidance, including long-run GAAP and cash ETRs, and

[2] As an anecdotal example, Ford Motor Co. replaced their CEO Bill Ford, Jr. with Alan Mulally after receiving a credit downgrade to junk status in 2005.

an adjusted measure of ETR that mitigates the likelihood that results are driven by changes to the valuation allowance (Schwab, Stomberg, and Xia 2022). Additionally, we find that credit rating inflation is associated with greater use of tax haven locations, consistent with firms shifting income to low-tax jurisdictions. Second, we show that our results are not driven by firms that receive Fitch ratings by re-estimating our main models on only firms that *do not* receive a rating from Fitch. In this setup, because firms are rated only by Moody's and/or S&P, rating inflation can only affect tax avoidance through the rating agency competition channel, and not through a channel whereby Fitch happens to offer high ratings to firms that are likely to engage in tax avoidance. The results of this analysis are similar to our main analysis.

Third, we support our primary inferences with an alternative measure of rating inflation. We generate a model-implied ("predicted") rating using financial statement variables (see, e.g., Alissa et al. 2013; Dimitrov, Palia, and Tang 2015; Bonsall et al. 2017), and we find that firms with an observed rating that is one notch larger than their predicted rating engage in greater tax avoidance. Specifically, when a firm's rating is one level higher than predicted, managers reduce GAAP (cash) ETRs by 1.04 (0.97) percentage points, increasing net income (cash flow) by $13.52 ($12.61) million. In contrast, when a firm's observed rating is below its predicted rating, we see no impact on tax avoidance.

This study contributes to the literature in several ways. First, our study provides new evidence on the real effects of credit rating inflation. We show that rating inflation leads to increased tax planning activities, resulting in a shifting of risk from equity to debt holders as managers engage in greater tax avoidance. This also results in reduced cash inflows to tax authorities. Using the average reduction to cash ETRs in our sample of firms with an inflated rating, increased tax avoidance from rating inflation results in approximately $19.7 billion in reduced cash outflow to the tax authority during our sample period. Second, we provide empirical support for recent theory that suggests that credit rating agencies with an incentive to inflate earnings will pool some high-risk firms with higher quality firms, leading to incentives for these firms to avoid being subsequently revealed as high risk (Goldstein and Huang 2020). Our findings provide novel evidence that managers of higher risk firms will take actions to avoid being subsequently revealed as low quality.

Third, our findings add to the tax literature by providing new evidence on both the determinants and consequences of tax avoidance (Hanlon and Heitzman 2010; Wilde and Wilson 2020). Our study suggests that managers perceive tax planning as an important mechanism to maintain an inflated rating and that these activities are successful in limiting subsequent downgrades of risky firms. Related to our paper is the work of Alissa et al (2013), who show that firms manage earnings when their actual rating level deviates above or below a model-implied expected rating level. In contrast to their work, we show that firms attempt to maintain upwardly-biased rating levels through the use of tax planning activities.

2. Related Literature and Hypothesis Development

2.1 Information Content of Credit Ratings

Credit ratings are widely regarded by investors, regulators, and financial counterparties as key indicators of credit risk (Kisgen 2007). Prior literature links ratings to capital structure and investment (Kisgen 2006; Kisgen 2009; Tang 2009; Almeida et al. 2017; Kisgen 2019) and information characteristics (Ashbaugh-Skaife, Collins, and LaFond 2006; Cheng and Subramanyam 2008). Because debt holders face asymmetric payoffs from risky investment, credit rating agencies incorporate firm risk-taking incentives into the ratings decision (Kuang and Qin 2013). As such, firms must balance the benefit of risky investment for equity holders, with the potential increased cost of debt from lower credit ratings.

Despite the importance of ratings, there is strong theoretical and empirical evidence that ratings can be biased. The issuer-pays revenue model that the major rating agencies (e.g., S&P, Fitch, and Moody's) utilize generates the incentive for rating agencies to issue inflated, inaccurate ratings in exchange for current and future rating revenue.[3] Although reputation and legal/regulatory punishment concerns may generate incentives to issue accurate ratings, existing literature suggests that short-term incentives for rating fees can outweigh long-term incentives for reputation.

The incentive to inflate ratings can be exacerbated in the presence of rating agency competition, because rating agencies may *cater* to firm preferences for high ratings to capture market share. In addition to rating catering, rating inflation may occur in equilibrium due to the ability of firms to *shop* for the highest ratings: when multiple rating agencies offer ratings to a given firm, it will only purchase the highest ones. The theoretical models of Skreta and Veldkamp (2009), Bolton et al. (2012), Bar-Isaac and Shapiro (2013), and Sangiorgi and Spatt (2017) predict that rating inflation arises from one or both of these channels, and the empirical evidence in Becker and Milbourn (2011), Jiang et al. (2012), Griffin et al (2013), Cohen and Manuszak (2013), and Flynn and Ghent (2018) support the idea that rating agency competition leads to rating inflation through one or both channels.

Regardless of how ratings become inflated in equilibrium, inflated ratings can have real effects on firms. Bolton et al. (2012) show theoretically that inflated ratings can reduce the cost

[3] Bonsall (2014) suggests that rating optimism from issuer-pay rating agencies relative to investor-pay agencies is driven by soft information that indicates higher credit quality, and that more optimistic issuer-pay rating levels are associated with better ex-post performance. Dimitrov et al. (2015) suggest that the Dodd-Frank Act of 2010 led credit rating agencies to become more conservative and issue less informative ratings. However, deHaan (2017) interprets these results as likely driven by reputation damage from the financial crisis.

of capital when “naïve” investors take ratings at face value and do not know they are inflated. deHaan, Li, and Watts (2023) find that retail bond investors over rely on untimely credit ratings, consistent with biased ratings affecting retail investors. Even if investors rationally discount inflated ratings, rating inflation can affect market prices through the impact of rating-contingent regulation (Opp et al 2013), or through feedback effects whereby rating agencies understand their impact on firms’ cost of debt and make their rating decisions accounting for this (Goldstein and Huang 2020).

2.2 Tax Avoidance, Risks, and Credit Ratings

Tax avoidance can provide significant cash flow benefits by reducing one of the largest single expenses on a firm’s financial statements (Shackelford and Shevlin 2001; Hanlon and Heitzman 2010; Scholes et al. 2015). However, like other risky investment, tax avoidance strategies can result in both direct and indirect costs to the firm. Prior research suggests that risk-neutral equity holders encourage tax avoidance as a form of risky investment, similar to other risky investments such as R&D (Rego and Wilson 2012). However, debt holders face asymmetric payoffs from tax avoidance because they bear the potential downside risk of reduced cash flow from future tax audits and penalties (tax risks), as well as potential indirect risks to the firm’s cash flow through negative reputation (Hanlon and Slemrod 2009; Lee et al. 2021), political scrutiny (Mills, Nutter, and Schwab 2013), and regulatory costs (Dyreng, Hoopes, and Wilde 2016). Therefore, although risk-neutral equity holders encourage tax avoidance, debt holders discourage it by applying higher risk premia to the debt of firms engaging in aggressive tax avoidance (Hasan et al. 2014; Shevlin, Urcan, and Vasvari 2020).

Relatively few papers directly examine the relation between tax avoidance and credit ratings. Ganguin and Bilardello (2005) suggest that ratings analysts view a firm's taxes as a simple percentage payment, failing to incorporate tax burden into their analysis. Ayers, Laplante, and McGuire (2010) find that credit rating agencies apply lower credit ratings to firms with higher book-tax-differences (BTDs). However, when BTDs are primarily attributable to tax avoidance, as opposed to poor earnings quality, the effect does not occur. Bonsall, Koharki, and Watson (2017) find that credit ratings agencies consider tax avoidance activities as part of the ratings process. However, due to the complexity of transactions underlying tax avoidance activities, ratings agencies disagree in their assessment of firms' ratings as tax avoidance increases, resulting in greater rating divergence between agencies. Taken together, these studies indicate that tax avoidance, in isolation, likely does not directly change a firm's credit rating.

2.3 Hypothesis

We hypothesize two related ways in which an increase in rating inflation leads directly to an increase in tax avoidance. First, because rating inflation reduces a firm's cost of capital, it can make risky investments marginally positive NPV. If investment in tax avoidance becomes positive NPV with an inflated rating, then rating inflation can lead directly to higher tax avoidance. Second, we expect firms to have the incentive to maintain their inflated rating to continue capturing the benefits of a lower cost of capital. Maintaining the inflated rating would allow low-quality firms to continue to pool with high-quality firms (Goldstein and Huang 2020) and issue lower-cost debt and/or invest in risky projects. Because of the importance of taxes on net income and cash flow, and because rating agencies take these financial metrics into account when evaluating ratings, we expect managers to use tax avoidance to maintain an inflated rating.

Important to our hypothesis is the assumption that, if the firm's rating is accurate and it increases, then the firm does not engage in additional tax avoidance. This assumption is motivated by the idea that if the rating is accurate then: 1) the firm's credit rating is already consistent with its true financial condition, and 2) assuming no change in financial performance, the firm expects its rating level to be unchanged in the long-run. In contrast, the transitory nature of an inflated rating gives firms the incentive to avoid taxes in order to maintain the inflated rating.

This motivates our main hypothesis:

***Hypothesis 1*: Rating inflation is associated with an increase in tax avoidance.**

However, there are several reasons why rating inflation may not be associated with tax avoidance. First, the decision depends on whether managers perceive the benefits of increased tax avoidance to outweigh any costs, including creditors responding to tax avoidance by increasing the cost of debt. Instead of tax avoidance, managers may opt to engage in other types of risky investment and leave their level of tax avoidance unchanged when their rating is inflated. Alternatively, risk-averse managers may prefer not to exploit a temporary lower cost of capital because increased tax avoidance presents additional costs, including risks to the firm and to management's reputation (Hanlon and Slemrod 2009; Rego and Wilson 2012). Therefore, it is possible that, rather than increasing tax avoidance or other investment, managers do not change their risk-taking.

The tension in our hypothesis suggests that results are likely to vary in several cross-sectional dimensions. First, we expect the impact of rating inflation on tax avoidance to be stronger for firms that are engaged in risky investment with uncertain future payoffs. This is because tax avoidance can increase risky firms' likelihood of maintaining their inflated rating and pooling with low-risk firms, thereby allowing risky firms to attenuate the impact of high-risk investments on credit ratings. In contrast, we expect the impact of rating inflation to be weaker for less risky firms, because these firms should have less incentive to attenuate investment risk in order to maintain an inflated rating.

Second, we expect to find a stronger effect when managers derive greater benefits from maintaining their credit rating, and therefore have an incentive to increase their earnings and operating cash flow to do so. We anticipate the benefits to managers are higher when their rating is currently below that of peer firms. We also anticipate a stronger effect when managers have stronger career concerns, i.e., when they are less likely to seek the quiet life (Bertrand and Mullainathan 2003).

3. Data and Research Design

3.1. Research Design

We use the following model to examine the relation between credit rating inflation and firm behavior:

$$ETR_{i,t+1} = \alpha + \beta_1 CRATING_{i,t} + \beta_2 FITCH_{j,t} + \beta_3 CRATING_{i,t} * FITCH_{j,t} + \gamma X_{i,t} + \mu_i + \tau_{j,t} + \epsilon_{i,t} \quad (1)$$

where $ETR_{i,t+1}$ is either the GAAP ETR (*GETR*) or cash ETR (*CETR*) for firm *i* in year *t+1*,[4] $CRATING_{i,t}$ is the average numeric S&P long-term issuer rating value for firm *i* in year *t*, and $FITCH_{j,t}$ is the market share of Fitch relative to industry *j* in year *t*. The main coefficient of interest is β_3 which captures the interaction of $CRATING_{i,t}$ and $FITCH_{j,t}$. Higher values of β_3

[4] We focus our analyses on a single year measure of tax avoidance because we are interested in the within-firm changes to tax avoidance as the likelihood of credit rating inflation increases. Using multiple year measures of tax avoidance can generate noise as the likelihood of credit rating inflation changes in subsequent years. We evaluate the robustness of our results to a long-run measure of tax avoidance in Section 5.4.

indicate the firm's credit rating is more inflated due to more intense competition among Fitch, S&P, and Moody's. If credit rating inflation leads to increased tax avoidance, then we expect β_3 to be negative.

$X_{i,t}$ is a vector of control variables that previous literature has found to be associated with tax avoidance and credit ratings. This includes firm size (*ASSETS*), age (*LN_AGE*), pre-tax profitability (*PTROA*), debt (*LEVERAGE*), net operating loss carryforwards (*TLCF*), market-to-book ratio (*MTB)*, the existence of multinational activities (*FOREIGN*), tangible assets (*PPENT*), cash holdings (*CASH)*, research and development expense (*R&D)*, likelihood of bankruptcy (*MOD_ZSCORE*), and institutional ownership (*INST_PCT*).[5]

Importantly, μ_i and $\tau_{j,t}$ are firm and industry-by-year fixed effects, respectively. Firm fixed effects capture time-invariant firm characteristics that can influence tax avoidance. Industry-by-year fixed effects capture the effect of unobservable industry-trends over time. While industry-year variation in Fitch's market share provides an instrument that is plausibly exogenous to a firm's measure of tax avoidance, industry-year fixed effects mitigate the concern that annual changes that influence a particular industry are not simultaneously influencing both ETRs and Fitch's market share. The lower order term *Fitch* is subsumed by $\tau_{j,t}$.

Robust standard errors are clustered at the industry-year level as this is where variation in our primary independent variable of interest occurs (Bertrand, Duflo, and Mullainathan 2004). We winsorize ETR measures at 0 and 1. All other continuous variables are winsorized at the 1% and 99% values to mitigate the influence of outliers. Variable definitions are outlined in Appendix A.

3.2. Data Sources and Sample Construction

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[5] We replace missing R&D with 0 and include an indicator variable for each observation that had missing R&D (*MISS_R&D*).

We construct our sample from a panel of Compustat firm-years between 1995 and 2016. Our sample period is based on availability of S&P long-term issuer credit ratings from Compustat, which we require for our analysis, and it ends in 2016 to avoid confounding effects on tax avoidance from the Tax Cuts and Jobs Act (TCJA) of 2017. Following Becker and Milbourn (2011), we convert the S&P alphabetic credit rating values to numeric values. Additionally, because Compustat reports ratings at the monthly level, we construct yearly ratings for each firm by taking the average of the monthly ratings over the fiscal year.[6] For our primary analyses, we also construct standard firm-level controls from Compustat and we include institutional ownership from Thomson Reuters 13-F filings. We require non-missing control variables for our sample. Additionally, we exclude financial firms (SIC 6000-6799) and utilities (SIC 4610-4991) as their investment strategies are highly regulated compared to firms in other industries.

To construct a yearly measure of credit rating inflation, we follow Becker and Milbourn (2011) and use Fitch's market share in each 2-digit NAICS industry as a measure of competition among the three major credit rating agencies, S&P, Moody's, and Fitch. The data used to construct Fitch's market share relative to S&P and Moody's comes from the Mergent Fixed Income Securities Database (FISD). The Mergent FISD database provides credit ratings for individual bond issues from all three credit rating agencies. With the Mergent FISD data we construct Fitch's market share as the number of credit ratings issued by Fitch within a given industry *j* in year *t* relative to the total number of credit ratings issued by all three major ratings agencies in industry *j* in year *t*. Becker and Milbourn (2011) show that, consistent with theory,

[6] To convert the alphabetic credit rating values to numeric values we follow Becker and Milbourn (2011). The corresponding values are as follows: AAA = 28, AA+ = 26, AA = 25, AA- = 24, A+ = 23, A = 22, A- = 21, BBB+ = 20, BBB = 19, BBB- = 18, BB+ = 17, BB = 16, BB- = 15, B+ = 14, B = 13, B - = 12, CCC+ = 11, CCC = 10, CCC- = 9, CC = 7, and C = 4.

greater Fitch market share is associated with credit rating inflation. By using Fitch's market share as a measure of competition among the credit rating agencies, we construct a measure of credit rating inflation that is exogenous to a firm's specific level of tax aggressiveness. This is because Fitch's market share relative to the other major credit rating agencies is unlikely to be directly related to a firm's tax planning strategy.

Finally, ETRs represent our primary dependent variables of interest. ETRs are uninterpretable when the denominator is negative, therefore, consistent with prior literature, we drop (t+1) firm-year observations with pre-tax losses.

After our sample selection cuts, we retain a final panel of 9,139 firm-year observations between 1995 and 2016. Table 1 outlines the sample selection process.

INSERT TABLE 1 HERE

We report summary statistics in Table 2. Panel A presents the descriptive statistics for our analyses. Notably, our sample consists of profitable firm year observations in year (t+1) that are relatively large, with average assets of $ 7.518 billion and an average credit rating of 18.14, corresponding to an S&P rating of BBB-. The average Fitch market share during our sample is 32.4 percent. Approximately 63.2 percent of our firm-year observations are multinationals. Average GAAP (cash) ETRs are 34.0 (28.2) percent.

INSERT TABLE 2 HERE

In Panel B of Table 2, we report the Fitch market share by NAICS industry, including market share within our full sample period and then split by years between 1995-2000, 2001-2006, and 2007-2016. The results are broadly consistent with Becker and Milbourn (2011) and generally show an increase in Fitch market share over time.[7]

[7] Table 2 indicates that our sample retains 1 firm categorized as utilities (NAICS = 22) and 4 firms categorized as financial (NAICS = 52). This likely arises due to differences in categorization between SIC and NAICS. To remain

4. Results

4.1. Main Results

In Table 3 we present the results from estimating equation (1). Panel A includes industry and year fixed effects, Panel B includes firm and year fixed effects, and Panel C includes firm and industry-by-year fixed effects. Columns 1 through 3 of each panel report the impact of rating inflation on *R&D, CAPX*, and *D_ISSUE* in year *t+1*. Next, in columns 4 through 7, we show the results of our primary analysis of rating inflation on tax avoidance. Tax avoidance is measured as *GETR* in columns 4 and 5 and *CETR* in columns 6 and 7. In each regression in which tax avoidance is the dependent variable, we include investment and debt controls measured in year *t* as outlined in Section 3.1, and we add the year *t+1* measures of investment and debt issuance in columns 5 and 7 to mitigate the concern that these changes to investment or debt are fully explaining the effect of rating inflation on tax avoidance.

INSERT TABLE 3 HERE

We draw several important takeaways from this analysis. First, rating inflation is positively related to both R&D and capex. The relation with R&D and capex is consistent with lower cost of capital resulting in additional investment in new positive NPV projects. This is also broadly consistent with the findings of Baghai, Servaes, and Tamayo (2014), who show that more *stringent* ratings are associated with lower investment in acquisitions. Second, the results in column 3 indicate that rating inflation is associated with greater year-ahead debt issuance, which is also consistent with the finding of Baghai, Servaes, and Tamayo (2014) that more stringent ratings are associated with lower debt issuance.

consistent with prior tax avoidance work, we do not drop beyond the SIC categorization of financials. However, our results are unaffected by removing these firms (untabulated).

Turning to our main analyses in columns 4 through 7, all three panels show that our measure of credit rating inflation, *CRATING*FITCH* is negative and significant for both GAAP and cash ETRs (a negative coefficient in columns 4-7 represents more tax avoidance). Focusing specifically on Panel C, the firm fixed effect structure provides inferences on the *within-firm effect* of our instrument for credit rating inflation on tax-avoidance, indicating the relative change to ETRs as credit rating inflation is likely to increase. Panel C also indicates that our results are robust to controlling for industry-by-year effects that may covary with both tax avoidance and Fitch market share. Finally, controlling for changes to investment and debt that are contemporaneous with tax avoidance in columns 5 and 7 mitigates concerns that tax avoidance outcomes are incidental to changes in firms' investment or leverage.

Notably, the baseline effect of *CRATING* on the tax avoidance variables is only consistently significant in the specifications that use cash ETR. This suggests that increased, but accurate, credit ratings do not result in additional tax avoidance. Overall, the findings indicate that as credit rating inflation increases, managers avoid taxes more on average. This provides empirical support for our main hypothesis and suggests that, given rating inflation, managers shift risk from equity to debt holders to increase the short-term credit profile of the firm.

4.2. Matching on Investment and Debt

In columns 5 and 7 of Table 3, Panels A through C, we control for the year *t+1* investment and debt issuance. This specification mitigates the concern that changes to tax avoidance represent an unintended consequence of simultaneous changes to investment or debt. We work to further mitigate this concern by testing our hypothesis using a matched research design. Specifically, we rank the measure of Fitch market share by quintile within each credit rating level. We then retain observations that are either within the bottom (quintile = 1) or top (quintile = 5) quintile. Using coarsened exact matching (CEM) (Iacus et al. 2011, 2012), we match observations with high Fitch market share to those with low Fitch market share on *CRATING*, *ASSETS*, *LEVERAGE*, and year *t+1 R&D* and *CAPX*.[8] This results in a matched sample of 2,753 observations with similar credit ratings, size, debt, and investment characteristics that differ only in terms of the relative likelihood that their credit rating is inflated.

INSERT TABLE 4 HERE

In Table 4, we report the results of this analysis, replacing the continuous measure of *FITCH* with an indicator variable for the top quintile of fitch market share (*HighFITCH*). The interaction *CRATING*HighFITCH* represents the differential effect of a firm's credit rating when it moves from the bottom to top quintile of fitch market share. As expected from our matching process, columns 1 through 4 show that *CRATING*HighFITCH* does not result in a differential effect on investment.[9] However, in columns 5 through 8, we continue to find a significant reduction in *GETR* and *CETR*, suggesting that managers reduce tax avoidance as credit rating inflation increases in ways that are unrelated to the direct effects on investment. Focusing on specifications with firm and industry-by-year fixed effects, moving from the bottom to top quintile of Fitch market share is associated with a 1.14 (1.76) percentage point reduction to GAAP (cash) ETRs.

4.3. Tax Avoidance to Mitigate Investment Risk

Goldstein and Huang (2020) suggest that rating inflation results in pooling of firms above certain thresholds into a high-quality rating category. They propose that, while the partial

[8] Coarsened exact matching (CEM) is a nonparametric matching procedure developed by Iacus et al. (2011, 2012). CEM is less sensitive to measurement error in the calculation of the covariates than other matching procedures like propensity score matching and ensures that there is common support across all measures (Chen, Wu, and Zhang 2021 and Cornaggia et al. 2022).

[9] For brevity, we focus analysis on industry and year (analogous to Table 3, Panel A) and firm and industry-year (analogous to Table 3, Panel C) fixed effect structures. Though we note similar inferences with firm and year fixed effects.

verifiability constraint means that rating agencies are unlikely to pool extremely poor-quality firms with high quality firms, there are still some firms that are likely to choose risky projects and eventually be revealed as having low credit quality. Our conceptual mechanism suggests that firms are likely to increase tax avoidance to shore up earnings and capital in the short-term, mitigating the likelihood of being revealed as having low credit quality and enabling lower cost of capital to fund higher risk projects. If this is correct, then we expect tax avoidance to occur more for riskier firms that are most likely to be pooled with high-quality firms.

To examine this, we identify firms that are likely to be making higher risk investments. While no observable measure of investment is perfect, we exploit the fact that R&D is typically considered a high-risk investment with uncertain future payoffs (Coles, Daniel, and Naveen 2006), whereas capital expenditures are investments with more certain outcomes, often associated with managers living the "quiet life" (Bertrand and Mullainathan 2003). We expect that, if firms use tax avoidance to mitigate the likelihood of being revealed as poor credit quality, then they are more likely to avoid taxes when investing more in R&D as opposed to capex.

We split our sample by firms with above median R&D or capital expenditures at *t+1* within each credit rating and year (*HighR&D* = 1, or *HighCAPX* = 1). Firms with above median *R&D* (*CAPX*) within their respective credit rating categories each year are more likely to be those that choose risky (low risk) investment. We then modify equation (1) to interact *HighR&D* (or *HighCAPX*) with our measure of rating inflation (*CRATING*FITCH*). With this triple interaction approach, *CRATING*FITCH* represents the effect of rating inflation on firms with below median R&D or capital expenditures, while the triple interaction represents the effect of rating inflation on firms with above median R&D or capital expenditures, respectively. We also include a control for *R&D/CAPX* expenditures at *t+1* to mitigate concerns that differences are driven by research and experimentation tax credits or accelerated depreciation.

INSERT TABLE 5 HERE

Table 5, Panel A, presents the result of the cross-sectional analysis of high R&D firms. Across three of the four specifications, we find that the interaction *CRATING*FITCH*HighR&D* is negative and significant, indicating that rating inflation's effect on tax avoidance primarily occurs within firms that are likely to be engaged in riskier activities. Alternatively, Table 5, Panel B, presents the results of the cross-sectional analysis of high *CAPX* firms. In this analysis, we find that the effect of rating inflation does not significantly differ by level of capex, with Column 4 showing a marginally significant reduction to the effect within firms with higher capital expenditures, consistent with high capex being less likely to represent significant risk. Taken together, the results of Table 5 provide evidence consistent with firms avoiding tax when they are more likely to be revealed as making higher risk investments and therefore more likely to be downgraded in the future.

Finally, we examine cross-sectional differences in tax avoidance based on whether firms are issuing new publicly traded debt. Firms issuing new debt are less likely to be concerned about maintaining their credit rating (because higher leverage puts downward pressure on ratings, all else equal) and instead seek to reap the immediate benefits of a lower cost of debt. Additionally, because tax avoidance is likely to directly increase the firm's cost of debt (Hasaan et al. 2014), managers will be less likely to engage in additional tax avoidance as they use capital markets to increase debt financing.

In Table 6, we interact our measure of rating inflation with an indicator variable for public debt issuance in *t+1* (*D_ISSUE*). Consistent with our expectations, rating inflation's effect on tax avoidance is primarily concentrated within firms that do not issue new public debt (*D_ISSUE* = 0).

INSERT TABLE 6 HERE

4.4. CEO Incentives for Higher Ratings

Next, our hypothesis is based on the idea that managers exploit credit rating inflation as an opportunity to improve the firm's financial position through tax avoidance. Tax avoidance provides immediate improvements to net income and cash flow that can increase the firm's capital position, buying managers an increased probability of maintaining their credit rating in future periods. We expect this to be more likely to occur when managers have greater incentive or pressure to achieve higher credit ratings. Otherwise, managers can avoid the potential direct and indirect risks from increased tax avoidance and accept the reduced cost of capital to increase long-run investment or return capital to shareholders.[10]

We examine this possibility in two ways. First, we expect managers to have higher (lower) incentives to increase capital and maintain higher credit ratings when their credit rating is low (high) relative to industry peers. We create an indicator variable (*Above_PEER*) equal to one when a firm's credit rating is higher than the industry-year median. We expect the effect of credit rating inflation to be mitigated when *Above_PEER* = 1. To test this, we modify equation (1) with the triple interaction term *CRATING*FITCH*Above_PEER*. With this interaction, the effect of *CRATING*FITCH* represents the effect of credit rating inflation on tax avoidance within firms with lower than median credit ratings, while the triple interaction term describes how this association changes for firms with above-peer credit ratings.

INSERT TABLE 7 HERE

[10] Although managers may be aware of some risks associated with tax avoidance, there are other risks such as regulatory concerns and firm reputation risks that they may not be aware of (Krupa 2024).

Table 7, Panel A presents the results of this analysis. We find that the effect of credit rating inflation on tax avoidance is concentrated among firms with below-peer credit ratings, whereas the effect is mitigated for firms with above-peer credit ratings. This result provides support for our primary inferences that managers use tax avoidance to improve the firm's capital position.

Next, we expect managers to feel higher pressure to increase the firm's capital position through tax avoidance when they have greater career concerns (Li et al. 2022). To test this, we follow prior literature and implement a Principal Component Analysis (PCA) on various proxies for the CEO's power (Custódio, Ferreira, and Matos 2013; Falato and Milbourn 2015; Abernethy, Kuang, and Qin 2015; Hoi, Wu, Zhang 2019; and Li, Lu, Phillips 2019). This includes (1), whether the CEO is also the Chair of the Board (*Duality*), (2) the amount of time the CEO has been with the firm (*Tenure*), and (3) the percent of ownership by the CEO (*CEO_Ownership*). We construct these measures using ExecuComp data and describe each in more detail in Appendix A. The first component from this PCA reports an eigenvalue greater than 1 and is positively associated with all three measures. As such, we label this as *CEO_POWER*.[11]

We then modify equation (1) by interacting *CRATING*FITCH*CEO_POWER.* With this interaction, the effect of *CRATING*FITCH* represents the effect of credit rating inflation on tax avoidance as *CEO_POWER* approaches 0 and the triple interaction term represents the effect of credit rating inflation on tax avoidance as CEO power increases. We expect that managers will be more likely to accept greater risk from tax avoidance when they have greater career concerns

[11] The first component is positively associated with *Dual*, *Tenure*, and *CEO_Ownership* at 0.3898, 0.6884, and 0.6116 respectively.

(i.e., less CEO power) and therefore are more likely to be willing to shift risk from equity to debt holders to increase the firm's capital position.

Table 7, Panel B presents results of this analysis that are consistent with our expectations. We find a strong negative effect of *CRATING*FITCH*, where CEO power is low, on ETRs. We then find that the triple interaction *CRATING*FITCH*CEO_POWER* is positive and significant.[12] Taken together, the results of Tables 7 support the idea that managers are more likely to shift risks from equity to debt holders when they have either incentives or pressure to improve the firm's capital and increase the likelihood of maintaining or increasing the firm's credit rating in subsequent years.

4.5. Effect of Tax Avoidance on Subsequent Ratings Downgrades

Our analysis is fundamentally motivated by the idea that ratings agencies issue inflated ratings that pool some lower quality firms with high quality firms. The risky investments from these lower quality firms are likely to be revealed in subsequent periods, leading to a rating downgrade. In this section, we perform a more direct empirical analysis of this theory. We begin by examining the association between the level of rating inflation in year *t* and the likelihood of a downgrade at *t+1*, *t+2*, or *t+3*. We create an indicator variable equal to one when a firm's credit rating decreases between year *t* and *t+3* (*Downgrade_t(1,3)* = 1).

<u>INSERT TABLE 8 HERE</u>

We analyze the effect of rating inflation on a subsequent downgrade in Table 8, Panel A. In column 1, we estimate the model using the full sample of firms and do not find evidence that inflated ratings revert downward over time *on average*. However, we expect that only the subset of firms engaging in risky investment are likely to be revealed as low quality in subsequent

[12] This analysis uses a smaller sample of firm-years not missing ExecuComp data, limiting our sample to S&P 1500 firms.

periods, resulting in downgrades. Therefore, we split our sample between the high and low R&D groups in columns 2 and 3 respectively. Consistent with our expectations, we find that rating inflation is positively related to a future downgrade for higher risk firms. Conversely, as column 3 shows, firms that are less likely to engage in risky investment are less likely to receive a subsequent downgrade following rating inflation, consistent with these firms being revealed as high quality in future periods. Taken together, these results provide empirical evidence to support previous theoretical literature (Goldstein and Huang 2020).

Next, in Table 8, Panel B, we examine the extent to which increased tax avoidance can mitigate the likelihood of a subsequent rating downgrade. To test this, we measure the change in either GAAP or cash ETRs from year *t* to *t+1* (*ΔTA*). We multiply this change by negative one such that an increasing number represents an increase in tax avoidance. We then interact *ΔTA* with our measure of rating inflation and examine the effect on the likelihood of a subsequent downgrade. Columns 1 and 2 (3 and 4) represent the effect within the high (low) R&D sample where we do (do not) expect tax avoidance to be used to reduce the likelihood of a downgrade.[13] Consistent with our expectations we find that in columns 1 and 2 the triple interaction *CRATING*FITCH*ΔTA* is negative and significant, suggesting that increasing tax avoidance partially mitigates the likelihood of a subsequent downgrade. Alternatively, we do not find this effect when firms are less likely to take risky investments (columns 3 and 4), consistent with these firms being less likely to utilize tax avoidance to shore up capital and earnings.

5. Additional Analysis

5.1. Alternative Credit Rating Measures

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[13] The sample sizes are slightly reduced between Panel A and Panel B because Panel B drops year *t* loss observations to create a reliable change in ETR measure.

We perform a series of tests to examine the robustness of our findings. In Table 9, Panel A, we re-run our analysis examining a composite rating from Standard & Poor's, Moody's, and Fitch. Because not every agency provides a credit rating, we include three indicator variables for whether the composite rating includes Moody's (*RatedMR*), Standard & Poors (*RatedSPR*) and Fitch (*RatedFR*). This results in a smaller sample from our primary tests, but inferences are unchanged.

<u>INSERT TABLE 9 HERE</u>

Next, in Table 9, Panel B, we report the results of this analysis, but *omit* any observation with a Fitch rating. This results in a sample of firm-years where credit rating inflation is instrumented through Fitch market share but in which there is no direct effect of a Fitch rating. This mitigates concerns that our documented effect is driven by firm-specific characteristics that result in demand for a new credit rating. The inferences from this specification are similar.

5.2 Alternative Measures of Tax Avoidance

In Table 10, we examine the robustness of our results to four alternative measures of tax avoidance. First, in column 1, we replace our dependent variable with adjusted ETR (*ADJ_ETR*) in year *t+1* as measured by Schwab, Stomberg, and Xia (2022). The authors suggest that certain factors largely unrelated to intentional tax avoidance activities can create artificially low or high ETRs. Using tax footnote data, the authors create an adjusted measure of ETR that mitigates the influence of incidental changes to ETRs. Results are consistent with our primary analyses and provide comfort that incidental changes to ETRs, such as changes to the valuation allowance, are not driving our results. Next, in columns 3 and 4, we use longer-run measures of tax avoidance by examining thee-year measures of GAAP (*3YGETR*, column 3) and cash ETRs (*3YCETR*, column 4), measured as the sum of cash taxes paid or tax expense over (*t, t*+2) divided by the sum of pre-tax income over (*t*, *t*+2). We find results consistent with primary analyses, suggesting that managers engage in longer-term tax planning given ratings inflation (Dyreng, Hanlon, and Maydew 2008). Finally, in columns 4 and 5, we examine the effect of rating inflation on firms' tax haven activities. For this analysis, we analyze the existence of subsidiaries in tax haven locations (Dyreng and Lindsey 2009).[14] In column 5, we measure the effect of rating inflation on the log of one plus the number of tax haven subsidiaries (*TaxHavens*) using an OLS model. Because recent research suggests that logging a count variable can result in bias, in column 6 we follow the suggestion of Cohn et al. (2022) and re-examine the effect using a Pseudo Poisson Maximum Likelihood Fixed Effect (PPMLFE) estimation, appropriate when the dependent variable is a count measure and robust to the use of high order fixed effects. Across both columns 5 and 6 we find that *CRATING*FITCH* is positively associated with firms' use of tax haven activities, providing additional evidence of tax planning activities following rating inflation.

<u>INSERT TABLE 10 HERE</u>

5.3 Alternative Analysis of Rating Inflation

While Becker and Milbourn (2011) provide compelling evidence that Fitch market share is plausibly exogenous to firm and industry characteristics, other research raises the possibility that Fitch market share is associated with some industry characteristics and may not proxy for rating inflation (Bae et al. 2015). We mitigate this concern, in part, by including industry-by-year fixed effects throughout our main analyses. This fixed effect structure holds constant any

[14] We thank Scott Dryeng for sharing this data on his personal website. This data is available through 2014, limiting our sample size. We retain the controls from equation (1) for this analysis, but remove *FOREIGN* as this is likely to absorb some of the effect we are examining.

industry-year characteristic that may influence both tax avoidance outcomes and the decision for Fitch to compete in a market.

To further examine the robustness of our findings, we utilize an alternative measure of rating inflation. Following prior literature, we generate a predicted rating implied by observable firm characteristics (Alissa et al. 2013). Specifically, we predict the rating using market-to-book ratio (*MTB*), property, plant and equipment (*PPENT*), research and development (*R&D*), an indicator variable for reported R&D (*R&D_IND*), selling, general, and administrative costs scaled by sales (*SGA*), profitability (*PTROA*), the natural log of firm's assets (*LN_ASSTS*), and the firm's operating risk (*OPRISK*) measured as the standard deviation of operating profit over the prior five years. To generate the predicted rating, we implement the following model.

$$CRATING_{i,t} = \alpha + \gamma Z_{i,t} + \lambda_j + \epsilon_{i,t} \quad (2)$$

Where $CRATING_{i,t}$ represents the firm's credit rating, $Z_{i,t}$ represents the vector of explanatory variables outlined above, and λ_j represents the firm's Fama French 12 industry. Equation (2) is estimated using an ordered probit model. The equation is estimated cross-sectionally by year to avoid look-ahead bias. We predict the probability of each rating category and select the rating category with the highest probability as the firm's predicted rating. We then calculate the difference between the actual rating and predicted rating as *DIFF*.

Table 11, Panel A, presents the results of the pooled estimation from equation (2). Next, in Panel B, we verify that Fitch market share is positively associated with the rating differential. To do this, we examine the relation between *DIFF* and *FITCH*, retaining the controls from equation (1) and industry fixed effects. In column 1 (2) we report results using an ordered probit (OLS) model. Consistent with the inferences from Becker and Milbourne (2011), we find that

Fitch market share is *positively* associated with the differential between actual and predicted ratings.

INSERT TABLE 11 HERE

Next, we re-examine our primary analysis in Table 11, Panel C. We modify equation (1) by adding *DIFF* as our primary independent variable of interest. We retain the controls and fixed effect structure from equation (1), and we also control for the firm's actual credit rating at *t*, which allows us to interpret changes in *DIFF* in terms of changes in the predicted rating level. This analysis provides inferences regarding the effect of increased credit rating differential (*DIFF*) on tax avoidance. Consistent with our primary inferences, we find a negative and significant effect of *DIFF* on ETRs in three out of four specifications.[15]

Finally, it is important to highlight that *DIFF* captures deviation from expected ratings that can be associated with soft information (Bonsall 2014). Therefore, *DIFF* does not necessarily describe credit rating inflation in a similar manner as the use of the Fitch market share. If the effect of *DIFF* on tax avoidance is consistent with credit rating *inflation*, then we expect this to vary cross-sectionally with the sign of the deviation from the predicted rating. Specifically, we expect the effect of *DIFF* on tax avoidance to be stronger when the actual rating is above the predicted rating level (*DIFF>0*), compared to when the actual rating is below the predicted rating (*DIFF<0*). This is because firms with *DIFF>0* are experiencing rating inflation, whereas firms with *DIFF<0* are experience rating deflation.

To examine variation that depends on the sign of *DIFF*, we create four indicator variables for firms with actual ratings that are -2, -1, +1, and +2 levels from their model-predicted value. We utilize these cutoffs in order to also allow for variation in tax avoidance that depends on the

[15] We lose some observations compared to our primary analysis due to the requirement for additional variables from equation (2).

magnitude of the deviation. We replace our measure of *DIFF* with these four indicators. Because there is unlikely to be significant within-firm variation across each of these categories, we limit this analysis to industry and industry-by-year fixed effects. Table 11, Panel D presents the results of this analysis. We find that the increase to tax avoidance is specifically concentrated within firms that are rated one notch above the predicted level. Using the analysis with industry-by-year fixed effects, an inflated rating of one level above the model prediction is associated with a 1.04 (0.97) percentage point reduction in GAAP (cash) ETRs. This reduction in tax avoidance is economically meaningful. For the sample average of the pre-tax income for firm-years that receive a one-point elevated rating versus expectation of $1.3 billion, a 0.97 percentage point reduction is associated with a $12.61 million reduction to cash taxes paid. Within our sample, 1,568 firms-years exhibit a one-point elevated rating, suggesting a lower bound reduction to cash taxes paid of approximately $19.72 billion throughout our sample period.

6. Conclusion

Credit rating inflation pools low and high-risk firms in the same rating category, providing a temporary decrease to higher risk firms' cost of capital. This creates an incentive for managers to capture the benefits by shifting risk from equity to debt holders. Tax avoidance provides short-term cash flow and earnings benefits, increasing a firm's capital position and enabling managers to attempt to mitigate the likelihood of being subsequently revealed as low quality. Consistent with this, we find evidence that our instrument for credit rating inflation is positively associated with tax avoidance.

Furthermore, we find that the manager's choice to increase tax avoidance is related to their investment choices. Our cross-sectional analyses support the idea that managers use tax avoidance to mitigate the likelihood of future downgrades, particularly when engaging in higher risk investment in R&D. Rating inflation is most strongly associated with tax avoidance when firms are likely to engage in higher risk investment activities. We also find that the incentive to maintain inflated credit ratings is related to factors other than just the cost of capital. When managers have increased pressure because the rating is below peer firms and when they face greater career concerns, they are more likely to value the benefit of an increased rating by increasing tax avoidance.

Our results add to our understanding of the determinants of corporate tax avoidance, providing novel evidence that credit rating inflation can lead to increased tax avoidance as managers shift risk from equity to debt holders. We also add to the broader literature on tax avoidance and financing constraints. When managers have high, but accurate, credit ratings, they reduce tax avoidance as there is less need for internal financing (Edwards et al. 2016). However, when credit ratings are high, but inaccurate, managers increase tax avoidance to exploit the inflated credit rating. Finally, we provide new evidence that increased tax avoidance mitigates the likelihood of a future downgrade when a firm is otherwise likely to be revealed as high risk in subsequent periods.

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Appendix A
Variable Descriptions

GETR	The GAAP effective tax rate, calculated as worldwide income tax expense (TXT) divided by worldwide pre-tax income (PI). Compustat.
CETR	The cash effective tax rate, calculated as cash taxes paid (TXPD) divided by worldwide pre-tax income (PI). Compustat.
CRATING	The firm's average S&P credit rating over the fiscal year. The monthly alphabetic S&P credit ratings provided by Compustat are first converted to numeric values following Becker and Millbourn (2011). We then take the average of the monthly numeric credit ratings over the entire fiscal year.
FITCH	Fitch's market share as the number of credit ratings issued by Fitch within a given industry *j* in year *t* relative to the total number of credit ratings issued by all three major ratings agencies (Moody's, S&P, and Fitch) in industry *j* in year *t*. Industry is measured by the firm's 2-digit NAICS code. Data is from the Mergent FISD database.
ASSETS	Total assets (AT). Compustat.
LN_AGE	The natural log of the number of years since a firm first appeared in Compustat.
PTROA	The firm's earnings before interest and tax (EBIT) divided by prior year total assets (AT). Compustat.
TLCF	An indicator variable if the firm retains a tax-loss carryforward, 0 otherwise. Compustat.
MTB	Market to book ratio, calculated as the firm's market value of equity (PRCC_F*CSHO) plus debt (DLTT+DLC) Divided by lagged total assets (AT). Compustat.
FOREIGN	An indicator variable for whether a firm operates in foreign jurisdictions, 0 otherwise. Compustat.
LEVERAGE	Total debt (DLTT+DLC) divided by lagged total assets (AT). Compustat.
CASH	Cash and short-term investments (CHEQ) divided by lagged total assets (AT). Compustat.
PPENT	Property, plant, and equipment (PPENT) divided by lagged total assets (AT). Compustat.
R&D	Research and Development expenditures (XRD) divided by lagged total assets (AT). Compustat.
MISS_R&D	Indicator variable equal to one if Research and Development expenditures (XRD) is missing in Compustat and zero otherwise.
MOD_ZSCORE	The modified z-score, calculated as 1.2*(WCAP/AT) + 1.4*(RE/AT) + 3.3*(EBIT/AT) + 1*(SALE/AT). Compustat.
INST_PCT	Total institutional ownership as a percentage of outstanding shares. Thomson Reuters 13-F filings.
CAPX	Capital expenditures (CAPX) divided by lagged total assets (AT). Compustat.
D_ISSUE	An indicator variable equal to one when a firm issues new public debt, zero otherwise. Mergent FISD.
HighR&D	An indicator variable equal to one if a firm reports above median R&D expenditures sorted by credit rating-year, zero otherwise.

Appendix A (Continued)
Variable Descriptions

HighCAPX	An indicator variable equal to one if a firm reports above median CAPX sorted by credit rating-year, zero otherwise.
Above_PEER	An indicator variable if a firm's credit rating (CRATING) is greater than the median industry-year credit rating. zero otherwise. Compustat.
CEO_POWER	The first component from a principal component analysis of three measures of executive power, *Dual*, *Tenure*, and *CEO_Ownership*. *Dual* represents an indicator variable equal to one if a firm's CEO is also designated as the chair of the board, 0 otherwise. *Tenure* represents the number of years the CEO has been employed as such by the firm. *CEO_Ownership* represents the percentage of shares outstanding owned by the firm's CEO. ExecuComp.
RatedMR	An indicator variable if a firm receives a rating from Moody's, zero otherwise. Mergent FISD.
RatedSPR	An indicator variable if a firm receives a ratings from Standard and Poors, zero otherwise. Mergent FISD.
RatedFR	An indicator variable if a firm receives a rating from Fitch, zero otherwise. Mergent FISD.
ADJ_ETR	The measure of a firm's adjusted ETR as calculated by Schwab, Stomberg, and Xia (2022). Retrieved from Junwei Xia's personal website.
3YCETR	The measure of three-year cash ETR, calculated as the sum of cash taxes paid (TXPD) over years (t, t+2) divided by the sum of pre-tax income over years (t, t+2). Compustat.
3YGETR	The measure of three-year GAAP ETR, calculated as the sum of tax expense (TXT) over years (t, t+2) divided by the sum of pre-tax income over years (t, t+2). Compustat.
TaxHavens	The number of subsidiaries located in tax haven jurisdictions. Retrieved from Scott Dryeng's personal website.
SGA	Selling, general, and administrative costs (XSGA) divided by revenue (SALE). Compustat
OPRISK	The standard deviation of a firm's operating profit over years (t-4, t). Operating profit is calculated as EBITDA divided by lagged assets (AT). Compustat.
DIFF	The rating differential between the firm's actual credit rating and model implied credit rating using a cross-sectional ordered probit model from equation (2). T

Table 1
Sample Selection

	Firm-Years	Firms
Firm-Years Not Missing S&P Long-Term Credit Ratings: 1995-2016	36,483	(4,047)
Not Missing Mergent FISD Data on Fitch Market Share	22,738	(1,911)
Not Missing Control Data	15,141	(1,330)
Dropping Financials (SIC 6000-6799) and Utilities (SIC 4610-4991)	13,481	(1,187)
Dropping Loss Observations	**9,139**	**(997)**

This table outlines our sample selection process. The base sample is from Compustat and includes all firm-years between 1995 and 2016.

Table 2
Summary Statistics
Panel A: Descriptive Statistics

Variable	N	Mean	SD	P25	P50	P75
GETR	9,139	0.340	0.149	0.276	0.341	0.381
CETR	9,139	0.282	0.199	0.156	0.258	0.351
CRATING	9,139	18.143	3.241	15.538	18.000	20.000
FITCH	9,139	0.324	0.150	0.211	0.324	0.419
ASSETS	9,139	7518	9336	1546	3449	8763
LN_AGE	9,139	3.258	0.707	2.773	3.401	3.892
ROA	9,139	0.128	0.083	0.079	0.117	0.165
LEVERAGE	9,139	0.352	0.301	0.196	0.295	0.433
TLCF	9,139	0.501	0.500	0.000	1.000	1.000
MTB	9,139	1.835	1.472	1.012	1.445	2.164
FOREIGN	9,139	0.632	0.482	0.000	1.000	1.000
PPENT	9,139	0.342	0.271	0.140	0.259	0.481
CASH	9,139	0.112	0.145	0.025	0.066	0.146
R&D	9,139	0.020	0.039	0.000	0.000	0.024
MOD_ZSCORE	9,139	2.019	1.229	1.360	1.979	2.621
INST_PCT	9,139	0.619	0.352	0.437	0.750	0.890

Table 2 (Continued)
Summary Statistics
Panel B: Analysis of Fitch Share by Year and Industry

NAICS Industry (2-Digit)	Fitch Market Share (%)				Firms	
	Full	95-00	01-06	07-16	Count	%
11 - Agriculture, Forestry, Fishing and Hunting	30.37	9.19	23.88	46.97	4	0.40
21 - Mining, Quarrying, and Oil and Gas Extraction	28.46	16.46	24.82	37.84	84	8.43
22 - Utilities	40.13	23.66	32.98	54.30	1	0.10
23 - Construction	29.82	8.56	27.33	44.07	9	0.90
31 - Manufacturing: Food, Textile, Apparel	34.29	13.98	30.57	48.70	56	5.62
32 - Manufacturing: Wood, Paper, Printing, Petroleum, Chemicals, Plastics	28.89	13.77	24.18	40.78	149	14.94
33 - Manufacturing: Metals, Machinery, Computers, Electrical, Furniture	30.91	14.87	26.65	43.08	287	28.79
42 - Wholesale Trade	28.25	13.29	23.32	40.18	42	4.21
44 - Retail Trade: Motor Vehicles, Furniture, Electronics, Food, Gas	30.12	8.38	27.06	45.00	65	6.52
45 - Retail Trade: Sporting Goods, Books, Florists, Office Supplies, Mail-Order, Vending	38.95	18.39	38.78	51.38	27	2.71
48 - Transportation and Warehousing: Air Transport, Water Transport, Trucks, Pipelines	23.04	10.76	15.87	34.72	36	3.61
49 - Transportation and Warehousing: Messengers, Storage	16.68	6.57	19.19	21.25	4	0.40
51 - Information	35.85	15.06	27.52	53.32	78	7.82
52 - Finance and Insurance	36.54	23.88	34.36	45.43	4	0.40
53 - Real Estate and Rental and Leasing	31.98	11.63	35.39	42.13	8	0.80
54 - Professional, Scientific, and Technical Services	26.28	13.53	26.33	33.89	29	2.91
56 - Administrative and Support and Waste Management and Remediation Services	31.69	10.63	28.95	45.98	21	2.11
61 - Educational Services	26.10	16.77	31.36	28.54	1	0.10
62 - Health Care and Social Assistance	32.17	14.58	26.20	46.31	34	3.41
71 - Arts, Entertainment, and Recreation	25.86	13.49	20.49	36.50	16	1.60
72 - Accommodation and Food Services	31.18	10.51	29.45	44.62	37	3.71
81 - Other Services (except Public Administration)	15.48	8.74	22.16	15.52	5	0.50
Total					997	100.00

This table presents summary statistics for our analysis. Panel A outlines the descriptive statistics for our primary variables of interest and controls. Table B provides descriptive analysis of the Fitch market share percentage by industry. We separately report Fitch market share measures between 1995-2000, 2001-2006, and 2007-2016 to show consistency between our sample and Becker and Milbourn (2011).

<u>Table 3</u>

The Effect of Credit Inflation on Investment and Tax Avoidance

Panel A: Industry and Year Fixed Effects

VARIABLES	(1) R&D_t+1	(2) CAPX_t+1	(3) D_Issue_t+1	(4) GETR_t+1	(5) GETR_t+1	(6) CETR_t+1	(7) CETR_t+1
CRATING*FITCH	**0.0073***** **(5.59)**	**0.0111***** **(5.09)**	**0.0230**** **(2.25)**	**-0.0151***** **(-4.37)**	**-0.0145***** **(-4.04)**	**-0.0192***** **(-4.03)**	**-0.0158***** **(-3.23)**
CRATING	-0.0013*** (-3.86)	-0.0034*** (-5.24)	0.0254*** (6.09)	0.0001 (0.04)	0.0001 (0.10)	0.0092*** (5.08)	0.0089*** (4.93)
FITCH	-0.1191*** (-5.61)	-0.1914*** (-4.74)	-0.3684* (-1.83)	0.2201*** (2.95)	0.2106*** (2.84)	0.3806*** (3.91)	0.3247*** (3.26)
R&D_t+1					-0.1305 (-1.63)		-0.2654** (-2.41)
CAPX_t+1					0.0401 (1.43)		-0.1011*** (-2.67)
D_ISSUE_t+1					-0.0045 (-1.29)		-0.0132*** (-3.06)
ASSETS	0.0000*** (10.32)	0.0000*** (4.49)	0.0000*** (12.08)	0.0000* (1.90)	0.0000** (2.25)	-0.0000 (-1.16)	-0.0000 (-0.17)
LN_AGE	-0.0019*** (-5.90)	-0.0050*** (-5.85)	0.0870*** (11.45)	-0.0018 (-0.67)	-0.0015 (-0.53)	0.0007 (0.19)	0.0009 (0.22)
PTROA	0.0018 (0.24)	-0.0004 (-0.02)	0.2171** (2.33)	0.0791** (2.50)	0.0804** (2.55)	0.1742*** (4.58)	0.1775*** (4.76)
LEVERAGE	-0.0054*** (-2.76)	-0.0321*** (-6.92)	0.1706*** (6.49)	0.0009 (0.14)	0.0022 (0.34)	0.0084 (0.93)	0.0060 (0.67)
TLCF	0.0001 (0.22)	-0.0005 (-0.98)	-0.0096 (-1.31)	-0.0014 (-0.94)	-0.0014 (-0.95)	-0.0057*** (-3.61)	-0.0058*** (-3.95)
FOREIGN	-0.0001 (-0.10)	-0.0026 (-1.50)	0.0165 (1.60)	-0.0176*** (-4.94)	-0.0174*** (-4.88)	0.0112** (2.03)	0.0111** (2.04)
MTB	-0.0011** (-2.34)	0.0044*** (3.55)	-0.0159*** (-3.14)	-0.0058*** (-3.41)	-0.0061*** (-3.66)	-0.0132*** (-5.86)	-0.0133*** (-5.96)
PPENT	-0.0056*** (-2.77)	0.1542*** (18.49)	0.1512*** (5.47)	-0.0050 (-0.57)	-0.0113 (-1.16)	-0.0759*** (-5.92)	-0.0598*** (-4.26)
CASH	0.0129 (1.39)	0.0099 (1.46)	-0.0929** (-2.18)	-0.0291* (-1.96)	-0.0282** (-2.00)	-0.0318* (-1.81)	-0.0286* (-1.77)
R&D	0.8653*** (15.46)	-0.0263 (-0.86)	0.1303 (0.90)	-0.2851*** (-4.60)	-0.1705** (-1.98)	-0.3156*** (-4.18)	-0.0869 (-0.74)
MISS_R&D	-0.0039*** (-3.46)	-0.0037** (-2.17)	0.0009 (0.08)	0.0012 (0.30)	0.0008 (0.21)	0.0055 (0.99)	0.0041 (0.74)
MOD_ZSCORE	-0.0005 (-1.42)	0.0015 (1.56)	-0.0160** (-2.19)	0.0049** (2.38)	0.0047** (2.24)	0.0082*** (3.40)	0.0080*** (3.32)
INST_PCT	-0.0032*** (-4.96)	-0.0086*** (-4.29)	-0.0028 (-0.17)	-0.0139*** (-2.80)	-0.0140*** (-2.84)	-0.0236*** (-3.42)	-0.0254*** (-3.66)
Constant	0.0350*** (5.46)	0.0915*** (7.56)	-0.5421*** (-6.70)	0.3786*** (13.34)	0.3771*** (13.59)	0.1278*** (3.54)	0.1392*** (3.87)
Observations	9,139	9,139	9,139	9,139	9,139	9,139	9,139
Adjusted R-squared	0.733	0.415	0.197	0.081	0.082	0.066	0.068
Industry FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y

Table 3 (Continued)
The Effect of Credit Inflation on Investment and Tax Avoidance
Panel B: Firm and Year Fixed Effects

VARIABLES	(1) R&D_t+1	(2) CAPX_t+1	(3) D_Issue_t+1	(4) GETR_t+1	(5) GETR_t+1	(6) CETR_t+1	(7) CETR_t+1
CRATING*FITCH	**0.0074***** **(8.09)**	**0.0170***** **(7.30)**	**0.0434***** **(3.33)**	**-0.0210***** **(-5.08)**	**-0.0230***** **(-5.21)**	**-0.0119**** **(-2.04)**	**-0.0127**** **(-2.12)**
CRATING	-0.0011*** (-3.63)	-0.0025*** (-2.98)	0.0324*** (5.51)	0.0040* (1.92)	0.0045** (2.24)	0.0092*** (3.64)	0.0098*** (3.91)
FITCH	-0.1281*** (-8.46)	-0.3085*** (-7.09)	-0.8424*** (-3.40)	0.3389*** (4.21)	0.3725*** (4.51)	0.2942** (2.52)	0.3073** (2.57)
R&D_t+1					0.2712* (1.83)		0.2690** (2.00)
CAPX_t+1					0.0138 (0.42)		-0.0363 (-0.89)
D_ISSUE_t+1					-0.0064* (-1.83)		-0.0121** (-2.32)
ASSETS	-0.0000*** (-3.81)	-0.0000*** (-5.18)	0.0000*** (3.09)	0.0000 (1.62)	0.0000* (1.82)	0.0000** (2.31)	0.0000** (2.45)
LN_AGE	-0.0000 (-0.00)	-0.0201*** (-4.10)	0.1220*** (3.80)	-0.0228 (-1.65)	-0.0218 (-1.60)	-0.0122 (-0.78)	-0.0115 (-0.74)
PTROA	0.0060 (0.84)	0.0510* (1.94)	0.3736*** (3.42)	-0.0098 (-0.24)	-0.0098 (-0.24)	0.1117** (2.10)	0.1164** (2.17)
LEVERAGE	-0.0023 (-1.22)	-0.0261*** (-5.92)	0.1551*** (5.36)	0.0112 (1.19)	0.0131 (1.41)	-0.0039 (-0.40)	-0.0024 (-0.24)
TLCF	0.0003 (1.14)	-0.0000 (-0.13)	-0.0106 (-1.22)	-0.0048** (-2.07)	-0.0049** (-2.12)	-0.0034 (-1.52)	-0.0036 (-1.59)
FOREIGN	-0.0000 (-0.02)	0.0009 (0.55)	-0.0253 (-1.57)	-0.0218*** (-3.43)	-0.0219*** (-3.46)	-0.0073 (-0.96)	-0.0075 (-0.99)
MTB	-0.0011** (-1.99)	0.0037*** (3.27)	-0.0122** (-2.18)	-0.0042** (-2.23)	-0.0040** (-2.19)	-0.0122*** (-4.61)	-0.0119*** (-4.43)
PPENT	0.0052** (2.02)	0.0507*** (4.75)	0.1626*** (3.16)	-0.0005 (-0.03)	-0.0015 (-0.09)	-0.0214 (-1.07)	-0.0190 (-0.94)
CASH	-0.0232*** (-5.58)	-0.0167** (-2.12)	-0.1089** (-2.17)	-0.0127 (-0.60)	-0.0069 (-0.30)	0.0483** (2.39)	0.0526** (2.54)
R&D	0.3015*** (3.96)	0.0164 (0.62)	-0.3004 (-1.00)	-0.0189 (-0.18)	-0.1028 (-0.85)	0.2641 (1.61)	0.1800 (1.03)
MISS_R&D	-0.0044*** (-5.44)	0.0021 (1.04)	-0.0405 (-1.41)	0.0096 (1.15)	0.0105 (1.25)	0.0171 (1.50)	0.0179 (1.57)
MOD_ZSCORE	0.0007 (1.09)	0.0046*** (2.72)	-0.0303** (-2.49)	0.0109** (2.45)	0.0105** (2.35)	0.0056 (1.11)	0.0052 (1.04)
INST_PCT	0.0032** (2.47)	0.0136*** (3.44)	-0.0772** (-2.56)	-0.0374*** (-3.69)	-0.0390*** (-3.79)	-0.0170 (-0.99)	-0.0184 (-1.06)
Constant	0.0380*** (6.10)	0.1500*** (7.32)	-0.6145*** (-5.22)	0.3660*** (6.78)	0.3498*** (6.69)	0.1209** (2.34)	0.1087** (2.15)
Observations	9,139	9,139	9,139	9,139	9,139	9,139	9,139
Adjusted R-squared	0.876	0.703	0.344	0.203	0.204	0.225	0.226
Firm FE	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y

Table 3 (Continued)
The Effect of Credit Inflation on Investment and Tax Avoidance
Panel C: Firm and Industry-By-Year Fixed Effects

VARIABLES	(1) R&D_t+1	(2) CAPX_t+1	(3) D_Issue_t+1	(4) GETR_t+1	(5) GETR_t+1	(6) CETR_t+1	(7) CETR_t+1
CRATING*FITCH	**0.0073*** **	**0.0159*** **	**0.0486*** **	**-0.0213*** **	**-0.0229*** **	**-0.0130** **	**-0.0133** **
	(8.30)	**(6.87)**	**(3.41)**	**(-4.82)**	**(-4.84)**	**(-2.13)**	**(-2.13)**
CRATING	-0.0009***	-0.0018**	0.0303***	0.0040*	0.0045**	0.0091***	0.0096***
	(-3.04)	(-2.21)	(4.78)	(1.83)	(2.08)	(3.43)	(3.68)
R&D_t+1					0.2531*		0.2827**
					(1.82)		(2.08)
CAPX_t+1					0.0019		-0.0727*
					(0.05)		(-1.70)
D_ISSUE_t+1					-0.0069*		-0.0130**
					(-1.90)		(-2.44)
ASSETS	-0.0000***	-0.0000***	0.0000***	0.0000	0.0000	0.0000	0.0000*
	(-3.75)	(-5.62)	(2.67)	(0.78)	(0.98)	(1.62)	(1.68)
LN_AGE	-0.0005	-0.0184***	0.1064***	-0.0222	-0.0213	-0.0106	-0.0105
	(-0.37)	(-4.14)	(3.28)	(-1.60)	(-1.56)	(-0.67)	(-0.66)
PTROA	0.0080	0.0561**	0.3862***	0.0175	0.0181	0.1155**	0.1224**
	(1.04)	(2.16)	(3.37)	(0.40)	(0.40)	(2.08)	(2.20)
LEVERAGE	-0.0030	-0.0254***	0.1420***	0.0097	0.0115	-0.0025	-0.0016
	(-1.55)	(-5.96)	(4.94)	(0.98)	(1.16)	(-0.23)	(-0.15)
TLCF	0.0003	-0.0005	-0.0115	-0.0039*	-0.0041**	-0.0029	-0.0032
	(1.03)	(-1.22)	(-1.31)	(-1.92)	(-1.98)	(-1.38)	(-1.48)
FOREIGN	-0.0000	0.0021	-0.0289*	-0.0228***	-0.0230***	-0.0046	-0.0048
	(-0.00)	(1.20)	(-1.74)	(-3.58)	(-3.61)	(-0.62)	(-0.65)
MTB	-0.0010*	0.0038***	-0.0130**	-0.0044**	-0.0042**	-0.0125***	-0.0121***
	(-1.79)	(3.41)	(-2.19)	(-2.14)	(-2.08)	(-5.93)	(-5.65)
PPENT	0.0058**	0.0462***	0.1746***	-0.0089	-0.0092	-0.0232	-0.0192
	(2.13)	(4.28)	(3.16)	(-0.48)	(-0.48)	(-1.07)	(-0.88)
CASH	-0.0229***	-0.0213***	-0.0849*	-0.0163	-0.0110	0.0428**	0.0466**
	(-5.31)	(-2.70)	(-1.67)	(-0.74)	(-0.47)	(2.00)	(2.13)
R&D	0.2979***	0.0365	-0.3432	-0.0326	-0.1104	0.1786	0.0926
	(3.90)	(1.34)	(-1.11)	(-0.30)	(-0.91)	(1.07)	(0.53)
MISS_R&D	-0.0051***	0.0023	-0.0490	0.0055	0.0065	0.0145	0.0155
	(-6.30)	(1.09)	(-1.64)	(0.62)	(0.73)	(1.21)	(1.30)
MOD_ZSCORE	0.0003	0.0043**	-0.0293**	0.0091**	0.0088**	0.0065	0.0063
	(0.54)	(2.58)	(-2.26)	(2.05)	(1.97)	(1.21)	(1.18)
INST_PCT	0.0035**	0.0164***	-0.0537*	-0.0346***	-0.0359***	-0.0156	-0.0161
	(2.52)	(4.05)	(-1.77)	(-3.25)	(-3.33)	(-0.87)	(-0.89)
Constant	-0.0027	0.0385***	-0.8362***	0.4839***	0.4788***	0.2219***	0.2145***
	(-0.37)	(2.62)	(-7.05)	(9.58)	(9.69)	(3.74)	(3.62)
Observations	9,139	9,139	9,139	9,139	9,139	9,139	9,139
Adjusted R-squared	0.876	0.709	0.343	0.209	0.210	0.236	0.237
Firm FE	Y	Y	Y	Y	Y	Y	Y
Industry-by-Year FE	Y	Y	Y	Y	Y	Y	Y

This table presents the results of our primary analysis of H1 as outlined in equation (1). Following Becker and Milbourn (2011), the interaction *CRATING*FITCH* provides an instrument for the existence of credit rating inflation within a 2-digit NAICS industry-year. As a baseline analysis, in Columns 1 through 3 we examine the effect of rating inflation on firm investment and public debt issuance. Columns 4 and 5 examine the effect of rating inflation on GAAP ETRs in year t+1 (*GETR*). Columns 6 and 7 examine the effect of rating inflation on cash ETRs in year t+1 (*CETR*). Column 5 (7) includes additional controls for contemporaneous changes to investment and debt issuance. A negative coefficient in columns 4-7 indicates more tax avoidance. Panel A performs analyses using industry and year fixed effects. Panel B performs analyses using firm and year fixed effects. Panel C performs analyses using firm and industry-by-year fixed effects. With the inclusion of industry-by-year fixed effects, the coefficient on *FITCH* is subsumed. Variable definitions are outlined in Appendix A. Standard errors are clustered at the industry-by-year level. Cluster robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 4

Match Design Top vs Bottom Quintile of Fitch Share by Year

Match on Credit Rating, Year t+1 R&D, Year t+1 CAPX, Assets, and Leverage

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	R&D_t+1	R&D_t+1	CAPX_t+1	CAPX_t_t+1	GETR_t+1	GETR_t+1	CETR_t+1	CETR_t+1
CRATING*HighFITCH	**-0.0000**	**-0.0000**	**-0.0005**	**0.0004**	**-0.0071****	**-0.0114****	**-0.0111*****	**-0.0176****
	(-0.22)	**(-0.29)**	**(-1.13)**	**(0.46)**	**(-2.43)**	**(-2.12)**	**(-2.88)**	**(-2.57)**
CRATING	0.0001	0.0001	-0.0008*	-0.0017*	0.0017	-0.0027	0.0130***	0.0120*
	(0.25)	(0.41)	(-1.73)	(-1.68)	(0.67)	(-0.47)	(2.86)	(1.73)
Observations	2,753	2,753	2,753	2,753	2,753	2,753	2,753	2,753
Adjusted R-squared	0.907	0.955	0.419	0.713	0.136	0.396	0.084	0.338
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Industry FE	Y	N	Y	N	Y	N	Y	N
Year FE	Y	N	Y	N	Y	N	Y	N
Firm FE	N	Y	N	Y	N	Y	N	Y
Industry-by-Year FE	N	Y	N	Y	N	Y	N	Y
Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm

This table presents the results of our matched sample approach to isolate the effect of rating inflation on tax avoidance. We quintile rank Fitch market share (*FITCH*) within each credit rating category and retain firm-year observations within the bottom and top quintile of Fitch market share (*HighFITCH* =1 for observations within the top quintile, 0 for observations in the bottom quintile. Next, using CEM, we match firms between high and low Fitch market share categories on *CRATING*, *ASSETS*, *LEVERAGE*, and t+1 *R&D* and *CAPX*. *CRATING*HighFITCH* represents the effect of likely credit rating inflation on investment (columns 1 through 4) and tax avoidance (columns 5 through 8). A negative coefficient indicates more tax avoidance. Odd (Even) columns use industry and year (firm and industry-by-year) fixed effects. Variable definitions are outlined in Appendix A. Standard errors are clustered at the industry-by-year level. Cluster robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 5
Using Tax Avoidance to Pool with Low-Risk Firms Under Rating Inflation
Panel A: Analysis of High R&D

	(1)	(2)	(3)	(4)
VARIABLES	GETR_t+1	GETR_t+1	CETR_t+1	CETR_t+1
CRATING*FITCH	**-0.0053**	**-0.0142*****	**-0.0086**	**-0.0092**
	(-1.39)	**(-2.71)**	**(-1.61)**	**(-1.21)**
CRATING*FITCH*HighR&D	**-0.0264*****	**-0.0237*****	**-0.0239*****	**-0.0149**
	(-3.63)	**(-3.03)**	**(-2.90)**	**(-1.55)**
R&D_t+1	-0.0085	0.2990**	-0.1584	0.2802**
	(-0.10)	(2.11)	(-1.39)	(2.07)
CRATING	-0.0007	0.0029	0.0107***	0.0093***
	(-0.50)	(1.13)	(5.24)	(2.89)
FITCH	0.0501		0.2176**	
	(0.62)		(1.99)	
*FICH*HighR&D*	0.4798***	0.4151***	0.3885**	0.2010
	(3.50)	(2.67)	(2.45)	(1.04)
*CRATING*HighR&D*	0.0032	0.0046	-0.0023	0.0021
	(1.33)	(1.54)	(-0.77)	(0.54)
HighR&D	-0.0589	-0.0676	0.0736	0.0042
	(-1.23)	(-1.08)	(1.20)	(0.05)
Constant	0.3908***	0.3707***	0.0857**	0.1143*
	(12.82)	(7.15)	(2.03)	(1.79)
Observations	9,139	9,139	9,139	9,139
Adjusted R-squared	0.085	0.210	0.073	0.237
Controls	Y	Y	Y	Y
Industry FE	Y	N	Y	N
Year FE	Y	N	Y	N
Firm FE	N	Y	N	Y
Industry-by-Year FE	N	Y	N	Y

Table 5 (Continued)
Using Tax Avoidance to Pool with Low-Risk Firms Under Rating Inflation
Panel B: Analysis of High Capital Expenditures

VARIABLES	(1) GETR_t+1	(2) GETR_t+1	(3) CETR_t+1	(4) CETR_t+1
CRATING*FITCH	**-0.0188*** **	**-0.0266*** **	**-0.0218*** **	**-0.0192** **
	(-3.37)	**(-3.57)**	**(-3.34)**	**(-2.47)**
CRATING*FITCH*HighCAPX	**0.0087**	**0.0104**	**0.0113**	**0.0145***
	(1.17)	**(1.11)**	**(1.35)**	**(1.65)**
CAPX_t+1	0.0438	0.0261	-0.1122***	-0.0384
	(1.56)	(0.74)	(-2.89)	(-0.93)
CRATING	-0.0004	0.0046	0.0075***	0.0103***
	(-0.21)	(1.51)	(2.92)	(3.24)
FITCH	0.2573**		0.3796***	
	(2.32)		(3.00)	
*FITCH*HighCAPX*	-0.0979	-0.1379	-0.1051	-0.1704
	(-0.68)	(-0.76)	(-0.66)	(-1.00)
*CRATING*HighCAPX*	0.0009	-0.0010	0.0023	-0.0025
	(0.36)	(-0.33)	(0.80)	(-0.81)
HighCAPX	-0.0449	-0.0080	-0.0795	-0.0011
	(-0.92)	(-0.13)	(-1.43)	(-0.02)
Constant	0.3991***	0.5107***	0.1827***	0.2544***
	(9.71)	(9.87)	(3.75)	(4.10)
Observations	9,139	9,139	9,139	9,139
Adjusted R-squared	0.084	0.210	0.070	0.238
Controls	Y	Y	Y	Y
Industry FE	Y	N	Y	N
Year FE	Y	N	Y	N
Firm FE	N	Y	N	Y
Industry-by-Year FE	N	Y	N	Y

This table presents the results of cross-sectional analyses examining the effect of more (or less) risky investment strategies on tax avoidance outcomes. Following Becker and Milbourne (2011), the interaction *CRATING*FITCH* provides an instrument for the existence of credit rating inflation within a 2-digit NAICS industry-year. A negative coefficient indicates more tax avoidance. In Panel A (B), we interact the rating inflation instrument with an indicator variable for firms with above median R&D (capital) expenditures within their credit rating and year (*HighR&D [HighCAPX]*). *HighR&D* (*HighCAPX*) firms are (less) likely to be those that undertake higher risk investments and therefore have a greater (lower) probability of being revealed as high risk in subsequent periods. In Columns 1 and 2 (3 and 4) we examine the effect on *GETR* (*CETR*). Odd (Even) columns use industry and year (firm and industry-by-year) fixed effects. Standard errors are clustered at the industry-by-year level. Variable definitions are outlined in Appendix A. Cluster robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6

Using Tax Avoidance to Pool with Low-Risk Firms Under Rating Inflation: Public Debt Issuance

	(1)	(2)	(3)	(4)
VARIABLES	GETR_t+1	GETR_t+1	CETR_t+1	CETR_t+1
CRATING*FITCH	**-0.0192*****	**-0.0268*****	**-0.0248*****	**-0.0190****
	(-4.08)	**(-4.70)**	**(-3.88)**	**(-2.30)**
CRATING*FITCH*D_ISSUE_t+1	**0.0146****	**0.0169****	**0.0164****	**0.0131**
	(2.24)	**(2.37)**	**(2.06)**	**(1.45)**
LEVERAGE_t+1	-0.0027	0.0107	0.0052	0.0303**
	(-0.33)	(1.13)	(0.41)	(2.33)
CRATING	0.0010	0.0055**	0.0115***	0.0117***
	(0.61)	(2.16)	(5.14)	(3.83)
FITCH	0.2984***		0.4796***	
	(3.13)		(3.92)	
*FITCH*D_ISSUE_t+1*	-0.0036	-0.0042	-0.0057**	-0.0046
	(-1.49)	(-1.59)	(-2.08)	(-1.48)
*CRATING*D_ISSUE_t+1*	-0.2997**	-0.3570**	-0.3151**	-0.2478
	(-2.26)	(-2.45)	(-1.99)	(-1.39)
D_ISSUE_t+1	0.0735	0.0856	0.0967*	0.0731
	(1.45)	(1.55)	(1.77)	(1.17)
Constant	0.3588***	0.4868***	0.0851**	0.1977***
	(10.02)	(9.72)	(2.02)	(3.21)
Observations	9,139	9,139	9,139	9,139
Adjusted R-squared	0.082	0.210	0.066	0.237
Controls	Y	Y	Y	Y
Industry FE	Y	N	Y	N
Year FE	Y	N	Y	N
Firm FE	N	Y	N	Y
Industry-by-Year FE	N	Y	N	Y

This table presents the results of cross-sectional analyses examining the effect issuing public debt on tax avoidance outcomes. Following Becker and Milbourne (2011), the interaction *CRATING*FITCH* provides an instrument for the existence of credit rating inflation within a 2-digit NAICS industry-year. A negative coefficient indicates more tax avoidance. We interact the rating inflation instrument with an indicator variable for firms that issue public debt in year t+1. These firms choose to capture immediate benefits of reduced cost of capital through new debt issuances and are therefore revealed to be less likely to be concerned about retaining inflated credit ratings. In Columns 1 and 2 (3 and 4) we examine the effect on *GETR* (*CETR*). Odd (Even) columns use industry and year (firm and industry-by-year) fixed effects. Standard errors are clustered at the industry-by-year level. Variable definitions are outlined in Appendix A. Cluster robust t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 7
Cross-Sectional Analyses Based on Management Incentives to Maintain Credit Ratings
Panel A: Below vs Above Industry Median Credit Ratings

VARIABLES	(1) GETR_t+1	(2) GETR_t+1	(3) CETR_t+1	(4) CETR_t+1
CRATING*FITCH	**-0.0232***** **(-3.59)**	**-0.0270***** **(-3.51)**	**-0.0280***** **(-3.38)**	**-0.0210*** **(-1.90)**
CRATING*FITCH*Above_PEER	**0.0203**** **(2.46)**	**0.0186*** **(1.95)**	**0.0308***** **(3.22)**	**0.0289**** **(2.48)**
CRATING	0.0019 (0.82)	0.0054 (1.57)	0.0130*** (4.54)	0.0121*** (3.26)
FITCH	0.3530*** (3.09)		0.5376*** (3.69)	
*FITCH*Above_PEER*	-0.3875** (-2.44)	-0.3764** (-2.08)	-0.6297*** (-3.38)	-0.6020*** (-2.70)
*CRATING*Above_PEER*	-0.0051* (-1.88)	-0.0042 (-1.23)	-0.0131*** (-3.67)	-0.0128*** (-2.89)
Above_PEER	0.0994* (1.87)	0.0849 (1.32)	0.2657*** (3.73)	0.2663*** (3.00)
Constant	0.3713*** (7.79)	0.5133*** (9.46)	-0.0236 (-0.38)	0.2069*** (3.12)
Observations	9,139	9,139	9,139	9,139
Adjusted R-squared	0.082	0.209	0.067	0.237
Controls	Y	Y	Y	Y
Industry FE	Y	N	Y	N
Year FE	Y	N	Y	N
Firm FE	N	Y	N	Y
Industry-by-Year FE	N	Y	N	Y

Table 7 (Continued)
Cross-Sectional Analyses Based on Management Incentives to Maintain Credit Ratings
Panel B: Analysis of CEO Power

VARIABLES	(1) GETR_t+1	(2) GETR_t+1	(3) CETR_t+1	(4) CETR_t+1
CRATING*FITCH	**-0.0236*** **	**-0.0371*** **	**-0.0338*** **	**-0.0363*** **
	(-3.00)	**(-3.65)**	**(-3.43)**	**(-2.78)**
CRATING*FITCH*CEO_POWER	**0.0189***	**0.0246** **	**0.0268** **	**0.0268***
	(1.72)	**(2.00)**	**(2.07)**	**(1.83)**
CRATING	0.0028	0.0101**	0.0137***	0.0162***
	(0.82)	(2.24)	(2.94)	(2.67)
FITCH	0.3472**		0.6958***	
	(2.28)		(3.61)	
*FITCH*CEO_POWER*	-0.3640*	-0.4422*	-0.5736**	-0.5224*
	(-1.71)	(-1.89)	(-2.28)	(-1.83)
*CRATING*CEO_POWER*	-0.0056	-0.0103**	-0.0078	-0.0072
	(-1.28)	(-2.05)	(-1.48)	(-1.15)
CEO_POWER	0.1146	0.1871**	0.1675*	0.1260
	(1.39)	(2.00)	(1.67)	(1.06)
Constant	0.3093***	0.4687***	-0.0043	0.1231
	(4.71)	(5.70)	(-0.05)	(1.15)
Observations	5,102	5,102	5,102	5,102
Adjusted R-squared	0.085	0.240	0.063	0.274
Controls	Y	Y	Y	Y
Industry FE	Y	N	Y	N
Year FE	Y	N	Y	N
Firm FE	N	Y	N	Y
Industry-by-Year FE	N	Y	N	Y

This table presents the results of cross-sectional analyses examining the incentive for managers to increase after-tax cash flows through tax avoidance following rating inflation. Following Becker and Milbourne (2011), the interaction *CRATING*FITCH* provides an instrument for the existence of credit rating inflation within a 2-digit NAICS industry-year. A negative coefficient indicates more tax avoidance. In Panel A, we interact rating inflation with an indicator variable or whether a firm's credit rating (*CRATING*) is above the median industry-year *CRATING*, *Above_PEER* = 1, 0 otherwise. In Columns 1 and 2 (3 and 4) we examine the effect on *GETR* (*CETR*). In Panel B, we interact rating inflation with the first principal component from the PCA of *Dual*, *Tenure*, and *CEO_Ownership*. We label this component as *CEO_POWER*. In Columns 1 and 2 (3 and 4) we examine the effect on *GETR* (*CETR*). In Columns 1 and 2 (3 and 4) we examine the effect on *GETR* (*CETR*). Odd (Even) columns use industry and year (firm and industry-by-year) fixed effects. Standard errors are clustered at the industry-by-year level. Variable definitions are outlined in Appendix A. Cluster robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8
Rating Inflation and Subsequent Downgrades
Panel A: High versus Low Risk Investments

	Sample = Full	Sample = High_R&D	Sample = Low_R&D
	(1)	(2)	(3)
VARIABLES	Downgrade_t(1,3)	Downgrade_t(1,3)	Downgrade_t(1,3)
CRATING*FITCH	**-0.0125**	**0.0629*****	**-0.0371**
	(-0.79)	**(3.33)**	**(-1.53)**
CRATING	0.1358***	0.1145***	0.1551***
	(16.53)	(9.56)	(16.66)
ASSETS	-0.0000*	-0.0000	-0.0000
	(-1.86)	(-0.59)	(-1.61)
LN_AGE	-0.0457	-0.0106	-0.1368**
	(-1.11)	(-0.19)	(-2.31)
PTROA	-0.5884***	-1.0698***	-0.2294
	(-3.91)	(-4.65)	(-1.31)
LEVERAGE	0.2311***	0.3377***	0.2676***
	(4.73)	(6.26)	(5.76)
TLCF	-0.0064	-0.0070	0.0065
	(-1.09)	(-1.14)	(0.07)
FOREIGN	-0.0144	0.0207	-0.0606**
	(-0.87)	(1.02)	(-2.50)
MTB	-0.0186**	-0.0078	-0.0483***
	(-2.10)	(-0.91)	(-3.80)
PPENT	-0.1083*	-0.0269	-0.1121
	(-1.90)	(-0.24)	(-1.64)
CASH	-0.0349	0.1016	-0.2707***
	(-0.54)	(1.31)	(-2.60)
R&D	1.0798***	0.6963*	-0.6511
	(2.95)	(1.89)	(-0.35)
MISS_R&D	-0.0134	-0.0500	0.0038
	(-0.40)	(-0.65)	(0.07)
MOD_ZSCORE	-0.0320*	0.0209	-0.0502***
	(-1.83)	(0.72)	(-2.62)
INST_PCT	-0.1788***	-0.2029***	-0.1695***
	(-5.54)	(-4.07)	(-3.65)
Constant	-1.7582***	-2.1756***	-1.4918***
	(-11.01)	(-7.84)	(-7.72)
Observations	7,095	3,414	3,599
Adjusted R-squared	0.299	0.317	0.332
Firm FE	Y	Y	Y
Industry-By-Year FE	Y	Y	Y

Table 8 (Continued)
Rating Inflation and Subsequent Downgrades
Panel B: Examining the Moderating Effect of Tax Avoidance

	Sample = High R&D		Sample = Low R&D	
	ΔTA = -ΔGETR	*ΔTA = -ΔCETR*	*ΔTA = -ΔGETR*	*ΔTA = -ΔCETR*
	(1)	(2)	(3)	(4)
VARIABLES	Downgrade_ t(1,3)	Downgrade_ t(1,3)	Downgrade_ t(1,3)	Downgrade_ t(1,3)
CRATING*FITCH	**0.0560****	**0.0605*****	**-0.0337**	**-0.0413**
	(2.38)	**(2.64)**	**(-1.24)**	**(-1.54)**
CRATING*FITCH*ΔTA	**-0.1597***	**-0.1102****	**-0.0012**	**-0.1467**
	(-1.92)	**(-2.08)**	**(-0.01)**	**(-1.44)**
CRATING	0.1184***	0.1188***	0.1570***	0.1615***
	(8.45)	(8.95)	(14.83)	(15.61)
*FITCH*ΔTA*	3.3915**	1.6005	-0.0526	2.2300
	(2.10)	(1.58)	(-0.02)	(1.22)
*CRATING*ΔTA*	0.0449	0.0205	0.0142	0.0298
	(1.62)	(1.18)	(0.27)	(1.09)
ΔTA	-1.1525**	-0.3516	-0.1867	-0.4722
	(-2.00)	(-1.00)	(-0.21)	(-0.94)
Constant	-2.2970***	-2.3636***	-1.5222***	-1.5307***
	(-7.20)	(-7.37)	(-7.15)	(-6.91)
Observations	3,094	3,094	3,234	3,234
Adjusted R-squared	0.326	0.322	0.335	0.342
Controls	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Industry-by-Year FE	Y	Y	Y	Y

This table examines the effect of rating inflation and tax avoidance on the likelihood of a subsequent rating downgrade over the following three years. Panel A reports the analysis of the likelihood of downgrade within the full sample (Column 1), the High R&D sample of firms (Column 2) and the Low R&D sample of firms (Column 3). Panel B examines the moderating effect of changes to tax avoidance (*ΔTA)* measured as negative one times the change in *GETR* (Columns 1 and 3) or negative one times the change in *CETR* (Columns 2 and 4). Columns 1 and 2 (3 and 4) report effects within the High (Low) R&D group. All columns include firm and industry-by-year fixed effects. Standard errors are clustered at the industry-by-year level. Variable definitions are outlined in Appendix A. Cluster robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

<u>Table 9</u>
Robustness Tests Using Composite Ratings from S&P, Moody's, and Fitch
Panel A: Composite Rating for Full Sample of Available Ratings

VARIABLES	(1) GETR_t+1	(2) GETR_t+1	(3) CETR_t+1	(4) CETR_t+1
CRATING*FITCH	**-0.0194***** **(-4.33)**	**-0.0280***** **(-4.86)**	**-0.0203***** **(-3.22)**	**-0.0172**** **(-2.03)**
CRATING	0.0023 (1.20)	0.0045* (1.73)	0.0080*** (3.23)	0.0077** (2.04)
FITCH	0.1821** (2.42)		0.3194*** (3.48)	
ASSETS	0.0000** (2.43)	0.0000 (0.63)	-0.0000 (-0.09)	0.0000*** (2.62)
LN_AGE	-0.0033 (-0.92)	-0.0447** (-2.39)	0.0051 (1.03)	-0.0159 (-0.69)
ROA	0.1311*** (3.15)	0.0790 (1.16)	0.2433*** (5.14)	0.1261 (1.60)
LEVERAGE	0.0037 (0.37)	0.0221 (1.45)	0.0073 (0.54)	0.0008 (0.04)
TLCF	-0.0029* (-1.82)	-0.0054* (-1.75)	-0.0024 (-1.02)	-0.0038 (-1.11)
MTB	-0.0188*** (-3.57)	-0.0191** (-2.23)	0.0131* (1.71)	-0.0110 (-0.99)
FOREIGN	-0.0116*** (-4.49)	-0.0136*** (-3.26)	-0.0207*** (-7.44)	-0.0191*** (-4.65)
PPENT	-0.0107 (-0.82)	0.0010 (0.03)	-0.0891*** (-5.18)	-0.0080 (-0.23)
CASH	-0.0382** (-2.05)	-0.0687** (-2.04)	-0.0463** (-2.19)	-0.0089 (-0.24)
R&D	-0.2627*** (-3.83)	0.0758 (0.58)	-0.2657*** (-2.66)	0.3635* (1.84)
MISS_R&D	0.0043 (0.80)	-0.0007 (-0.06)	0.0111 (1.56)	0.0035 (0.21)
MOD_ZSCORE	0.0086*** (4.96)	0.0048 (0.67)	0.0099*** (3.27)	0.0071 (0.77)
INST_PCT	-0.0094 (-1.04)	-0.0243 (-1.07)	-0.0376*** (-2.94)	-0.0373 (-1.17)
RatedMR	-0.0075* (-1.76)	-0.0050 (-0.96)	-0.0078 (-1.27)	-0.0040 (-0.59)
RatedSPR	0.0045 (1.19)	0.0005 (0.10)	-0.0015 (-0.27)	0.0033 (0.56)
RatedFR	0.0048 (1.00)	-0.0082 (-1.30)	-0.0071 (-1.11)	-0.0112 (-1.09)
Constant	0.3450*** (10.71)	0.5869*** (8.01)	0.1883*** (4.58)	0.3313*** (3.78)
Observations	5,419	5,419	5,419	5,419
Adjusted R-squared	0.094	0.231	0.081	0.249
Industry FE	Y	N	Y	N
Year FE	Y	N	Y	N
Firm FE	N	Y	N	Y
Industry-by-Year FE	N	Y	N	Y

Table 9 (Continued)
Robustness Tests Using Composite Ratings from S&P, Moody's, and Fitch
Panel B: Limit to Observations Without Fitch Ratings

VARIABLES	(1) GAAP_ETR	(2) GAAP_ETR	(3) CASH_ETR	(4) CASH_ETR
CRATING*FITCH	**-0.0270***** **(-5.38)**	**-0.0414***** **(-5.67)**	**-0.0201**** **(-2.59)**	**-0.0224**** **(-2.19)**
CRATING	0.0069*** (3.29)	0.0139*** (3.95)	0.0115*** (3.91)	0.0185*** (3.82)
FITCH	0.3069*** (3.54)		0.3075*** (2.76)	
ASSETS	-0.0000 (-0.79)	0.0000 (0.44)	-0.0000* (-1.76)	0.0000* (1.72)
LN_AGE	-0.0055 (-1.34)	-0.0387 (-1.61)	0.0003 (0.05)	-0.0050 (-0.15)
ROA	0.1993*** (4.14)	0.1623** (2.53)	0.2993*** (5.30)	0.2479*** (2.77)
LEVERAGE	-0.0010 (-0.08)	0.0321 (1.54)	0.0154 (1.01)	0.0520* (1.92)
TLCF	-0.0047 (-0.19)	-0.0518 (-1.40)	-0.0216 (-0.91)	-0.1961*** (-3.56)
MTB	-0.0187*** (-2.80)	-0.0129 (-1.17)	0.0109 (1.16)	-0.0181 (-1.22)
FOREIGN	-0.0148*** (-5.95)	-0.0130*** (-3.03)	-0.0215*** (-6.51)	-0.0215*** (-4.55)
PPENT	-0.0198 (-1.19)	-0.0155 (-0.38)	-0.1246*** (-5.34)	-0.0915* (-1.71)
CASH	-0.0346 (-1.47)	-0.0884** (-2.45)	-0.0380 (-1.45)	0.0030 (0.07)
R&D	-0.1712** (-2.19)	-0.1295 (-0.82)	-0.1932 (-1.51)	0.2745 (0.99)
MISS_R&D	0.0020 (0.31)	-0.0219 (-1.38)	0.0143 (1.59)	-0.0107 (-0.41)
MOD_ZSCORE	0.0049** (2.14)	0.0035 (0.32)	0.0051* (1.82)	0.0054 (0.47)
INST_PCT	-0.0158 (-1.37)	-0.0186 (-0.58)	-0.0524*** (-3.21)	-0.0344 (-0.80)
RatedMR	-0.0069 (-1.04)	-0.0041 (-0.46)	-0.0138 (-1.61)	-0.0021 (-0.18)
RatedSPR	0.0036 (0.64)	0.0043 (0.68)	-0.0058 (-0.81)	-0.0023 (-0.27)
Constant	0.3061*** (8.17)	0.4911*** (6.28)	0.2021*** (4.13)	0.2092* (1.79)
Observations	3,482	3,328	3,482	3,328
Adjusted R-squared	0.099	0.276	0.084	0.268
Industry FE	Y	N	Y	N
Year FE	Y	N	Y	N
Firm FE	N	Y	N	Y

This table presents a re-examination of the results of our primary analysis of H1 as outlined in equation (1), replacing *CRATING* from the measure of S&P ratings to a composite measure that includes S&P, Moody's and Fitch ratings. We include indicator variables for whether a firm is rated by each individual credit rating agency (*RatedMR*, *RatedSPR*, *RatedFR*). A negative coefficient indicates more tax avoidance. In Panel A, we examine the effect within our full sample of firms with all available ratings. In Columns 1 and 2 (3 and 4) we examine the effect on *GETR* (*CETR*). In Panel B, we limit our analysis to firms that do not receive a Fitch credit rating. In Columns 1 and 2 (3 and 4) we examine the effect on *GETR* (*CETR*). Odd (Even) columns use industry and year (firm and industry-by-year) fixed effects. Standard errors are clustered at the industry-by-year level. Variable definitions are outlined in Appendix A. Cluster robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 10

Robustness: Alternative Measures of Tax Avoidance

VARIABLES	(1) ADJ_ETR_t+1	(2) 3YGETR	(3) 3YCETR	(4) ln(1+TaxHavens)_t+1	(5) TaxHavens_t+1
CRATING*FITCH	**-0.0151***** **(-2.75)**	**-0.0208***** **(-3.96)**	**-0.0108*** **(-1.85)**	**0.0859*** **(1.91)**	**0.1464**** **(2.43)**
CRATING	0.0035 (1.53)	-0.0028 (-1.12)	0.0080*** (2.94)	-0.0246 (-1.26)	0.0064 (0.24)
Observations	6,284	8,719	8,656	3,380	3,380
Adjusted R-squared	0.354	0.267	0.380	0.757	N/A
Model	OLS	OLS	OLS	OLS	PPMLFE
Controls	Y	Y	Y	Y-No Foreign	Y-No Foreign
Firm FE	Y	Y	Y	Y	Y
Industry-by-Year FE	Y	Y	Y	Y	Y

This table presents a re-examination of the results of our primary analysis of H1 as outlined in equation (1), replacing our outcome variable with alternative measures of tax avoidance. *ADJ_ETR* is the measure of adjusted GAAP ETRs that eliminate components of ETRs that are less likely to be related to intentional tax avoidance, measured in *t+1* (Schwab, Stomberg, and Xia 2022). *3YCETR* is the three-year sum of cash taxes paid divided by the three-year sum of pre-tax income over (t, t+2). *3YGETR* is the three-year sum of tax expense divided by the three-year sum of pre-tax income over (t, t+2). TaxHavens represent the number of subsidiary locations in tax haven jurisdictions reported in a firm's Exhibit 21. These data are retrieved from Scott Dryeng's personal website. All columns include firm and industry-by-year fixed effects. Standard errors are clustered at the industry-by-year level. Variable definitions are outlined in Appendix A. Cluster robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 11
Alternative Rating Inflation Method
Panel A: Ordered Probit First Stage Model

VARIABLES	(1) CRATING
MTB	0.1481***
	(11.10)
PPENT	0.4605***
	(7.57)
R&D	-1.6234***
	(-4.24)
R&D_IND	0.3255***
	(9.95)
SGA	1.3519***
	(13.45)
PTROA	2.9833***
	(18.48)
LN_ASSETS	0.6481***
	(62.96)
OPRISK	-0.3741***
	(-5.12)
Observations	9,110
Fixed Effects	Industry

Panel B: Association between Fitch Market Share and Rating Differential

VARIABLES	(1) DIFF	(2) DIFF
FITCH	**0.3426****	**0.7421****
	(2.37)	**(2.47)**
Model	Ordered Probit	OLS
Observations	9,110	9,110
Adjusted R-squared	N/A	0.151
Controls	Y	Y
Industry FE	Y	Y

Table 11 (Continued)
Alternative Rating Inflation Method
Panel C: DIFF as a Measure of Rating Inflation

VARIABLES	(1) GETR_t+1	(2) GETR_t+1	(3) CETR_t+1	(4) CETR_t+1
DIFF	**-0.0022****	**-0.0006**	**-0.0028***	**-0.0055*****
	(-2.13)	**(-0.49)**	**(-1.86)**	**(-3.04)**
Observations	9,110	9,110	9,110	9,110
Adjusted R-squared	0.079	0.206	0.064	0.236
Controls	Y	Y	Y	Y
Lagged Credit Rating	Y	Y	Y	Y
Industry FE	Y	N	Y	N
Year FE	Y	N	Y	N
Firm FE	N	Y	N	Y
Industry-by-Year FE	N	Y	N	Y

Panel D: Cross-Sectional Analysis of Above/Below Predicted Ratings

VARIABLES	(1) GETR_t+1	(2) GETR_t+1	(3) CETR_t+1	(4) CETR_t+1
Rating: Prediction +2	-0.0001	0.0001	-0.0010	-0.0007
	(-0.03)	(0.05)	(-0.32)	(-0.21)
Rating: Prediction +1	**-0.0107*****	**-0.0104*****	**-0.0084**	**-0.0097***
	(-3.00)	**(-2.90)**	**(-1.60)**	**(-1.80)**
Rating: Prediction -1	0.0029	0.0024	0.0015	0.0030
	(0.54)	(0.44)	(0.21)	(0.41)
Rating: Prediction -2	0.0018	0.0010	0.0041	0.0046
	(0.65)	(0.36)	(1.10)	(1.26)
Observations	9,110	9,110	9,110	9,110
Adjusted R-squared	0.081	0.088	0.065	0.073
Controls	Y	Y	Y	Y
Credit Rating	Y	Y	Y	Y
Industry FE	Y	N	Y	N
Year FE	Y	N	Y	N
Industry-by-Year FE	N	Y	N	Y

This table presents the results of an alternative analysis of rating inflation. Panel A outlines the first stage ordered probit model for a firm's credit rating. We perform our analyses separately for each fiscal year, avoiding look-ahead bias. We then calculate the difference between the actual credit rating and the predicted credit rating as *DIFF*. Panel B examines the effect of increasing FITCH market share on the difference between actual and expected ratings (DIFF). Column 1 (2) reports results using an ordered probit (OLS) model. Panel C examines the effect of the credit rating differential (DIFF) on tax avoidance. Columns 1 and 2 (3 and 4) examine the effect on GETR (CETR). Odd (Even) columns use industry and year (firm and industry-by-year) fixed effects. Panel D examines the effect of the deviation from expectations by creating indicator variables for firms with an actual rating that is -2, -1, +1, or +2 from expectation. Columns 1 and 2 (3 and 4) examine the effect on GETR (CETR). Because there is unlikely to be much within-firm variation within these categories, we limit our analyses to cross-sectional results, using industry and year (odd columns) and industry-by-year (even columns) fixed effects. Standard errors are clustered at the industry-by-year level. Variable definitions are outlined in Appendix A. Cluster robust t-statistics in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.