

Managerial Ownership and Tax Avoidance

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Abstract: Prior work examines and finds that a variety of ownership structures are associated with corporate tax avoidance (e.g., family ownership, private equity ownership, and dual-class ownership). Although diffuse ownership is a prevalent ownership structure of the U.S. public firms, there is limited evidence on the relation between managerial ownership and tax avoidance among firms with diffuse ownership. We address this question in two ways. First, we examine a set of firms with diffuse ownership for which boards of directors adopt target ownership plans. Using a difference-in-difference design for 3,321 firm-years, we find firms that adopt stock ownership plans that require increased managerial ownership are associated with lower cash effective tax rates following plan adoption relative to propensity-matched control firms; whereas firms that adopt plans that only constrain managerial selling are not associated with lower cash effective tax rates following adoption. Second, we complement these findings by examining a pooled sample of 23,112 firm-years over the period 1992-2013. Using a pooled approach, we estimate quantile regressions and find that managerial ownership has a positive relation with cash effective tax rates at the lower tail of the cash effective tax rate distribution, whereas it exhibits a negative relation with cash effective tax rates at the higher tail of the distribution. Collectively, our findings are consistent with improved incentive alignment between managers and shareholders mitigating both over- and under-investment in tax avoidance.

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1. Introduction

In this paper we examine the effects of managerial ownership on corporate tax avoidance by focusing on public firms with diffuse ownership. While previous research on tax avoidance examines and finds that various forms of corporate ownership structures are associated with corporate tax avoidance (e.g., family ownership (Chen et al. 2010), private equity ownership (Badertscher et al. 2013), and dual-class ownership (McGuire et al. 2014)), there is limited evidence on how managerial ownership is associated with tax avoidance amongst the U.S. public firms with diffuse ownership. Given that diffuse ownership is a dominant ownership structure of the U.S. public firms, our paper enhances our understanding of the nature of the relation between corporate ownership and tax avoidance.

Studying the impact of managerial ownership on tax avoidance presents significant obstacles. Managerial ownership is likely endogenous to a variety of corporate policies including tax planning strategy as well as unobservable firm characteristics such as growth opportunities. To mitigate this issue, we follow Core and Larcker (2002) and examine a set of firms with diffuse ownership where boards of directors adopt target ownership plans when firms have a misalignment between managers and shareholders.¹ Studying the adoption of stock ownership plans is advantageous relative to studying the level of managerial ownership or voluntary changes in ownership because managers could increase ownership levels in anticipation of improved performance, part of which can be due to more effective tax planning. The adoption of a stock ownership plan will induce increases in managerial ownership that are unlikely to be related to changes in executive expectations (Core and Larcker 2002).

¹ Core and Larcker (2002) find accounting returns are significantly higher in the two years following plan adoption and excess returns are significantly higher in the first six months in the year the plan is adopted.

Target ownership plans mandate that managers obtain a certain level of stock ownership within a given period of time. Consequently, studying a sample of firms that adopt target stock ownership plans enables us to directly identify the remediation of agency problems (pre-adoption versus post-adoption of stock ownership plan) between managers and shareholders, and its impact on tax avoidance activities. The identification is instrumental because the relation between managerial ownership and incentive alignment between managers and shareholders can be nonlinear (e.g., Himmelberg et al. 1999).

The literature on tax avoidance has conflicting views on the nature of the relation between agency conflicts and tax avoidance. Armstrong et al. (2015) articulate a traditional view of the role of governance on tax avoidance. Under this traditional view, tax avoidance is a risky investment opportunity and unresolved agency conflicts can result in managers choosing a suboptimal level of tax avoidance. Empirical studies provide evidence consistent with this view (e.g., Rego and Wilson 2012). In contrast to the traditional view of agency costs, Desai and Dharmapala (2006) argue that tax avoidance can be the outcome of agency conflicts between managers and shareholders. The authors posit that self-interested managers engage in aggressive tax planning to hide managerial diversion of corporate resources. Desai and Dharmapala (2006) predict a negative association between managerial incentives and aggressive tax planning. We build on Core and Larcker (2002), who document stock ownership plans improve incentive alignment between managers and outsider shareholders, and we examine how the improvement in incentive alignment from ownership plans affects managers' tax avoidance activities. Given the competing explanations of Armstrong et al. (2015) and Desai and Dharmapala (2006), it is unclear whether the increase in managerial ownership from the target ownership plans will lead to more or less tax avoidance.

We compare changes in tax avoidance activity for firms that adopt stock ownership plans for their named executive officers relative to a set of control firms. We use propensity-score matching to select control firms that exhibit similar likelihoods of adoption to our sample of adoption firms, but that did not actually adopt stock ownership plans. To isolate the effects of plan adoption, we use our treatment and control firms to implement a difference-in-differences design, and we control for known determinants of tax planning to mitigate concerns about correlated omitted variables. We measure the level of tax avoidance using the cash effective tax rate. Unlike the traditional GAAP effective tax rate, the cash effective tax rate is not biased by changes in tax accounting accruals and reflects tax avoidance activities related to the deferral of cash tax payments (Dyreng et al. 2008).

Next, we split our sample of adoption firms into two groups according to whether the stock ownership plan required an increase in ownership for at least one executive or required no executive to increase stock ownership. When examining firms adopting target ownership plans that require an increase in managerial ownership, we observe an increase in the level of tax avoidance. For firms that adopt ownership plans not requiring additional managerial ownership, we observe no change in the level of tax avoidance. This result helps mitigate concerns that an unidentified factor, rather than the ownership increase, is leading to increased tax avoidance. We also examine the sustainability of the observed increase in tax avoidance by examining ten-year cash effective tax rates following the adoption of target ownership plans. Similar to our primary tests of cash effective tax rates over the four years before and after plan adoptions, we find the ten-year rates decline significantly following the adoption of the ownership plans requiring an increase in stock ownership. The reduced ten-year rates suggest the increased tax planning following plan adoption is a result of implementing sustainable tax strategies and not a reflection of managers

implementing extremely aggressive strategies that are later reversed upon examination. Overall, these findings are consistent with improved incentive alignment post-adoption leading managers to put more effort into tax planning resulting in increased tax avoidance.

One concern that arises from using a set of firms that adopted the mandatory ownership plans is the extent of the generalizability of inferences to a broader sample. We address this issue by examining the relation between managerial ownership and tax avoidance for a broader set of firms with available data in COMPUSTAT. In this regard, our paper is similar to, but differs from Armstrong et al. (2015). Armstrong et al. (2015) argues that unresolved agency conflicts lead to over- and under-investment in tax planning. They find a positive association between board independence and tax avoidance for firms exhibiting low levels of tax avoidance, but find a negative association between board independence and tax avoidance for firms engaged in high levels of tax avoidance. They conclude that improved monitoring by the board can help mitigate over- or under-investment in tax avoidance.

Our setting differs from theirs in that we look at incentive alignment for managers rather than the level of monitoring by the board. However, we make a similar prediction for our setting. Specifically, we expect that improved incentive alignment will induce managers to exert additional effort to evaluate whether their firm is over- or under- invested in tax avoidance. For firms engaging in low levels of tax avoidance, we expect a positive relation between managerial ownership and tax avoidance, consistent with increased incentive alignment leading managers to put more effort into tax planning. In contrast, for firms already exhibiting high levels of tax avoidance, we expect a negative relation between managerial ownership and tax avoidance, consistent with increased incentive alignment motivating managers to reevaluate their firms tax planning and take steps to mitigate any overinvestment in tax avoidance.

To test our predictions, we follow Armstrong et al. (2015) and run quantile regressions for a pooled sample of 23,112 firm-years over the period 1992-2013. The results support our predictions, where we find a negative (positive) relation between managerial ownership and tax avoidance at the higher (lower) tail of the tax avoidance distribution. These findings are consistent with improved incentive alignment helping mitigate both under- or over-investment in tax planning.

We also run additional tests to rule out alternative explanations for our findings and to provide further corroborating evidence. First, we note that the firms adopting ownership plans exhibit higher average cash ETRs prior to adoption than the propensity matched control firms. The higher cash ETRs raise the concern that our analysis is simply capturing the mean-reversion of cash ETRs. To mitigate this concern, we repeat our analysis by examining the four years before and after a false adoption date set four years prior to the actual adoption. The intuition underlying this test is that if changes in cash ETR around the adoption of stock ownership are attributable to the mean-reversion, such a relation is likely a general pattern of the data, and thus should be observed in other time periods. We find no evidence of an increase in tax avoidance in the falsification test, which suggests our results are not an artifact of mean-reversion of cash ETRs. Second, as a robustness check, we include covariates from our propensity-score matching procedure to control for imbalance between treatment and control firms on variables affecting the likelihood of adoption, and we continue to find evidence of a statistically, and economically, significant decrease in cash ETRs for adoption firms that require an increase in ownership.

This paper contributes to the literature in several respects. Our study provides evidence on the relation between managerial ownership and tax avoidance by employing the differences-in-differences approach. A recent but growing literature examines the impact of agency conflicts on

tax avoidance. One line of research examines the association between various corporate governance structures (including equity compensation) and tax avoidance (Desai and Dharmapala 2006; Rego and Wilson 2012; Armstrong et al. 2012; and Armstrong et al. 2015). The other line of research investigates the impact of various ownership structures including family ownership (Chen et al. 2010), private equity ownership (Badertscher et al. 2013), and dual-class ownership (McGuire et al. 2014) on tax avoidance decisions. Despite this work, existing research provides a limited picture of the relationship between managerial ownership and tax avoidance. The studies examining the association between equity compensation and tax decisions provide mixed results² and the studies examining ownership structure focus on settings with unique agency concerns (e.g. family ownership or dual class stock). A shortcoming and possible cause of the mixed results in studies examining the relationship between equity incentives and tax avoidance is the endogenous nature of managerial ownership and tax avoidance. The differences-in-differences approach we employ in this study increases our confidence in drawing inferences on the relation between ownership structure and tax reporting policy.³ In doing so, the study complements and extends existing work on the relationship between stock ownership and tax avoidance in the cross-section of firms.

Our paper also provides a more nuanced view of the relation between managerial ownership on tax avoidance. Using quantile regressions for a larger pooled sample of firms, we find that managerial ownership has a positive relation with tax avoidance at the lower part of the

² Desai and Dharmapala (2006) find a negative association between equity incentives and tax sheltering among poorly governed firms. Rego and Wilson (2012) and Gaertner (2014) find a positive association between option vega and measures of tax aggressiveness. Armstrong et al. (2012) do not find an association between CEO variable compensation (including stock and options) and tax avoidance. We discuss these studies in more detail in Section 2.

³ We note that the adoption of the ownership plans is a decision made by the board of directors and so our study also suffers from concerns about endogeneity. We attempt address this concern with our propensity score matching procedure.

tax avoidance distribution but a negative relation with tax avoidance at the higher part of the tax avoidance distribution. Thus, our study extends Armstrong et al. (2015) who report differential effects of board independence on tax avoidance contingent on the level of tax avoidance. Overall, our results suggest improved incentive alignment can help mitigate both under- or over-investment in tax planning.

Finally, we contribute to the literature on the relation between managerial and corporate performance. Core and Larcker (2002) present evidence that stock ownership plans are consistent with boards of directors contracting efficiently with managers to maximize firm value, but the authors leave the specific mechanisms of value creation unexplored. We document a channel through which efficient contracting improves firm value. This finding is useful for boards of firms with low levels of managerial ownership as they contemplate the implications of adopting a stock ownership plan.

The remainder of the paper is organized as follows. The next section develops our hypotheses. Section 3 describes sample selection procedures and provides descriptive statistics. Section 4 presents the empirical methods and results. Section 5 provides additional analysis, and Section 6 concludes.

2. Literature Review and Hypothesis Development

2.1 Literature Review

A growing line of research investigates the impact of various ownership structures on tax avoidance. Little evidence exists, however, on how manager-shareholder agency conflicts in diffuse-ownership firms affects tax avoidance. Rego and Wilson (2012) is among the few studies examining the effect of executives' equity holdings on tax planning activity. Specifically, they

examine the association between executives' equity risk incentives and the amount of firms' risky tax avoidance. Building on existing research in finance and accounting, they predict top executives' appetite for risk will increase with equity risk incentives, which will lead to an increased willingness to engage in risky tax avoidance. Consistent with this prediction, they find a positive association between equity risk incentives of CFOs and CEOs and tax avoidance activity. In contrast, Desai and Dharmapala (2006) argue that tax avoidance can be the outcome of manager-shareholder agency conflicts. From this perspective, self-interested managers engage in aggressive tax planning to hide managerial diversion of corporate resources. Thus, they predict a negative association between managerial incentives and aggressive tax planning and provide evidence consistent with their prediction. Consequently, the exact nature of the relation between managerial equity incentives and tax avoidance remains unclear.

Armstrong et al. (2015) offer an alternative view on tax avoidance. They maintain that tax avoidance is a risky investment project and unresolved agency conflicts between managers and shareholders result in suboptimal tax avoidance activities. Unlike Rego and Wilson (2012) and Desai and Dharmapala (2006), they predict that suboptimal tax avoidance can result in either "too little" or "too much" tax avoidance, and thus better corporate governance reduces "too extreme" tax avoidance in both directions. Consistent with this prediction, Armstrong et al. (2015) report a negative (positive) association between governance mechanisms and tax avoidance for firms with high (low) levels of tax avoidance.

Although Armstrong et al. (2015) advance our understanding of the nature of the relation between tax avoidance and agency concerns, they do not directly speak to the association between the separation of ownership and control and tax avoidance. Understanding the nature of the relation between managerial equity ownership and tax avoidance is important because the separation of

ownership and control is a root cause of agency conflicts between shareholders and managers (Jensen and Meckling 1976), and governance mechanisms, such as executive compensation, are designed to mitigate such conflicts. This paper provides direct evidence on how the degree of the separation of ownership and control is associated with levels of corporate tax avoidance.

While prior work examines the relation between various ownership structures and corporate tax avoidance (e.g., family ownership (Chen et al. 2010), private equity ownership (Badertscher et al. 2013), and dual-class ownership (McGuire et al. 2014)), none of these existing studies directly examine the effects of the separation of ownership and control faced by most firms. The nature of agency conflicts among family firms, firms with dual-class shares, or firms with private equity ownership differs from the agency conflicts between managers and diffuse shareholders (Bebchuk and Weisbach 2010). For example, the time horizon of the controlling shareholders in family firms or dual-class firms is much longer than that of managers in firms with diffuse ownership. If rent extraction activities decrease a firm's long-term value, the longer time horizon possibly incentivizes the controlling shareholders not to engage in tax avoidance as a way of extracting rents from the minority shareholders (i.e., they prefer "quiet life"). In contrast, it is possible the shorter time horizon of managers among firms with diffuse ownership incentivizes them to engage in tax avoidance as a way of extracting rents from diffuse shareholders, because it is difficult to ex post recoup wealth expropriation from shareholders to managers (Shleifer and Vishny 1997). The above discussion suggests that it is difficult to generalize findings of studies examining the impact of "unique" ownership structures on tax avoidance to firms with diffuse ownership. Our contribution to the literature is to provide evidence on the effects of the agency conflicts between managers and shareholders among firms with diffuse ownership on tax avoidance.

2.2. Hypotheses Development

To understand the relation between separation of ownership and control and tax avoidance, we study the adoption of stock ownership plans. Boards of directors adopt stock ownership plans, which specify the minimum amount of stock that must be owned by executives. Core and Larcker (2002) present evidence consistent with boards adopting ownership plans when managerial ownership is too low, and the increase in ownership following adoption mitigating manager-shareholder agency conflicts.

This research setting has several advantages relative to studying the level of managerial ownership or voluntary changes in ownership. First, studying ownership plans mitigates the possibility that managers increase ownership levels in anticipation of improvements in stock price performance, because improvements in stock performance may be associated with corporate tax avoidance. Second, our research setting allows us to directly examine the impact of the remediation of agency problems (pre-adoption versus post-adoption of target ownership plan) between managers and shareholders on tax avoidance activities. Finally, this approach also allows us to perform inter-temporal analyses so as to avoid an endogenous relation between managerial ownership structure and tax avoidance, which potentially arises in cross-sectional research settings.⁴

It is ex ante unclear whether increases in managerial ownership result in more or less tax avoidance. The extant theory of corporate tax avoidance provides two opposing predictions about the impact of increases in managerial ownership on tax avoidance. Under the traditional view that managers engage in risky tax avoidance activities in an attempt to maximize shareholders' value by diverting resources from the government to shareholders, increasing managerial ownership

⁴ This concern is particularly important when examining the relation between ownership and tax avoidance, because the relation between managerial equity ownership and agency conflicts is concave (McConnell and Servaes 1990).

results in more aggressive tax avoidance (e.g., Rego and Wilson 2012). In other words, as agency conflicts decrease from pre- to post-adoption period, managers are likely to engage in more aggressive level of tax avoidance in the interests of themselves and shareholders.

In contrast, Desai and Dharmapala (2006) posit that managers can structure complex tax avoidance transactions in a bid to extract rents from shareholders. Under this alternative view, increasing managerial ownership results in less aggressive tax avoidance. Stated differently, as agency conflicts decrease post-adoption, managers are likely to engage in less tax avoidance. Thus, we view it as an empirical question which view is more descriptive than the other in our setting. Our hypothesis is expressed as follows (in the null form):

H: Tax avoidance does not change from pre- to post-adoption period.

3. Sample

Our sample begins in 1993 and runs until 2013. We obtain financial statement information from Compustat and managerial ownership data from Execucomp. We use the stock ownership plan sample of Quinn (2015). Starting with a sample of S&P 1500 firms as of January 1, 1995, Quinn (2015) identifies firms that adopt stock ownership plans using a Python script that searches EDGAR filings for “ownership plan”.⁵ Stock return data come from CRSP.

Our research question examines the effect of ownership requirements on cash effective tax rates. If cash effective tax rates tend to decrease for all firms, not just firms that adopt stock ownership plans, during our sample, we would be unable to draw inferences by examining differences in cash effective tax rates before and after the adoption of a stock ownership plan. To

⁵ To eliminate false positive matches, Quinn (2015) hand checks each firm’s first match to ensure that plan is a stock ownership plan for executives, rather a plan for directors or non-executive employees. To eliminate false negative matches, he checks the proxy statement prior to the first match. For non-adoption firms, he reads the most recent proxy to verify the firm is a non-adoption firm.

mitigate this limitation and to control for changes in effective tax rates for all firms, we select a set of year-matched control firms. Because firms that adopt stock ownership plans may exhibit different firm characteristics than the cross section of firms, we also employ a propensity-score matching procedure (Rosenbaum and Rubin [1983]).

To obtain propensity scores, we estimate a logistic model that contains variables that prior work suggests affect the probability of ownership plan adoption. Consistent with boards adopting plans to mitigate perceived governance problems, Core and Larcker (2002) find executives at adoption firms exhibit low equity ownership prior to adoption. We include lagged CEO equity ownership scaled by the market value of equity and the mean of the lagged equity ownership of the other named executive officers, also scaled by the market value of equity.⁶ With more resources to implement governance reforms, large firms may be more likely to adopt an ownership plan, and we included the lagged value of total assets. Because plans require managers to retain a certain level of ownership, boards of firms with volatile stock prices may be less likely to adopt an ownership plan. We include stock volatility as a determinant of plan adoption. The series of accounting scandals in 2000 and 2001, and the passage of Sarbanes-Oxley Act of 2002 (SOX), lead to several governance reforms, and we include a SOX indicator variable in our prediction model. Finally, Core and Larcker (2002) document that adoption firms exhibit poor price and accounting performance relative to their industry peers. As such, we include stock returns and industry-adjusted performance as additional determinants of adoption. The results of the propensity-score matching procedure are presented in Appendix B.

3.2 Descriptive Statistics

⁶ Appendix A lists and defines all covariates that we use in the propensity-score matching procedure.

Table 1 provides descriptive statistics for our sample. The mean *CETR* for our sample is 24.6 percent, which is below the U.S. statutory rate of 35 percent for our sample period. The interquartile range of *CETR* ranges from 11.5 to 34.0 percent, which suggests the firms in our sample exhibit varying degrees of tax planning. Approximately 52 percent of our sample consists of multinational corporations ($MNC = 0.522$). Table 2 provides Pearson and Spearman correlation statistics for our sample.⁷ Our primary dependent variable of interest, *CETR*, exhibits a negative correlation with net operating losses (-0.10 , $p\text{-value} < .01$), size (-0.07 , $p\text{-value} < .01$), leverage (-0.16 , $p\text{-value} < .01$) and R&D expenditures (-0.06 , $p\text{-value} < .01$). *CETR* exhibits a positive correlation with pre-tax profitability (0.12 , $p\text{-value} < .01$) and multinational status (0.11 , $p\text{-value} < .01$). Inconsistent with firms changing their tax planning after the adoption of a stock ownership plan, we do not find statistically significant evidence that the Pearson correlation is statistically different from zero (0.00 , $p\text{-value} = .92$).⁸ Because the univariate correlations fail to account for differences in other determinants of *CETR*, we rely on our multivariate analyses for drawing inferences.

4. Empirical Approach

4.1 The effects of target ownership plans on tax avoidance

To examine changes in tax aggressiveness around the adoption of stock ownership plans, we estimate the following regression:

$$CETR_{i,t} = \phi_1 TREATMENT_{i,t} + \phi_2 POST_{i,t} + \phi_3 TREATMENT * POST_{i,t} + \sum \theta * CONTROL_{j,i,t} + \sum \beta * YEAR_t + \zeta_{i,t}, \quad (1)$$

⁷ Because the Pearson and Spearman correlations are similar, we focus our discussion on the Pearson correlation statistics for ease of exposition.

⁸ The Spearman correlation is also not statistically different from zero (0.01 , $p\text{-value} = .92$).

where *CETR* is the firm-year cash effective cash rate with pretax income adjusted for special items.⁹ While *CETR* is a common measure of tax planning, Hanlon and Heitzman (2010) note that several measures of tax planning exist, and the authors also emphasize that the appropriate measure of tax planning depends on the setting. In our setting, we posit that managers increase firm value through improved tax planning subsequent to the adoption of stock ownership plans. Reducing cash paid to tax authorities through better tax planning directly increases cash flows available to the firm.¹⁰

TREAT is an indicator variable that equals one for firms that adopt stock ownership plans, and zero otherwise. *POST* is an indicator variable that equals one for firm-years that occur after a plan adoption. For the control firms, *POST* equals one for firm-years that occur after the pseudo plan adoption. Our independent variable of interest is the interaction between *TREAT* and *POST*, and the coefficient estimate on the interaction represents the average treatment effect for adoption firms.

We also control for potential determinants of cash effective tax rates. We control for pre-tax profitability (*PT_ROA*), which we compute as pre-tax income divided by average total assets. We control for the extent of net operating losses, which we compute as tax loss carry forwards divided by average total assets.¹¹ Zimmerman (1983) argues political costs lead larger firms to pay

⁹ Following Dyreng et al. 2008, we adjust for special items to remove the effect of GAAP only items, such as goodwill write-downs, that do not affect taxes. Nevertheless, our results are qualitatively similar when we do not adjust cash effective tax rates for special items.

¹⁰ We use a one-year measure of cash ETR. Hanlon and Heitzman (2010) note that the one-year cash ETR measure is more volatile than one-year GAAP ETR and one-year current ETR measures. The authors also note that the denominator and numerator of the one-year cash ETR measure may be mismatched. Dyreng et al. (2008) use a long-run cash ETR measure, which is less volatile than the one-year cash ETR measure and also improves matching between the numerator and denominator. We do not use long-run cash ETRs in our setting because such a measure would, for some years in the post period, be estimated over post the pre-adoption and post-adoption years. Furthermore, our tests examine change in cash effective tax rates over the four years following adoption, which also mitigates concerns about the volatility and mismatching in the one-year measure.

¹¹ We set net operating losses equal to zero for firms with missing TLCF.

higher tax rates, and we control for *SIZE*. We define *SIZE* as the natural logarithm of average total assets. Rego (2003) finds that multinational corporations exhibit lower worldwide GAAP ETRs, and we control for whether the firm is a multinational corporation. *MNC* is an indicator variable equal to one when a firm reports a non-missing value for foreign pre-tax income, and zero otherwise. Interest expenses from debt are a qualified business expense, and we control for leverage (*LEV*) by including total liabilities divided by average total assets. The Economic Recovery Act of 1981 provides tax credits to firms that engage in certain types of research and development (*R&D*), and we control for R&D as research and development expense scaled by average total assets. Dyreng et al. (2014) find that average corporate taxes have decreased over the past 25 years, and we include year fixed effects to mitigate concerns that our results simply reflect the downward trend that Dyreng et al. (2014) document.¹²

Table 3 presents the results of estimating equation (1). Model 1 presents the results with all adoption firms. The coefficient estimate on *TREAT*POST* is -0.030, which is statistically significant at the one-percent level. The coefficient estimate represents an average treatment effect of a 3.0 percentage point reduction in cash effective tax rate after the adoption. A 3.0 percentage point reduction represents an economically significant 12.2 percent reduction relative to the mean (median) *CETR* for our sample.¹³

Next, we split our sample into adoption firms that require one or more executives to increase ownership in the firm and adoption firms that require an ownership floor for executives, but set the ownership floor below all executives' current ownership. Model 2 presents the results for the firms that require an increase in managerial ownership. In Model 2, the coefficient estimate

¹² By comparing changes in effective tax rates in our treatment firms to changes at adoption-year-matched control firms, our difference-in-differences research design also mitigates concerns that are results simply reflect the downward trend in effective tax rates.

¹³ The mean and median *CETR* in Table 1 is .246.

on the interaction between *TREAT* and *POST* is -0.039, which is statistically significant (t -stat = -3.66). Model 3 presents the results for the firms that require no increase in managerial ownership. In Model 3, the coefficient estimate on *TREAT*POST* is -0.018, which is not statistically significant (t -stat = -0.99). Overall, the stronger reduction in cash effective tax rates in adoption firms that require an increase in ownership is consistent with our hypothesis.

4.2 Do tax savings reverse?

Our primary tests document that adoption firms that require increased ownership exhibit, on average, lower cash effective tax rates in the four years following plan adoption. A natural question is whether firms sustain the cash tax savings or whether the cash tax savings reverse. To investigate whether adoption firms maintain the reduced cash effective tax rates beyond our sample period, we extend our sample to ten years after plan adoption and re-estimate equation (1).

Table 4 presents the results. The negative coefficient estimate on the interaction between *TREAT* and *POST* is statistically significant in Model 1 (-0.030, t -stat=-2.61). We investigate whether tax savings reverse for firms that required ownership increases in Model 2. The coefficient estimate on the *TREAT*POST* interaction in Model 2 of Table 4 is -0.038 and is statistically significant at the one-percent level. The economic magnitude in Model 2 of Table 4 is similar to the estimate on the *TREAT*POST* interaction in Model 2 of Table 3 (-0.039), which suggests that the reduction in cash tax savings persist after the adoption of plans that require ownership increases. The results in Table 4 suggest managers are not implementing overly aggressive tax strategies that cannot be sustained upon audit.

4.3 Managerial ownership and tax avoidance: a pooled approach

The findings reported in the previous section suggest that increased incentive alignment between managers and shareholders results in more aggressive tax planning for a set of firms that

adopted the managerial ownership plans relative to control firms. A natural follow-up question is what the relation between managerial ownership and tax avoidance looks like for the population. Put differently, to what extent can we generalize inferences drawn from a set of firms that adopted the managerial ownership plans to a more general population? In this section, we shed light on this issue by examining the relation between the managerial ownership and tax avoidance for a broader sample of firms.

As discussed earlier, Armstrong et al. (2015) offer an alternative view on the relation between managerial ownership and tax avoidance. Under this view, unresolved agency conflicts result in suboptimal tax avoidance (i.e., either “too little” or “too much” tax avoidance). This view provides nuanced predictions for the relation between managerial ownership and tax avoidance. Under this view, the effect of managerial ownership on tax avoidance goes in either direction depending on the tax avoidance distribution. This occurs because there is an interior level of tax avoidance wherein firm value is maximized (Armstrong et al., 2015). The separation of ownership and control results in incentive misalignment between managers and shareholders and thus managers potentially engage in suboptimal levels of tax avoidance. Managerial ownership improves alignment between managers and shareholders thus preventing managers from over- and under-investing in tax avoidance. Thus, we predict a positive (negative) relation between managerial ownership and tax avoidance in the lower (higher) tail of tax avoidance.

To test our predictions, we employ quantile regressions, which allow us to estimate the relation between managerial ownership and tax avoidance across the entire tax avoidance distribution, with a particular focus on the extreme tails of the distribution. Specifically, we estimate the following quantile regressions for a sample of 23,112 firm-years over the period 1992-2013:

$$CETR3Y_{i,t} = \alpha + \beta_1 TOP5OWN_{i,t} + \sum \gamma * CONTROL_{j,i,t} + \varepsilon_{i,t}, \quad (2)$$

where CETR3Y is a three-year cash effective tax rate, measured as the sum of cash taxes over three years divided by the sum of pre-tax book income less special items over the same period; TOP5OWN is the percentage of shares held by the top five largest executives in the form of direct ownership, where raw data are transformed to the natural logarithm $[1 / (1 - \text{managerial ownership})]$ (Demsetz and Villalonga 2001). Control variables included are as follows: pre-tax profitability; a net operating loss indicator; the natural logarithm of average total assets; a multinational corporation indicator; leverage; changes in a net operating loss indicator; pre-tax foreign income; capital intensity; equity income; market-to-book equity ratio; and the natural logarithm of one plus vega. We include industry- and year-fixed effects and also cluster standard errors by firm. We expect β_1 to be negative (positive) for the right (left) tail of the tax avoidance distribution. We do not expect β_1 to be significant with either sign for the middle of the distribution.

The results reported in Table 5 support our predictions. While we focus on quantile regressions, we also run the OLS regressions for the purpose of comparison. The OLS regressions results in Table 5 provide no evidence on the relation between managerial ownership and tax avoidance. This suggests no significant relation between managerial ownership and the conditional mean of tax avoidance. However, the quantile regression provides a different picture where we find that managerial ownership is positively related to three-year cash effective tax rates for the lower part of the cash effective tax rates distribution but a negative relation for the higher part of the distribution. These findings suggest that improved incentive alignment through managerial ownership prevents managers from engaging suboptimal tax avoidance (i.e., either under- or over-investment in tax planning).

5. Additional Analysis

5.1 Falsification test

One concern with our primary analysis is that the changes in cash ETRs we have documented thus far can be an artifact of the mean-reverting nature of cash ETRs. If so, one would expect to observe changes in cash ETRs without a treatment effect. In the context of our setting, changes in cash ETRs may not be due to remediation of agency conflicts, but to the data-generation process. Another concern is whether the difference-in-differences estimator maintains a zero-correlation assumption. The assumption requires that the coefficient estimate on the interaction between *TREAT* and *POST* results from the treatment effect, rather than from preexisting trend differences between treatment and control firms.

To address these concerns, we examine changes in cash effective tax rates around a false adoption date. For the false adoption date, we use four years prior to the actual adoption. The choice of this date prevents any true post years from being in the post group and maximizes the nearness to the true adoption. Documenting a reduction in cash effective tax rates for treatment firms in this test would suggest the confounding effect of the mean-reversion of cash ETRs or pre-existing trends bias our results.

Table 6 presents the falsification results. Rather than only examine falsification results for the adoption firms that require an increase in ownership, we also examine results for all adoption firms and adoption firms that require no action on the part of executives. We examine each of the three samples because we draw inferences on each sample, and mean-reversion of cash ETRs and a violation of the zero-correlation assumption could bias results for an individual sample without necessarily appearing in the other samples. In Model 1, we find no evidence of a statistically significant negative coefficient on the *TREAT*POST* interaction term (t -stat = -1.06). When we

split the sample into firms that require an ownership increase (Model 2) and firms that require no action (Model 3), we again find no evidence that pre-existing trends in the pre-event period bias our results. For the firms that are the focus of our study, firms that require an ownership increase, the coefficient estimate on *TREAT*POST* is an economically and statistically insignificant -0.002 (t -stat = -0.16). Overall, the results of our falsification tests mitigate concerns that our results are artifacts of data-generating process (i.e., mean-reversion of cash ETRs) or driven by a violation of the zero-correlation assumption.

5.2 Covariate imbalance

Rosenbaum (2002, 297) notes propensity-matched sets tend to balance covariates in that, “treated and control subjects in the same stratum or matched set tend to have the same distribution of \mathbf{x}_s .” Although propensity-score matching will tend to balance covariates, it is possible covariate imbalance will exist, and the covariate balance will influence the results. To mitigate the concern that covariate imbalance in the matching procedure biases later tests, we include covariates as control variables in our examination of changes in *CETR*.

Table 7 reports the results of including the matching covariates as additional control variables. In Model 1, we see that the coefficient estimate on *TREAT*POST* remains statistically significant, although the economic and statistical significance is slightly lower (-0.025, t -stat=-2.36). In Model 2, we see that for firms that require an increase in managerial ownership upon plan adoption, the coefficient estimate on the *TREAT*POST* interaction variable remains negative and statistically significant at the one-percent level (-0.033, t -stat=-3.20).¹⁴

¹⁴ If adoption firms increase their executives’ vega around adoption, an alternative explanation for our results would be an increase in vega for adoption firms. Additional analyses reveal that our results are qualitatively similar when we include vega as an additional control variable.

6. Conclusion

This paper contributes to the literature in several ways. First, we provide evidence on the relation between managerial ownership and tax avoidance by employing a differences-in-differences approach. Prior work provides evidence on the *cross-sectional* relation between various ownership structures and tax avoidance. The differences-in-differences approach increases our confidence in drawing inferences on a relation between the ownership structure and firms' tax planning strategies. Second, this paper sheds light on the literature that examines the determinants of tax avoidance by providing evidence on the impact of the remediation of agency problems between managers and shareholders on tax avoidance activities.

We find that following the adoption of a stock ownership plan, adoption firms increase their tax planning, and on average, exhibit a lower cash effective tax rate. Upon splitting adoption firms into firms that require an increase in managerial ownership and firms that require no such increase, our results cluster in the firms that require increases in managerial ownership. Additional analysis reveals that our results are neither attributable to mean-reversion of cash effective tax rates, nor are our results attributable to pre-existing trends in cash effective tax rates prior to the adoption. We also find that our results are not due to covariate imbalance between the treatment and control firms. We corroborate the results from a set of firms that adopted a stock ownership plan by examining the relation between managerial ownership and tax avoidance for the broader population (i.e., COMPUSTAT). Using quantile regressions, we find a negative relation between managerial ownership and tax avoidance at the right tail of the tax cash effective tax rate distribution and a positive relation at the left tail of the distribution. Overall, our results suggest that improved incentive alignment is associated with an increase in tax avoidance consistent with

reduced agency conflicts mitigating under-investment in tax avoidance, whereas improved incentive alignment also appears to reduce over-investment in tax avoidance.

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Appendix A

Matching variables

<i>CEO_OWN</i>	CEO equity ownership scaled by market value of equity
<i>IND_ADJ_ROA</i>	Income before special items scaled by average assets, minus the median ROA of firms in the same two-digit SIC industry that year
<i>NEO_OWN</i>	Mean equity ownership of other (i.e., non-CEO) named executive officers scaled by market value of equity
<i>RETURNS</i>	Buy-and-hold stock returns over the prior calendar year
<i>SIZE</i>	Log of total assets
<i>SOX</i>	Indicator variable equal to one for fiscal years ending after 2002, zero otherwise
<i>STD</i>	Standard deviation of daily stock returns over the prior calendar year

Test variables

<i>CETR</i>	Cash effective cash rate, measured as cash taxes paid divided by pretax income minus special items
<i>LEV</i>	Leverage, measured as total liabilities divided by average total assets
<i>MNC</i>	Multinational indicator equal to one for firms with non-missing foreign income, zero otherwise
<i>NOL</i>	Net operating loss, measured as Tax Loss Carry Forwards divided by average total assets
<i>POST</i>	Post indicator variable that equals one for firm-years that occur after a plan adoption. For the control firms, <i>POST</i> equals one for firm-years that occur after the pseudo plan adoption
<i>PT_ROA</i>	Pre-tax profitability, measured as pre-tax income divided by average total assets
<i>R&D</i>	Research and development divided by average total assets
<i>SIZE</i>	Natural logarithm of average total assets
<i>TREAT</i>	Treatment indicator variable that equals one for firms that adopt stock ownership plans, and zero otherwise

Appendix B

Matching model	
Dep. variable = adopt	
<i>CONSTANT</i>	-2.2892 (0.00)
<i>CEO_OWN</i>	-5.5928 (0.00)
<i>NEO_OWN</i>	-7.3962 (0.01)
<i>SIZE</i>	0.1134 (0.00)
<i>STD</i>	-10.7968 (0.00)
<i>SOX</i>	1.0153 (0.00)
<i>IND_ADJ_ROA</i>	0.3547 (0.24)
<i>RETURNS</i>	0.0844 (0.02)
Year matching	Y
Observations	7109
Adjusted R-squared	0.16

Appendix B provides coefficient estimates on the variables that we use to estimate propensity scores. *CEO_OWN* is CEO equity ownership scaled by market value of equity. *IND_ADJ_ROA* is income before special items scaled by average assets, minus the median ROA of firms in the same two-digit SIC industry that year. *NEO_OWN* is the mean equity ownership of other (i.e., non-CEO) named executive officers scaled by market value of equity. *RETURNS* is buy-and-hold stock returns over the prior calendar year. *SIZE* is the log of total assets. *SOX* is an indicator variable equal to one for fiscal years ending after 2002, zero otherwise. *STD* is the standard deviation of daily stock returns over the prior calendar year.

Table 1

Descriptive Statistics						
VARIABLES	N	mean	sd	p25	p50	p75
CETR	5,522	0.246	0.183	0.115	0.246	0.340
LEV	5,522	0.617	0.224	0.479	0.611	0.755
MNC	5,522	0.522	0.500	0	1	1
NOL	5,522	0.027	0.121	0.000	0.000	0.005
POST	5,522	0.439	0.496	0	0	1
PT_ROA	5,522	0.095	0.080	0.039	0.077	0.131
R&D	5,522	0.020	0.042	0.000	0.000	0.018
SIZE	5,522	8.218	1.626	7.103	8.120	9.286
TREAT	5,522	0.531	0.499	0	1	1
TREAT*POST	5,522	0.247	0.432	0	0	0

This table presents descriptive statistics for variables used in our analyses. *CETR* is the cash effective cash rate, measured as cash taxes paid divided by pretax income minus special items. *LEV* is leverage, measured as total liabilities divided by average total assets. *MNC* is multinational indicator equal to one for firms with non-missing foreign income, zero otherwise. *NOL* is net operating loss, measured as tax loss carry forwards divided by average total assets. *POST* is a post indicator variable that equals one for firm-years that occur after a plan adoption. For the control firms, *POST* equals one for firm-years that occur after the pseudo plan adoption. *PT_ROA* is pre-tax profitability, measured as pre-tax income divided by average total assets. *R&D* is research and development divided by average total assets. *SIZE* is the log of average total assets. *TREAT* is a treatment indicator variable that equals one for firms that adopt stock ownership plans, and zero otherwise.

Table 2

		Correlations (Pearson above Spearman)									
		1	2	3	4	5	6	7	8	9	10
1	CETR	1.00	0.00	0.05	0.00	0.12	-0.10	-0.07	0.11	-0.16	-0.06
2	POST	0.01	1.00	0.06	0.65	0.01	0.04	0.13	0.08	0.00	0.01
3	TREAT	0.06	0.06	1.00	0.54	0.03	-0.05	0.12	0.09	0.04	-0.03
4	TREAT*POST	0.01	0.65	0.54	1.00	0.02	0.01	0.14	0.08	0.04	-0.01
5	PT_ROA	0.25	0.03	0.05	0.03	1.00	-0.03	-0.22	0.18	-0.43	0.20
6	NOL	-0.04	0.07	-0.01	0.06	0.05	1.00	-0.12	0.10	-0.12	0.26
7	SIZE	-0.11	0.13	0.13	0.14	-0.27	-0.08	1.00	-0.05	0.45	-0.20
8	MNC	0.12	0.08	0.09	0.08	0.24	0.24	-0.05	1.00	-0.30	0.32
9	LEV	-0.19	0.00	0.05	0.05	-0.51	-0.20	0.45	-0.30	1.00	-0.39
10	R&D	0.01	0.02	0.06	0.05	0.26	0.12	-0.19	0.46	-0.37	1.00

This table presents descriptive statistics for variables used in our analyses. *CETR* is the cash effective cash rate, measured as cash taxes paid divided by pretax income minus special items. *LEV* is leverage, measured as total liabilities divided by average total assets. *MNC* is multinational indicator equal to one for firms with non-missing foreign income, zero otherwise. *NOL* is net operating loss, measured as tax loss carry forwards divided by average total assets. *POST* is a post indicator variable that equals one for firm-years that occur after a plan adoption. For the control firms, *POST* equals one for firm-years that occur after the pseudo plan adoption. *PT_ROA* is pre-tax profitability, measured as pre-tax income divided by average total assets. *R&D* is research and development divided by average total assets. *SIZE* is the log of average total assets. *TREAT* is a treatment indicator variable that equals one for firms that adopt stock ownership plans, and zero otherwise.

Table 3

The effect of stock ownership plans on tax avoidance			
Dep. variable = CETR	(1)	(2)	(3)
	All	Increase required	No action required
<i>TREAT</i>	0.029** (2.45)	0.046*** (3.52)	0.000 (0.02)
<i>POST</i>	0.025*** (2.63)	0.021** (2.27)	0.033* (1.78)
<i>TREAT*POST</i>	-0.030*** (-2.77)	-0.039*** (-3.66)	-0.018 (-0.99)
<i>PT_ROA</i>	0.089 (1.55)	0.056 (0.66)	0.119* (1.96)
<i>NOL</i>	-0.119*** (-4.40)	-0.118*** (-3.56)	-0.116*** (-3.16)
<i>SIZE</i>	-0.003 (-0.77)	-0.008* (-1.67)	0.002 (0.39)
<i>MNC</i>	0.036*** (3.29)	0.037*** (3.23)	0.040** (2.41)
<i>LEV</i>	-0.146*** (-5.05)	-0.164*** (-4.84)	-0.105*** (-2.80)
<i>R&D</i>	-0.656*** (-6.15)	-0.747*** (-5.94)	-0.516*** (-4.63)
Cluster by firm	Y	Y	Y
Cluster by year	Y	Y	Y
Year fixed effects	Y	Y	Y
Observations	5,522	3,321	2,201
Adjusted R-squared	0.093	0.114	0.087

This table presents the results of examining the shift in cash effective tax rates between a sample of firms that adopted stock ownership plans (SOPs) and the propensity-matched control firms from the pre- to post-adoption period. Column (1) shows the results for all firms. Column (2) reports the results for firms that adopted stock ownership plans that required at least one named executive officer to increase stock ownership and the associated set of propensity-score-matched control firms. Column (3) displays the results for firms that adopted stock ownership plans that required no named executive officer to their increase stock ownership and the associated set of propensity-score-matched control firms. Variable definitions are in Appendix A. *t*-statistics are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4

Does tax avoidance reverse?			
Dep. variable = CETR	(1)	(2)	(3)
	All	Increase required	No action required
<i>TREAT</i>	0.027** (2.40)	0.005 (0.40)	0.000 (0.01)
<i>POST</i>	0.018* (1.73)	0.044*** (3.47)	0.023 (1.26)
<i>TREAT*POST</i>	-0.030*** (-2.61)	-0.038*** (-3.34)	-0.020 (-1.06)
<i>PT_ROA</i>	0.143** (2.40)	0.130* (1.74)	0.151** (2.28)
<i>NOL</i>	-0.115*** (-4.33)	-0.114*** (-3.33)	-0.115*** (-3.43)
<i>SIZE</i>	-0.001 (-0.16)	-0.006 (-1.45)	0.004 (1.04)
<i>MNC</i>	0.035*** (3.02)	0.036*** (3.17)	0.035** (2.14)
<i>LEV</i>	-0.154*** (-5.67)	-0.158*** (-5.45)	-0.132*** (-3.62)
<i>R&D</i>	-0.713*** (-6.96)	-0.799*** (-6.53)	-0.576*** (-6.07)
Cluster by firm	Y	Y	Y
Cluster by year	Y	Y	Y
Year fixed effects	Y	Y	Y
Observations	7,460	4,489	2,971
Adjusted R-squared	0.098	0.116	0.089

This table presents the results of examining whether tax avoidance reverses. The pre- and post-adoption periods span four years and ten years respectively. Column (1) shows the results for all firms. Column (2) reports the results for firms that adopted stockownership plans that required at least one named executive officer to increase stock ownership and the associated set of propensity-score-matched control firms. Column (3) displays the results for firms that adopted stock ownership plans that required no named executive officer to their increase stock ownership and the associated set of propensity-score-matched control firms. Variable definitions are in Appendix A. *t*-statistics are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5

Managerial ownership and tax avoidance: a pooled approach		
X = Dep. variable		TOP5OWN CETR3Y
	Coeff.	t-stat.
<i>OLS</i>	-0.001	-1.08
<i>Quantiles</i>		
0.05	0.002*	1.90
0.10	0.000	-0.18
0.20	-0.001	-1.08
0.30	-0.001	-1.43
0.40	0.000	-0.67
0.50	-0.001	-1.43
0.60	-0.001*	-1.76
0.70	-0.001	-1.24
0.80	-0.001	-1.56
0.90	-0.002**	-2.04
0.95	-0.005***	-3.32
Year fixed effects	Y	Y
Industry fixed effects	Y	Y
Cluster by firm	Y	Y
Control variables	Y	Y
Observations		23112

This table presents the results of examining the quantile regression of a three-year cash effective tax rate (CETR3Y) on managerial ownership (TOP5OWN) and a set of control variables for 23,112 firm-years over the 1992-2013 period. Variable definitions are as follows: CETR3Y = The sum of cash taxes over three years divided by the sum of pre-tax book income less special items; TOP5OWN = the percentage of shares held by the top five largest executives in the form of direct ownership, where raw data are transformed to the natural logarithm $[1 / (1 - \text{managerial ownership})]$. Control variables include pre-tax profitability, a net operating loss indicator, the natural logarithm of average total assets, a multination corporation indicator, leverage, changes in a net operating loss indicator, pre-tax foreign income, capital intensity, equity income, market-to-book equity ratio, and the natural logarithm of one plus vega. *t-statistics* are calculated using the Markov chain marginal bootstrap method. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6

Falsification test			
Dep. variable = CETR	(1)	(2)	(3)
	All	Increase required	No action required
<i>TREAT</i>	0.036*** (2.97)	0.047*** (3.54)	0.018 (1.05)
<i>POST</i>	0.004 (0.51)	0.007 (0.62)	0.000 (0.01)
<i>TREAT*POST</i>	-0.008 (-1.06)	-0.002 (-0.16)	-0.016 (-1.25)
<i>PT_ROA</i>	0.074 (1.16)	0.084 (1.00)	0.045 (0.60)
<i>NOL</i>	-0.138*** (-4.66)	-0.177*** (-2.86)	-0.127*** (-4.16)
<i>SIZE</i>	-0.003 (-0.77)	-0.009 (-1.62)	0.001 (0.21)
<i>MNC</i>	0.043*** (4.21)	0.040*** (3.92)	0.049*** (3.04)
<i>LEV</i>	-0.166*** (-4.72)	-0.161*** (-4.34)	-0.162*** (-3.15)
<i>R&D</i>	-0.655*** (-6.04)	-0.733*** (-6.18)	-0.526*** (-3.42)
Cluster by firm	Y	Y	Y
Cluster by year	Y	Y	Y
Year fixed effects	Y	Y	Y
Observations	5,860	3,523	2,337
Adjusted R-squared	0.100	0.117	0.097

This table presents the results of conducting falsification tests (i.e., parallel shift). Column (1) shows the results for all firms. Column (2) reports the results for firms that adopted stockownership plans that required at least one named executive officer to increase stock ownership and the associated set of propensity-score-matched control firms. Column (3) displays the results for firms that adopted stock ownership plans that required no named executive officer to their increase stock ownership and the associated set of propensity-score-matched control firms. Variable definitions are in Appendix A. *t*-statistics are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7

Inclusion of matching covariates			
Dep. variable = CETR	(1)	(2)	(3)
	All	Increase required	No action required
<i>TREAT</i>	0.013 (1.22)	-0.011 (-0.70)	-0.020 (-1.28)
<i>POST</i>	0.001 (0.08)	0.033*** (2.94)	0.012 (0.55)
<i>TREAT*POST</i>	-0.025** (-2.36)	-0.033*** (-3.20)	-0.015 (-0.77)
<i>PT_ROA</i>	0.008 (0.14)	-0.009 (-0.10)	0.013 (0.19)
<i>NOL</i>	-0.112*** (-3.96)	-0.104*** (-3.01)	-0.113*** (-2.81)
<i>SIZE</i>	0.035*** (2.88)	0.038** (2.45)	0.028 (1.52)
<i>MNC</i>	0.018* (1.76)	0.016 (1.56)	0.025 (1.63)
<i>LEV</i>	-0.086*** (-2.89)	-0.111*** (-3.00)	-0.037 (-1.09)
<i>R&D</i>	-0.569*** (-4.78)	-0.667*** (-4.72)	-0.424*** (-3.25)
Cluster by firm	Y	Y	Y
Cluster by year	Y	Y	Y
Year fixed effects	Y	Y	Y
Covariate controls	Y	Y	Y
Observations	5,144	3,087	2,057
Adjusted R-squared	0.072	0.087	0.081

This table presents the results, in which we also control for differences in covariates from the matching, of examining the change in cash effective tax rates between a sample of firms that adopted stock ownership plans (SOPs) and the propensity-matched control firms around plan adoptions. Column (1) shows the results for all firms. Column (2) reports the results for firms that adopted stockownership plans that required at least one named executive officer to increase stock ownership and the associated control firms. Column (3) displays the results for firms that adopted stock ownership plans that required no named executive officer to increase stock ownership and the associated control firms. Variable definitions are in Appendix A. *t*-statistics are in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.