Review of Accounting Studies
https://doi.org/10.1007/s11142-020-09543-y

Tax-savvy executives

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Published online: 21 June 2020

Abstract
We investigate why firms include individuals with significant professional tax experience on their senior management team and the consequences associated with the presence of these *tax-savvy* executives. We find that past performance, network connections, geographic location, and tax-rate level, relative to industry peers, are all significant determinants of having a tax-savvy executive on the senior management team. Using propensity-score matching, we find that effective tax rates decrease substantially after the addition of a tax-savvy executive to senior management and revert following the departure of such an executive. We connect the changes in effective tax rates to changes in the usage of foreign subsidiaries in low tax jurisdictions.

Keywords Corporate taxes · Effective tax rates · Employment history · Professional experience

JEL Classification G30 · H25, M12

1 Introduction

This study investigates why firms include individuals with significant tax-related experience on the senior management team and the consequences associated with employing these *tax-savvy* senior executives. Despite a growing literature arguing that innate managerial characteristics (sometimes referred to as "manager fixed effects")

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affect corporate policies, there has been little attention devoted to investigating the decision to employ senior executives with professional experience and specialized expertise (Dittmar and Duchin 2016). Furthermore, researchers know very litttle about whether and how an executive's professional tax expertise influences corporate business strategies, financial policies, or firm performance. In this study, we provide empirical evidence identifying the factors associated with including experienced tax professionals in the senior management team and present evidence that, after controlling for these factors, the presence of a tax-savvy executive is associated with significantly lower subsequent GAAP and cash effective tax rates. In supplemental tests, we also find some evidence that the presence of tax expertise in senior management is associated with improved internal information quality and influences other nontax corporate policies.

Corporate taxes provide a unique setting for examining the consequences of including executives with specialized experience in senior management. Specifically, taxes are one of the largest expense items on the income statement and are therefore highly visible to investors and regulators. Taxes are also very complex and present several important empirical puzzles that mystify academic researchers. For example, a significant number of companies appear to avoid taxes over long periods, whereas other comparable firms consistently pay higher taxes (Dyreng et al. 2008). Does (the lack of) tax expertise in the senior management team contribute to this puzzle? Dyreng et al. (2010) present evidence that specific executives have an incremental effect on tax outcomes that cannot be explained by individual or firm characteristics. Moreover, integrating tax consequences into business strategy requires a high level of financial sophistication and legal expertise that have been acquired by few senior executives.[1] Thus investigating the prevalence and factors associated with the placement in the senior management team of an executive with significant tax experience could provide new insights into how expertise in general influences corporate financial policies.

The need to integrate tax considerations in the formation of corporate financial policies has been substantial and has been building over time. For example, Carl Allegretti, chairman and CEO of Deloitte Tax, LLP recently stated: "Because the implications of tax affect the financial and strategic decisions of many organizations, tax issues are capturing the attention of C-suite executives and boards" (*The Wall Street Journal* 2015). Despite the increasing demand for tax knowledge on the senior management team, few senior executives have the time and background necessary to develop tax-specific knowledge and relevant experience. Indeed, professional tax experience and expertise appears to be a scarce resource in the executive labor market. A recent survey conducted by Tax Talent Inc. reveals 94% of the respondents suggest that it is "moderate" to "very difficult" to find such talent.[2]

[1] For example, see http://deloitte.wsj.com/cfo/2013/10/15/opening-the-black-box-five-questions-for-your-tax-executive/. In this way, our examination of significant tax experience moves beyond personality characteristics or managerial style and captures years of training and experience, which allows the executive to contribute a unique and sophisticated perspective on the implications of different tax positions and how such positions can affect outcomes.

[2] See https://media.taxtalent.com/2017%20Tax%20Hiring%20Outlook.pdf. Further, although this article refers specifically to staffing within corporate tax departments, it suggests it is likely even more difficult to employ tax expertise within senior management teams. Indeed, a Deloitte partner stated: "Generally, the talent pool at lower levels—entry and staff levels—is still adequate, but the talent pool at the leadership level is extremely challenged. In some major markets, tax leadership jobs have stayed unfilled for up to a year because of an inability to find the skillset companies seek" (*The Wall Street Journal* 2015).

Tax-savvy senior executives could be attractive to certain top management teams for a number of reasons. First, the detailed understanding of tax law and tax-related industry experience acquired by tax-savvy executives translates into a better command of the financial implications of operational and strategic decisions as well as financial reporting consequences. Such detailed knowledge and experience provides tax-savvy executives with the ability to identify and integrate tax saving opportunities into business strategies and translate these opportunities into improved financial results. Moreover, evidence in the psychology literature, and recent accounting and finance literature suggests that a manager's professional experience impacts corporate outcomes (Dittmar and Duchin 2016; Hoitash et al. 2016).

Second, a senior management team that includes managers with significant tax experience is more likely to establish a tax-sensitive "tone-at-the-top" that emphasizes the importance and financial implications of tax outcomes. Their professional experience can bind strong preferences that root into a manager's style, which can significantly influence firm policy (Bertrand and Schoar 2003; Bamber et al. 2010; Dyreng et al. 2010). Third, a senior management team with significant tax experience facilitates more effective and efficient internal communications on tax and accounting matters, which can translate into improved efficiency (Gallemore and Labro 2015). In addition, their experience can expedite better communication with external tax service providers, thereby contributing to better use of planning resources. In sum, we expect tax-savvy executives to be attractive to firms because they can facilitate and explore opportunities to improve tax and financial reporting results.[3]

To investigate which firms include tax-savvy individuals in senior management, we begin by examining the employment history of the individuals serving as senior managers from 1994 through 2014 as identified by BoardEx. We then construct a sample of individuals having significant (manager-level or higher) tax experience.[4] Such experience is derived from managing tax departments of private or public companies and tax practices in Big Four accounting firms or tax law firms, where the executive has performed at the manager or partner level. Importantly, because tax-savvy executives are scarce in the executive labor market and their tax knowledge can translate into economic benefits to firms, we do not expect tax-savvy executives to be randomly distributed across firms. Instead, we investigate factors associated with the presence of a tax-savvy senior executive, and we then connect this presence to tax outcomes. Importantly, to capture a more salient effect of such expertise on tax outcomes, our empirical analysis centers on the presence of tax expertise within the senior management team.

[3] We examined 8-K disclosures surrounding the hiring of tax-savvy executives to identify specific instances that firms recognize the benefits of tax expertise in new hires. A number of companies explicitly mention the importance and benefits of hiring executives with significant tax experience. For example, GT Solar International Inc. states in its February 9, 2010 8-K filing that the new CFO "brings extensive financial control and international tax experience." Pendrell Corporation, in its September 3, 2014 8-K filing, highlights the extensive tax experience of its new CFO and suggests the tax expertise will "serve us well as we continue to expand our business through organic growth and strategic transactions."

[4] Examples of actual past titles include assistant tax manager, assistant director of tax, assistant vice president (VP) of tax, chief tax officer, controller-tax, corporate director-tax, head of tax, manager-tax, senior director-tax, senior manager-tax, senior VP-tax, tax partner, VP-general tax counsel, VP-tax, treasurer-tax.

Because of the high demand and the relative scarcity of individuals qualified for top management, acquiring tax-savvy executives is not likely to be costless, and we expect that firms vary in the ability of senior managers to recognize the need for significant tax experience in the senior management team. Thus we conduct the empirical tests in two stages. First, we begin by investigating the factors associated with the presence of a tax-savvy executive on the senior management team. We explicitly predict that tax burdens relative to industry peers, firm resources, recent financial performance, network connections, and geographic proximity to areas with larger concentrations of tax talent can have a meaningful impact on having a tax-savvy executive on the senior management team. We identify and evaluate a sample of 653 tax-savvy executives hired into senior management positions in the U.S. labor market from 1994 to 2014. We then estimate logit regressions to identify the factors that are associated with firms employing tax-savvy executives. We find a firm is more likely to have a tax-savvy executive on the senior management team when the firm is larger, is multinational, has recent acquisitions, has lower profitability, has lower effective tax rates than industry peers, and has greater access to tax talent.

In the second stage of our study, we investigate whether including tax-savvy executives in senior management is associated with subsequent financial performance. To address endogeneity concerns in this analysis, we use propensity-score matching to construct a sample of firms with similar observable characteristics. Importantly, we match a firm that has hired (for the first time) a tax-savvy executive to a firm that has never done so during our sample period but has recently hired a (nontax-savvy) senior executive. We find firms led by tax-savvy senior executives subsequently exhibit at least a 1.6 percentage point lower GAAP effective tax rate and at least 2.1 percentage point lower cash effective tax rate, compared to a control sample of firms that have recently experienced a change in the top management team and that otherwise appear similar on all relevant observable characteristics. Given pretax income of $795 million for our matched sample of firms, a 1.6 (2.1) percentage point lower subsequent GAAP (cash) effective tax rate roughly translates into an average $12.72 ($16.70) million reduction in tax expense (cash taxes paid). This result is economically significant and robust to the inclusion of firm fixed effects (untabulated), thereby ruling out the possibility that innate, time-invariant, unobservable firm characteristics may be driving these empirical patterns.

We then isolate a mechanism through which tax-savvy executives can lower their firm's effective tax rate. Specifically, we observe that the lower subsequent effective tax rates among tax-savvy executives' firms are associated with a greater usage of material subsidiaries in tax haven countries and low tax foreign jurisdictions after the tax-savvy executive is added to the senior management team. Finally, supporting our main result and consistent with the results of Dyreng et al. (2010), we report that effective tax rates and their corresponding mechanisms (foreign subsidiaries in low tax jurisdictions) rebound after the departure of a tax-savvy senior executive. This latter result helps to rule out the possibility that our results are attributable to some unobserved event that merely coincides with the presence of a tax-savvy executive.

Note that our focus on the presence of tax experts in senior management encompasses both the hiring and retention of these individuals. Thus presence can be viewed as more inclusive than merely examining the act of hiring. Further, our relatively small sample of senior executives with extensive tax experience precludes an extensive

examination of the factors leading firms to add a tax expert to senior management. In supplemental tests, we illuminate this issue and explore which pre-existing firm characteristics matter in acquiring tax expertise by estimating a fixed effects logit and report results largely consistent with our primary results. However, because this model identifies only additions, we view it as less complete than a presence model. Nevertheless, we acknowledge that our determinants model emphasizes presence, not explicit hiring events, and we caution the reader from overgeneralizing our results to a hiring model.

Our paper broadly relates to several concurrent studies. First, Jiang et al. (2020) investigate the effects of hiring former IRS employees on corporate tax outcomes. Our study differs from theirs by considering a broader set of tax experience, and we examine why firms employ senior executives with significant professional tax experience and how these individuals can impact subsequent tax outcomes. Second, Chen et al. (2019) examine how the size and mix of the internal tax function can benefit firms in tax planning, and Ege et al. (2020) employ social hierarchy theory to examine how the power and status of the tax function can affect tax outcomes. Our study differs from these studies by examining the determinants of adding tax expertise to the executives in the top management team. Recent evidence also shows that firms have different preferences in using the internal tax department and external auditor-provided tax services as well as whether external tax services complement or substitute for the internal function (Klassen et al. 2016). This suggests that corporate investment in tax expertise is likely to vary across firms, and advancing understanding in this area would be a particularly useful endeavor. In addition, other than Jiang et al. (2020), who focus on IRS experience, none of these studies explore *why* firms employ managers with tax experience. Moreover, none of them examine how effective tax rates are lowered.

Our study offers several contributions to the literature. First, the literature has identified associations between tax outcomes and executive movement across firms (Dyreng et al. 2010), managerial ability (Koester et al. 2017), gender (Francis et al. 2014), military experience (Law and Mills 2017), religious preferences (Dyreng et al. 2012; Boone et al. 2013), and personality characteristics (Chyz 2013; Kubick and Lockhart 2017; Olsen and Stekelberg 2016). However, all of these studies are based on the premise that some observed innate characteristic of the manager is reflected in a tax outcome. For example, Law and Mills (2017) argue that managers with military experience are less tax aggressive because their experience imparts a belief in the legitimacy of government structures and an enhanced belief in honor and integrity. Unfortunately, none of these studies have been able to connect innate managerial characteristics directly to income tax expertise or experience, and, to our knowledge, no study has examined why firms sometimes employ tax experts in senior management positions. Hence, while the effect of actual managerial experience or expertise on tax policies is implied by the literature, this conjecture is actually untested. In this study, we go beyond innate characteristics to provide the first direct test for whether significant professional expertise affects corporate outcomes.[5]

[5] Studies in finance have begun to show that specific managerial experience influences corporate outcomes. For example, Field and Mkrtchyan (2017) demonstrate that acquisition experience is associated with current corporate acquisitions and performance. Likewise, Schoar and Zuo (2017) demonstrate that managers who have experienced a recession are more likely to enforce conservative financial policies, such as lower leverage ratios.

Second, given the emphasis in our study on the determinants of employing tax-savvy senior executives, we offer new insights into factors associated with the addition of tax expertise in the senior management team. Our empirical patterns reveal differences in firms' ability and motivation to staff tax-talent in the senior management team. We find that the likelihood of employing a manager with tax expertise is associated with the size and past performance of the firm, connections to other firms, geographic proximity to tax talent, and the level of effective tax rates relative to industry peers as well as other firm characteristics. These insights could be particularly useful for future research seeking to advance understanding of the broader effects of professional expertise on corporate policies and outcomes as well as potential indicators for changes in future tax outcomes.

Third, we can identify a distinct characteristic of senior management (tax-related experience) that matters for corporate tax policy, and, in doing so, we answer a specific call of Hanlon and Heitzman (2010) to further examine the "manager effect" in corporate tax outcomes. Our study also helps reveal the consequences of bringing specialized expertise and experience into the senior management team. In this way, our study complements research examining how managerial experience in general (but not specialized expertise) affects corporate outcomes (e.g., Bertrand and Schoar 2003; Bamber et al. 2010; Dyreng et al. 2010; Schoar and Zuo 2017). Lastly, our findings should inform corporate boards as well as stakeholders outside the senior management team involved in making or analyzing decisions regarding the composition of the senior executive team.

2 Hypothesis development

2.1 Professional experience of executives

Professional experience constitutes a central piece of a senior executive's qualifications and competence. Barnard (1938, p. 38) describes experience as the memories and conditioning that jointly determine present behaviors. Experience assigns a meaning to the adaptation of human behaviors rather than a simple "response" to current conditions. Moreover, the professional experience of senior executives could profoundly affect the way they manage their firms.

The growing literature on managerial characteristics suggests that executives are not homogeneous. Instead, they have distinct "styles" in managing their firms, which can have a significant impact on firm policies (Bertrand and Schoar 2003). Bamber et al. (2010) argue managers have unique voluntary disclosure styles and suggest such differences in style are associated with some demographic characteristics and personal backgrounds. In a tax setting, Dyreng et al. (2010) document that individual top executives have incremental effects on effective tax rates beyond firm-level characteristics. However, they cannot tie the differences in these managers' individual effects to general observable characteristics of executives (e.g., age, gender, or educational background). This emerging literature suggests that the neoclassical view that executives are homogenous inputs might not hold and that significant heterogeneity in firm policies exists as a result of different management styles.

While much of the attention in the literature has been devoted to examining the outcomes of different management styles, exploring why executives behave differently in the first place has largely been unaddressed. With regard to tax outcomes, recent research has drawn some connections to gender (Francis et al. 2014) and personality traits (Olsen and Stekelberg 2016). However, these characteristics are fixed, and it can be difficult to isolate how they influence tax outcomes. Law and Mills (2017) find that firms led by CEOs with military backgrounds engage in less tax avoidance, arguing that these CEOs "share common values related to government legitimacy and government allegiance." However, such innate factors are distinct from the education, professional qualifications, experience, and competence of senior executives. In this paper, we focus on a direct but overlooked factor shaping corporate tax outcomes—the professional experience of senior executives.

The literature has examined whether the total years of experience and qualifications of CFOs are associated with firm outcomes. For example, Aier et al. (2005) show that the financial expertise (measured by years of experience) of CFOs is negatively associated with accounting restatements. Li et al. (2010) find that firms with more experienced CFOs (more years of experience and having a certified public accountant license) are less likely to receive adverse internal control opinions. Collectively, these studies suggest that CFO experience helps determine financial reporting quality.

Brochet and Welch (2011) report that top executives (CEOs and CFOs) with prior valuation experience (investment banking, private equity, venture capital, or management consulting) record goodwill impairments more frequently and in smaller scales. Hoitash et al. (2016) suggest that CFOs with accounting experience are conservative in corporate policies and exhibit greater risk aversion. Dittmar and Duchin (2016) argue CEOs who have led distressed firms tend to borrow less, hold more cash, and invest less than other firms, particularly in poorly governed firms. These studies broadly suggest that senior executives' professional experience can impact their behavior and company policies, thus affecting their performance and corporate outcomes.[6]

Interestingly, the tax literature is generally silent about the effect of employing executives with specific types of professional experience.[7] We posit that assuming executives with specific professional experience are distributed randomly among firms is implausible. For example, Li et al. (2010) find that, after firms receive adverse internal control opinions in 2005, they are more likely to employ CFOs with better qualifications and greater professional experience. These results suggest that firms alter the weight they place on the professional experience of executives in employment decisions as part of an overall commitment to a specific strategy, such as better financial reporting. In a similar spirit, our aim is to examine the factors that determine the presence of executives with significant tax experience in senior management and whether having this expertise affects firm outcomes.

[6] Some studies have connected the experience of board members to specific outcomes, such as bank performance and risk-taking (Ahmed et al. 2019; Minton et al. 2014) and corporate acquisitions (Field and Mkrtchyan 2017).

[7] An exception is the work of Abernathy et al. (2016), who examine the effect of corporate general counsel in the top management team on tax outcomes.

2.2 Empirical predictions

2.2.1 Determinants of having significant tax expertise on the senior management team

Our initial data screening reveals the scarcity of tax experience in the senior executive labor market. Given the increasing demands for tax knowledge in senior management, we conjecture that the presence of tax-savvy executives will largely be determined by the strength of the corporate incentives to employ executives with tax experience as well as the availability of tax talent. Exploring these factors provides some insights into the potential trade-offs firms are making in their senior management staffing decisions.

Firms with strong incentives to reduce tax expense might be more inclined to employ a tax-savvy executive. For example, firms facing greater tax burdens than industry peers might face pressure to conform to industry norms (Zhang and Rajagopalan 2003; Kubick et al. 2015).[8] To do so, they could search for tax talent in the executive labor market to include tax expertise in senior management. Alternatively, firms could recognize the importance of having in-house tax expertise in the senior management team as part of an effort to maintain or even enhance their tax positions. Ultimately, whether previous tax outcomes are positively or negatively associated with the presence of tax expertise in the senior management team is an empirical question.

Although it is unclear how firm size influences tax outcomes (e.g., Zimmerman 1983; Porcano 1986), the size of the firm can be a significant factor in employment decisions. Larger companies usually have more resources available to retain talent, and their prominence could attract labor market candidates (Guthrie and Datta 1997). Given that larger companies have more resources available to invest in human capital, we expect larger firms are more likely to retain tax-savvy executives in the executive labor market.

Operating performance also impacts firm employment decisions (Dalton and Kesner 1985; Datta and Guthrie 1994; Guthrie and Datta 1997). For example, facing the pressure of poor operating performance, management might seek tax-related avenues to boost earnings by managing the income tax accounts (e.g., valuation allowances, reserve for uncertain tax positions) or minimizing tax expense through tax planning (Cook et al. 2008; Hanlon and Heitzman 2010). To this end, senior management might need to have tax expertise on the senior management team. Alternatively, firms with positive operating performance could have stronger incentives to have tax-savvy executives to identify and exploit tax saving strategies to further improve operating profits and liquidity. Finally, acquisitive and multinational firms may have a greater need for tax expertise on the senior management team to navigate the tax implications of acquisitions activity as well as operating in multiple jurisdictions.

While industry pressures, firm resources, and performance can affect the demand for tax expertise, factors affecting the supply of tax talent can also affect a firm's ability to acquire and retain tax expertise. In particular, network connections can affect firms' employment decisions (Williamson and Cable 2003), and research has shown that greater connections to other companies improve access to information on tax outcomes (Brown 2011; Brown and Drake 2014; Jiang et al. 2020). Specifically, connections to

[8] The strategic conformity theory in the management literature suggests that firms tend to conform their strategies to their competitors and industry norms (e.g., Finkelstein and Hambrick 1990).

other companies could impact the propensity to employ tax-savvy executives via at least two channels. First, when the connected firms have tax-savvy executives on the senior management team, this information may diffuse via connections and cause a firm to seek similar candidates in the labor market. Second, greater information access to other firms may help acquire tax talent directly from the connected firms.

Similarly, the geographic location of firms' headquarters also helps determine employment decisions (Yonker 2017). From the firm's perspective, proximity to concentrations of tax talent could increase the chance to acquire and retain tax talent in senior management. Therefore we expect that firms located closer to tax talent are more likely to employ a tax-savvy executive. In sum, the factors discussed above influence the incentives and the abilities of firms to employ tax-savvy executives. We broadly state this research question as our first hypothesis, as follows.

H1: The presence of tax-savvy senior executives relates to the firm's incentives and ability to employ these individuals.

In the empirical tests that follow, we test each one of these specific factors. Thus, we state H1 more explicitly, as follows.

H1a: The presence of tax-savvy senior executives relates to the firm's tax burden relative to industry peers.
H1b: The presence of tax-savvy senior executives relates to firm size.
H1c: The presence of tax-savvy senior executives relates to operating performance.
H1d: The presence of tax-savvy senior executives relates to acquisition activity and multinational operations.
H1e: The presence of tax-savvy senior executives relates to the firm's network connections.
H1f: The presence of tax-savvy senior executives relates to the firm's proximity to geographic areas with larger concentrations of tax talent.

2.2.2 Consequences of having significant tax expertise on the senior management team

After examining the potential determinants of employing tax-savvy executives on the senior management team, we explore whether the first-time presence of executives with tax expertise in senior management influences tax and financial outcomes. We expect that the addition of senior executives with significant tax experience will influence a firm's tax outcomes for the following reasons. First, tax-savvy executives have managerial experience in managing the tax function. Such pertinent experience provides senior management with a more detailed understanding of the tax law and its implications on operational and strategic decisions. The expertise that tax-savvy executives bring could assist senior management to better understand the implications of specific tax positions. Further, tax experience could help senior management to be more directly involved in identifying and exploring tax saving opportunities for operational and strategic decisions. The literature has begun to connect broad experience to corporate outcomes (e.g., Aier et al. 2005; Li et al. 2010; Hoitash et al.

2016). In a similar vein, we conjecture that the tax experience of senior executives can influence their firms' financial (i.e., tax) outcomes.

Second, because tax-savvy executives understand the tax implications of operations and business strategies better than executives with generalist backgrounds, a senior management team with a tax-savvy executive is more likely to recognize the importance of tax planning and possibly place greater emphasis on certain tax outcomes. In this way, a tax-sensitive tone-at-the-top is more likely to form in a senior management team with a tax-savvy executive. Bamber et al. (2010) and Dyreng et al. (2010) argue that tone-at-the-top significantly influences several corporate policies and outcomes, including taxes. Thus we expect that the executives' tax-related experience will impact the tax outcomes of their firms.

Third, having senior executives with significant tax experience will likely improve communication on tax matters, both internally among senior management and externally with tax service providers. Corporate tax positions can involve complex strategies that are difficult to interpret, understand, and implement. Tax expertise in senior management is likely to improve the communication efficiency on such issues. Gallemore and Labro (2015) provide some empirical support for this conjecture, showing that better internal communication efficiency is associated with lower cash effective tax rates. In addition, many companies also use external tax services, from either auditors or non-auditors (Klassen et al. 2016). The communication efficiency between senior management and external tax service providers is important for tax outcomes, as communication among different organizations can be costlier than within an organization, due to differences in organizational culture and style. Therefore we expect that firms with tax-savvy senior executives better communicate about tax matters, which can influence tax outcomes. Thus we state our second hypothesis as follows.

H2: Tax-savvy senior executives influence the subsequent tax policies of their firms.

3 Methodology

3.1 Sample

Our sample is constructed in two stages. First, as we discuss in detail in the next section, we use the BoardEx senior management and disclosed earners employment history file to identify senior managers with significant tax experience. Second, we determine the portion of our sample with publicly available data from the intersection of the BoardEx and Compustat databases, spanning fiscal years 1994 through 2014. We limit our sample to years from 1994 onward following the effective date of Statement of Financial Accounting Standards (SFAS) 109 (codified in ASC 740).[9] Our sample period ends in fiscal year 2014, the last fiscal year for which we have complete data when this study was initiated. Consistent with prior research, we eliminate firm-year observations with negative pretax income, income tax expense, or cash taxes paid as

[9] SFAS 109 became effective for fiscal years beginning after December 15, 1992. Compustat assigns fiscal year 1993 if a firm has a fiscal year start during June–December 1992. To make consistent inferences, we begin the sample period in fiscal year 1994.

loss firms are in a fundamentally different tax planning position, relative to profitable firms.[10]

3.2 Tax expertise

Our objective is to identify firms with senior managers who have significant tax experience. BoardEx follows the careers of senior executives and provides a history, which enables us to observe where and in what capacity senior executives worked before joining senior management.[11] We begin the identification process by searching the BoardEx senior management employment history file for any positions with the keyword "tax" or "taxation" in the "role" and "role description" fields. Then we visually inspect all identified positions to ensure they are tax related. For example, some positions, such as investment manager for tax-exempt bonds, do not involve specific tax knowledge, so we exclude such observations. Next, we classify all tax-related positions into two categories: junior level (e.g. tax associates or tax accountants) and managerial level or above (e.g. manager, partner, or director). Although junior-level positions involve some tax specific knowledge, we limit our focus on significant tax experience at the managerial level or above, as we expect this experience to be more attractive to firms seeking tax expertise on the senior management team. Further, tax professionals at the managerial level or above are predominantly involved in complex tax practices, which are likely to build their skills in tax-advisory and tax-planning roles, which could be particularly useful in senior management positions.

From this procedure, we can identify 1388 individuals who meet the definition of having managerial level or above tax experience. However, not all of these individuals become executives in senior management at a domestically incorporated and publicly traded firm.[12] We find that some of these individuals hold senior management-level tax positions at public companies (e.g., "corporate tax director," "vice president – taxation," "chief tax counsel," and "chief tax officer"), and some of these individuals accept positions beyond tax-specific roles (e.g., "vice president – finance," "controller," "treasurer," "chief accounting officer," "CFO," "CEO"). We consider a firm to have tax expertise in senior management if it reported an experienced individual in a senior management role (including both tax and nontax roles).

Table 1 Panel A lists the position titles that we classified as indicating significant tax experience, and we find that 653 out of these 1388 individuals took positions in the senior

[10] We include financial and utilities industries, as tax expertise could also have a significant effect for firms operating in these industries. However, we continue to observe qualitatively similar results if we remove these industries from our sample, albeit with a smaller sample of tax-savvy executives.

[11] According to BoardEx, as of February 2016, it has "fully profiled" almost every publicly listed companies' and most notable private companies' directors and senior managers (for over 18,000 firms). It has included the entire employment history of directors and managers, as long as that information can be gathered from a reliable source. To the extent that some managers' prior tax experience is not picked up by BoardEx or that some managers with senior-level tax expertise may be present within a firm but not classified as "senior," this would work against finding results.

[12] We identify senior managers as those with titles of CEO, CFO, treasurer, controller, accounting or finance officer, corporate vice presidents, and corporate directors. We hand check the titles to confirm they are indeed senior executive titles.

Table 1 Previous and current position titles

Panel A: Position titles used to identify individuals with significant tax experience

Titles	Public Company	Private Company	Accounting/ Law Firm	Total
Chief Tax Officer	8	3	–	11
Director-Tax	142	44	–	186
Head of Tax	3	2	2	7
Principal/Partner	–	3	24	27
Tax Counsel/General Tax Counsel	34	9	–	43
Tax Manager/Senior Tax Manager	76	48	89	213
(Assistant) Treasurer/Controller*	12	2	–	14
(Assistant) Vice President – Tax	128	20	–	148
Others*	4	–	–	4
Total (number of individuals)	407	131	115	653

Panel B: Titles of positions held by tax-savvy senior executives in main sample

Current Title	Observations	Percentage
CEO/President	6	0.9%
CFO	170	26.0%
Chief Accounting Officer	27	4.1%
Chief Administration Officer	1	0.2%
Chief Compliance Officer	2	0.3%
Chief Tax Counsel	18	2.8%
Chief Tax Officer	16	2.5%
Comptroller/Controller/Treasurer	104	15.9%
Director/Senior Director - Treasury	2	0.3%
Director/Senior Director - Finance	5	0.8%
Director/Senior Director - Tax	37	5.7%
Head of Tax	1	0.2%
Secretary	6	0.9%
VP/Senior VP - Accounting	21	3.2%
VP/Senior VP – Finance	21	3.2%
VP/Senior VP – Tax	216	33.1%
Total	653	100.0%

Table 1 (continued)

Panel C: Titles of position held by tax-savvy senior managers in matched sample		
Current Title	**Observations**	**Percentage**
CFO	45	18.8%
Chief Accounting Officer	10	4.2%
Chief Operating Officer	1	0.4%
Chief Tax Counsel/Officer	7	2.9%
Comptroller/Controller	23	9.6%
Director-Accounting	1	0.4%
Director-Finance	1	0.4%
Director-Financial Reporting	1	0.4%
Director-Tax	37	15.4%
Secretary	1	0.4%
Treasurer	30	12.5%
VP-Accounting	1	0.4%
VP-Acquisitions	1	0.4%
VP-Finance	9	3.8%
VP-Internal Audit	1	0.4%
VP-Internal Control	1	0.4%
VP-Investor Relation	1	0.4%
VP-Risk Management	1	0.4%
VP-Tax	68	28.3%
Total	240	100.00%

management team at domestically incorporated public companies for which we have data.[13] These 653 tax-savvy executives are distributed across 626 unique firms, reflecting that some firms have employed more than one tax-savvy executive. Some of these tax-savvy executives also have worked at multiple firms. We use this sample of 653 tax-savvy executives at 626 unique firms to examine the determinants of having a tax-savvy executive in the senior management team (H1). Our first stage analysis, after requiring further data availability of our first-stage predictors (e.g., stock return volatility from CRSP), consists of 1939 firm-year observations that have at least one tax-savvy executive in senior management. In our second set of tests, we use propensity-score matching to examine the effect of first-time employment of tax expertise on the senior management team on subsequent tax outcomes (H2). This latter test results in a smaller matched sample of 232 tax-savvy executives at 240 unique firms. Table 1 Panel B lists the senior management titles of the tax-savvy executives used to test H1, and Panel C lists senior management titles of the matched sample of tax-savvy executives used to test H2.

Table 2 Panel A reports demographic characteristics obtained directly from BoardEx for our sample of 653 tax-savvy executives. Over 10% of these individuals have an

[13] Some corporate titles did not explicitly identify the position as a "tax" position. However, we classified it as a tax position if the BoardEx description of the position indicated that the individual had responsibility over the corporate tax function. Likewise, we classified division titles, such as division CEO/CFO/president/secretary, consistently with corporate titles.

Table 2 Demographic characteristics of tax-savvy executives

Variable	*N*	Mean	Std. Dev.	Min	Quartile	Median	Quartile	Max
Panel A: Tax-savvy executives in sample for test of H1								
MBA	653	0.12	0.32	0.00	0.00	0.00	0.00	1.00
Other Master's Degree	653	0.16	0.37	0.00	0.00	0.00	0.00	1.00
Law Degree	653	0.07	0.25	0.00	0.00	0.00	0.00	1.00
CPA	653	0.53	0.50	0.00	0.00	1.00	1.00	1.00
Female	653	0.17	0.38	0.00	0.00	0.00	0.00	1.00
Military	653	0.01	0.10	0.00	0.00	0.00	0.00	1.00
Age	653	50.70	7.04	30.00	46.00	51.00	55.00	82.00
Tenure at firm	653	5.41	3.89	1.00	3.00	4.00	7.00	28.00
Tenure in tax	653	13.90	8.44	1.00	7.00	13.00	19.00	43.00
Serves on board	653	0.26	0.44	0.00	0.00	0.00	1.00	17.00
# of board seats	169	2.37	2.37	1.00	1.00	1.00	3.00	17.00
Panel B: Tax-savvy executives in sample for test of H2								
MBA	240	0.14	0.35	0.00	0.00	0.00	0.00	1.00
Other Master's Degree	240	0.19	0.39	0.00	0.00	0.00	0.00	1.00
Law Degree	240	0.06	0.24	0.00	0.00	0.00	0.00	1.00
CPA	240	0.46	0.50	0.00	0.00	0.00	1.00	1.00
Female	240	0.17	0.38	0.00	0.00	0.00	0.00	1.00
Military	240	0.01	0.07	0.00	0.00	0.00	0.00	1.00
Age	240	47.90	7.33	31.00	43.00	48.00	53.00	78.00
Tenure at firm	240	4.02	2.83	1.00	2.00	3.00	5.00	21.00
Tenure in tax	240	11.94	8.22	1.00	5.00	10.00	17.00	35.00
Serves on board	240	0.24	0.43	0.00	0.00	0.00	0.00	1.00
# of board seats	58	2.66	2.55	1.00	1.00	1.00	3.00	14.00

MBA degree or other graduate degree. Approximately 7% have a law degree, and over half of these individuals hold a certified public accountant (CPA) license. Seventeen percent of these individuals are female, and the average age is 51 years. These individuals have nearly 14 years of tax experience and stay at their firm in a senior management role for an average of 5.4 years. Approximately 26% of these individuals also hold board positions at other firms. Among this subset of manager-directors, the average individual holds over two board seats. We observe similar patterns within our smaller matched sample of 240 first-time tax-savvy hires in Panel B of Table 2.

Figure 1 depicts the number of tax-savvy executives by state. Not surprisingly, we observe more tax-savvy executives from states with large urban populations, such as California, New York, and Texas. Figure 2 depicts the percentage of firms that have acquired a tax-savvy senior executive in top management. Note that these figures show the number and density (expressed as a percentage of tax-savvy firms) across states. Thus the bar in California, for example, depicts the number and percentage of firms within the state of California (which could include a number of different cities) that have tax expertise in the senior management team. Examining the distribution of

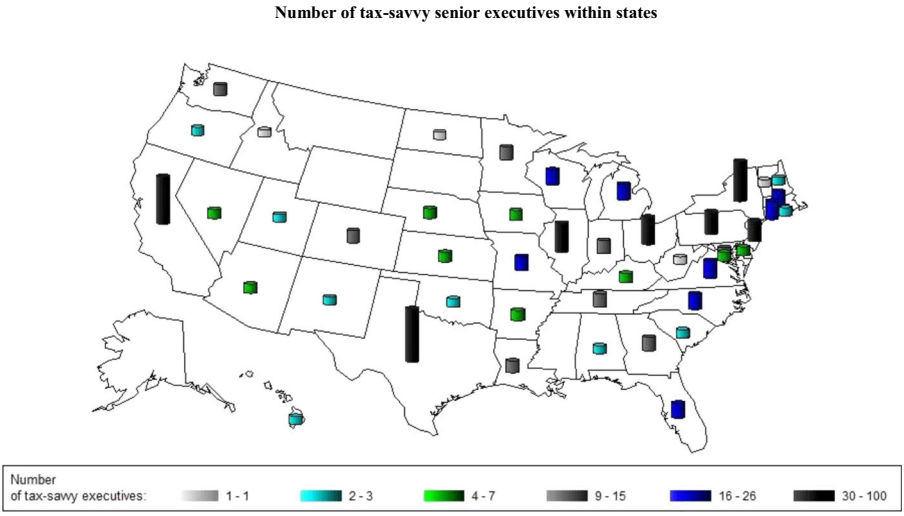

Fig. 1 Number of tax-savvy senior executives within states

percentages of tax-savvy firms across states, we observe at least 9.7% of our sample firms in Connecticut, Washington D.C., Hawaii, Louisiana, Missouri, Nebraska, New Mexico, North Dakota, and Ohio have a tax-savvy executive in senior management. Not surprisingly, we observe smaller percentages in California, Texas, and New York, as these states have a greater concentration of firms, resulting in a smaller percentage of tax-savvy firms within these states.[14] Overall, these figures provide some evidence of the geographic dispersion of the percentage of firms with tax-savvy senior executives.

3.3 Tax outcomes

In addition to examining the factors associated with the presence of sophisticated tax-experienced executives on the senior management team, we examine whether these tax-savvy executives impact subsequent tax outcomes. To this end, we consider two primary outcomes: the book effective tax rate (*ETR*) and the cash effective tax rate (*CETR*). We focus on the book effective tax rate, as a growing stream of literature shows substantial managerial attention devoted toward lowering tax expense, which increases reported earnings (Robinson et al. 2010; Armstrong et al. 2012; Graham et al. 2014). To complete the analysis, we also consider alternative tax outcomes based on cash taxes paid. However, these metrics, though potentially important to managers (Dyreng et al. 2008), may be less important than metrics that directly affect reported earnings. Hence we follow the guidance set forth by Hanlon and Heitzman (2010) and focus on measures of tax outcomes that we believe are most appropriate for our specific

[14] To assess the extent to which the distribution of tax-savvy firms overlaps the distribution of religious concentrations observed in prior research, we follow Dyreng et al. (2012) and Boone et al. (2013) and collect and measure the religiosity for each state from the Association of Religion Data Archives. We find that the presence of tax-savvy executives in senior management is negatively correlated with religiosity (Pearson correlation = −0.026; p value <0.01). In supplemental tests discussed later, we find that religiosity does not significantly explain the presence of tax-savvy executives in the senior management team.

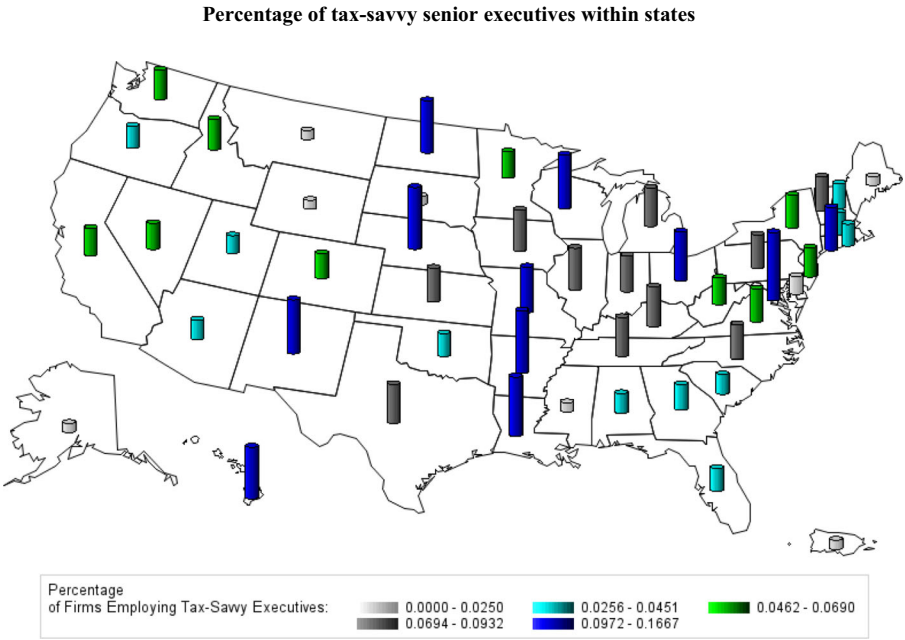

Fig. 2 Percentage of tax-savvy senior executives within states

setting. *ETR* equals total income tax expense divided by worldwide pre-tax earnings (Compustat TXT/PI), whereas *CETR* equals total taxes paid divided by worldwide pre-tax earnings (Compustat TXPD/PI). Consistent with prior research, we constrain *ETR* and *CETR* lie between zero and one to ensure a valid economic interpretation.

3.4 Empirical methodology

3.4.1 Determinants of the presence of tax expertise in senior management

Our study consists of two parts. First, we model the determinants of having a tax-savvy executive on the senior management team. Second, we use the first-stage model to form matched pairs using propensity-score matching to investigate the effects of significant tax experienced executives in the senior management team on subsequent tax outcomes. For the first-stage model, we estimate the following logistic regression.

$$\begin{aligned} TAX\_EXP_{i,t} = {} & \alpha + \beta_1 ETR\_ADJ_{i,t-1} + \beta_2 SIZE_{i,t-1} + \beta_3 TURNOVER_{i,t} + \beta_4 RETURN_{i,t-1} \\ & + \beta_5 VOLATILITY_{i,t-1} + \beta_6 ROA_{i,t-1} + \beta_7 FIRM\_CONNECTION_{i,t} \\ & + \beta_8 log(Distance\ to\ DC)_{i,t} + \beta_9 TEI_{i,t} + \beta_{10} AQC_{i,t-1} + \beta_{11} MNE_{i,t-1} + \varepsilon. \end{aligned} \tag{1}$$

TAX_EXP is a dichotomous variable taking a value of one if the firm has a tax-experienced executive in senior management and zero if the firm has never had such an executive.[15] Thus we are examining the cross-sectional determinants of

having a tax-savvy executive in senior management, compared to firms that have never employed tax expertise in senior management.[16] To allow such tax experienced executives to make a difference in corporate tax policies, we require them to hold their senior positions at least one full year before this indicator equals one.[17] To examine the incentives to include tax-experienced executives in senior management, we include a fiscal year, size and industry-adjusted GAAP effective tax rate measure of the prior year (*ETR_ADJ*).[18] We remain agnostic as to the sign of *ETR_ADJ* in the first-stage model, because, as discussed previously, both high tax burden firms and tax aggressive firms could have incentives to employ tax experienced executives.[19]

We include several variables capturing the ability of firms to have tax-savvy executives in senior management. Firm connections could impact the propensity to have tax experienced executives via at least two channels. First, when connected firms have tax experienced executives on the senior management team, this information may diffuse via shared directors and cause the focal firm to seek similar candidates in the labor market. Alternatively, access to other firms may help identify tax talent directly from connected firms. *FIRM CONNECTION* equals the number of firms connected by concurrently shared directors or senior management who also sit on another company's board.

We include two geographically based variables to broadly capture access to tax talent. We expect a concentration of tax talent in the Washington D.C. metro area, as all Big Four accounting firms have their national tax practices there, which are tax technical teams dealing with the most challenging and complex tax matters.[20] In addition, both the IRS headquarters and the U.S. Tax Court are located there, along with many leading tax law firms and tax policy organizations. Therefore, we include the distance between the firm's headquarters and Washington D.C. (*log Distance to DC*) as a broad proxy for the access to tax talent. To account for the geographic dispersion of local tax talent as well as the proximity to tax-related information channels (Kubick et al. 2017), we also include *TEI*, an indicator variable that equals one if there is a local Tax Executives Institute ("TEI") chapter within 25 miles.[21]

[15] Because corporate executive staffing decisions and performance evaluation are reviewed at least annually, we take a broader view of the *presence* of tax expertise (both hiring and retention) in senior management.

[16] Because we use this model to form matched pairs, we do not include years prior to the first-time hiring of a tax-savvy executive (to avoid inadvertently matching a tax-savvy firm to another tax-savvy firm in a pre-hiring year).

[17] Because BoardEx sometimes reports the exact date when executives are hired and, at other times, reports the year when executives start their current roles, this conservative delay also helps to mitigate data inconsistency concerns regarding the start date in BoardEx.

[18] We follow the procedures of Balakrishnan et al. (2019) to construct an industry-adjusted ETR measure. Specifically, for each fiscal year and industry, we rank firms into deciles based on total assets. Then we compute the mean ETR in each decile if there are at least five firms with nonmissing ETR. We subtract the industry mean ETR from each firms' ETR to capture an industry-adjusted ETR measure (*ETR_ADJ*).

[19] Further, as a practical matter, controlling for prior-year ETR also helps match treatment and control firms on past tax outcomes. This facilitates the parallel-trends assumption of the difference-in-differences regression methodology that we use to test the consequences of elevating tax expertise to the senior management team. Nevertheless, in untabulated tests, we find similar second stage results when omitting prior-year ETR from the first stage determinants model.

[20] For example, see https://www.pwc.com/us/en/washington-national-tax.html.

[21] TEI is a professional organization for senior tax executives (http://www.tei.org/membership/Pages/default.aspx). We compile a list of 49 local TEI chapters in the U.S. by zip code. Note TEI's local chapters are not distributed evenly among states. Some states have more than one local chapter, while some states do not have any.

We consider the number of turnover events for senior financial executives in the past 3 years, as more executive turnovers could increase the likelihood of having a tax experienced executive by chance. We also control for additional firm characteristics, such as size, profitability, stock return, and stock volatility. Accordingly, *SIZE* equals the natural log of market value of equity (Compustat items PRCC_F × CSHO). *ROA* equals pretax income divided by lagged total assets (Compustat items PI divided by lagged AT). *RETURN* equals annualized stock return calculated by dividing the change in market value of equity (adding back dividends) by the lagged market value of equity. And *VOLATILITY* equals the annualized abnormal daily stock return volatility over the previous fiscal year. Collectively, these variables capture the resources to retain sophisticated tax expertise on the senior management team as well as capital market pressures that may impact the incentives to employ this tax talent. We also include acquisitiveness (*AQC*) and level of foreign activity (*MNE*) to capture the demand for tax expertise. Specifically, *AQC* equals one if there is a cash outflow of funds used for the acquisition of a company (Compustat item AQC), and zero otherwise. *MNE* equals one if the firm has reported foreign income (Compustat item PIFO) or a material foreign subsidiary in Exhibit 21 of the annual 10-K filing and zero otherwise.

3.4.2 Consequences of placing a tax-savvy executive on the senior management team

To examine whether placing tax-savvy senior executives in senior management impacts tax outcomes, we use a difference-in-differences design using our first-stage model (Eq. (1)) to form matched pairs based on propensity scores and then estimate the following ordinary least squares regression (firm and time subscripts are omitted for brevity).

$$TAX = \alpha + \gamma_1 TAXFIRM + \gamma_2 POST + \gamma_3 TAXFIRM \times POST + Controls + fixed\ effects + \varepsilon. \quad (2)$$

We consider two explicit tax outcomes based on effective tax rates, *ETR* or *CETR*.[22] *TAXFIRM* equals one if the firm has a tax-savvy executive on the senior management team at any point during the sample period. *POST* equals one for all fiscal years following the first full year that a tax-savvy senior executive is present in senior management for the treatment firms and matched control firms. *POST* therefore captures the average subsequent effective tax rate for both treatment and control firms. The coefficient estimate of *TAXFIRM*× *POST* (γ_3) is our difference-in-differences estimator capturing the difference in tax outcomes between treatment firms and control firms following the first-time appointment of tax-experienced executives in the senior management team. To the extent tax-savvy executives enhance tax outcomes, we expect a negative and significant estimate on γ_3. Importantly, to control for the possibility that firms have different underlying propensities to replace or hire executives in senior management, we require control firms to have recently placed a nontax senior executive at the time the firm is matched to a treatment firm. Specifically, control firms

[22] Results are robust to using industry and size adjusted effective tax rates in lieu of *ETR* or *CETR* following Balakrishnan et al. (2019).

have never had a tax-savvy executive on the senior management at any point in our sample but, at the time of the match, made a change to the team.[23]

We control for a number of firm-level determinants motivated by prior research. To control for the resources available for tax planning (Zimmerman 1983; Porcano 1986), we control for *SIZE* as the natural logarithm of the prior year's market value of equity. Following Gupta and Newberry (1997) and Chen et al. (2010), we control for tax-related differences associated with equity income (*EQINC*), intangible assets deflated by total assets (*INTAN*), and capital intensity (*PPE*). Following Rego (2003), we control for the difference in tax outcomes related to profitability (*ROA*) and foreign operations (*FI*). We also control for performance-matched pretax discretionary accruals, following Frank et al. (2009).

Consistent with Chen et al. (2010), we control for differences in tax outcomes related to growth opportunities by including the market-to-book ratio (*MTB*). Following Graham and Tucker (2006), we also control for differences in tax outcomes related to debt usage by controlling for leverage (*LEV*). We control for the existence of and change in net operating loss (*NOL* and ΔNOL) to control for the effects of net operating loss carryforwards on tax outcomes.[24] We include free cash flow (*FCF*), as Dhaliwal et al. (2018) have shown a positive association between cash holdings and tax savings. We include research and development expenditures deflated by total assets (*R&D*) to capture the effects of research and development expenses and credits on tax outcomes.

To assess whether our identification of tax-savvy executives isn't inadvertently picking up financial or legal expertise, in a separate specification, we add controls for the innate manager characteristics that studies have found to be associated with effective tax rates. Following the methodology of these studies, we include binary variables representing CEO military experience (Law and Mills 2017), personal aggressiveness (Chyz 2013), firm-level religiosity (Boone et al. 2013), firm-level overconfidence (Ahmed and Duellman 2013), firm-level managerial ability (Demerjian et al. 2012), and top management legal expertise. Finally, depending on the specification, we include fiscal year and industry or firm fixed effects in our regression models, and we use one-tailed *p* values for variables in which we have directional predictions. All standard errors are clustered by firm (Petersen 2009).

4 Results

4.1 Determinants of having a tax-savvy executive on the senior management team

Panel A (Panel B) of Table 3 present descriptive statistics for the firm-years with (without) tax-savvy executives, and Panel C reports results from estimating Eq. (1). The comparison of the descriptive statistics is largely consistent with the regression results,

[23] For both our treatment and control groups, we define a change to the senior executive team as either a new hire or a replacement of a senior executive by promotion of an executive to the senior management team.

[24] Drake et al. (2020) find that a firm's history of losses can influence effective tax rates. We investigate the possibility that prior losses might be correlated with the presence of a tax-savvy executive or subsequent effective tax rates. In untabulated tests, we find that prior losses do not predict the presence of a tax-savvy executive in senior management and that the first-time hiring of a tax-savvy executive is associated with a reduction in effective tax rates after controlling for the existence of prior losses.

which suggests the following. First, the likelihood of having a tax-savvy senior executive in top management is greater when the firm has a lower effective tax rate, relative to size-adjusted industry peers (*ETR_ADJ*, Estimate: −0.990, *p* value = 0.002), greater when the firm is larger (*SIZE*, Estimate: 0.199, *p* value <0.01), and greater when the firm has experienced recent turnover in senior management (*TURNOVER*, Estimate: 0.178, *p* value <0.01). Second, the negative and significant coefficient estimates on *RETURN* (Estimate: −0.102, *p* value = 0.060) and *ROA* (Estimate: −1.446, *p* value <0.01) indicate that recent poor performance is positively associated with employing a tax-savvy senior executive in top management. In contrast, firms with greater stock return volatility are less likely to employ a tax-savvy executive (*VOLATILITY*, Estimate: −1.100, *p* value <0.01). Third, network connections of firms (*FIRM CONNECTION*) are positively associated with the decision to employ a tax-savvy senior executive (Estimate: 0.046, *p* value <0.01), and firms that are located closer to Washington D.C. (*logDistance to DC)*, Estimate: −0.105, *p* value <0.01) as well as those located close to a local TEI chapter (*TEI*, Estimate: 0.078, *p* value = 0.102) are more likely to employ a tax-savvy executive. This result suggests that a firm's proximity to concentrations of tax talent significantly affects their ability to retain tax talent in senior management. Finally, acquisitive (*AQC*) and multinational (*MNE*) firms are more likely to employ a tax-savvy executive (Estimate = 0.283, *p* value <0.01; Estimate = 0.802, *p* value <0.01). Overall, these patterns yield important insights into the determinants of having tax expertise on the senior management team.

We examine the marginal effects and find these patterns to be economically meaningful. For example, a one standard deviation decrease in *ETR_ADJ* is associated with a 6.25% increase in the likelihood of having a tax-savvy executive on the senior management team. This effect is economically significant, considering the baseline likelihood of having a tax-savvy senior executive is 9.6%. Similarly, a one-standard deviation increase in proximity to Washington D.C. or being located near a TEI chapter, respectively, is associated with a 9 and 3% greater likelihood of having a tax-savvy senior executive, respectively.

Diagnostics are reported near the bottom of the table. The Pearson Chi-squared goodness of fit test indicates that the regression model is not misspecified. The area under the ROC curve is 0.808, which indicates very good discriminate ability (Hosmer and Lemeshow 2000), and the model correctly classifies at least 90% of observations. In contrast to the regression results in Column (1), we include fiscal year and industry fixed effects in Column (2), and this results in slightly fewer observations, due to lack of variation for some industry-year groups. Notably, the coefficient estimates generally retain their sign and precision (significance levels) after the inclusion of fiscal year and industry fixed effects. We include both models in Panel C of Table 3 to illustrate this point as well as report the results of estimating the first-stage model (Column 1) that we use to form matched pairs in testing our second hypothesis.

4.2 Consequences of placing a tax-savvy executive on the senior management team

In this section, we examine the tax consequences associated with placing a tax-savvy senior executive on the senior management team. This analysis requires two steps. First, we use the logistic regression model (Eq. (1)) reported in Table 3 to form matched

Table 3 Determinants of the presence of a tax-savvy senior executive

Panel A: Descriptive statistics for treatment firm-years (those with a tax-savvy executive)

Variable	N	Mean	Std. Dev.	Min	25th Pctl	Median	75th Pctl	Max
TAX_EXP	1939	1.000	0.000	1.000	1.000	1.000	1.000	1.000
ETR_ADJ	1939	−0.003	0.077	−0.307	−0.039	0.000	0.039	0.352
SIZE	1939	8.069	1.618	1.523	7.007	7.986	9.249	11.816
TURNOVER	1939	2.112	1.805	0.000	1.000	2.000	3.000	8.000
RETURN	1939	0.223	0.470	−0.794	−0.038	0.163	0.390	6.927
ROA	1939	0.116	0.079	0.001	0.059	0.102	0.155	0.553
VOLATILITY	1939	0.289	0.144	0.102	0.188	0.252	0.349	1.524
FIRM CONNECTION	1939	10.376	6.619	0.000	5.000	9.000	15.000	31.000
Log (Distance to DC)	1939	6.121	1.106	1.629	5.432	6.289	6.873	7.800
TEI	1939	0.775	0.418	0.000	1.000	1.000	1.000	1.000
AQC	1939	0.592	0.492	0.000	0.000	1.000	1.000	1.000
MNE	1939	0.783	0.412	0.000	1.000	1.000	1.000	1.000

Panel B: Descriptive statistics for control firm-years

Variable	N	Mean	Std. Dev.	Min	25th Pctl	Median	75th Pctl	Max
TAX_EXP	18,269	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ETR_ADJ	18,269	0.006	0.085	−0.321	−0.029	0.009	0.049	0.364
SIZE	18,269	6.287	1.906	0.675	4.921	6.274	7.534	11.816
TURNOVER	18,269	1.082	1.405	0.000	0.000	1.000	2.000	8.000
RETURN	18,269	0.308	0.675	−0.851	−0.042	0.171	0.458	7.246
ROA	18,269	0.122	0.109	0.000	0.043	0.093	0.169	0.813
VOLATILITY	18,269	0.381	0.210	0.102	0.231	0.329	0.477	1.917
FIRM CONNECTION	18,269	4.622	5.501	0.000	0.000	3.000	7.000	31.000
Log (Distance to DC)	18,269	6.268	1.127	1.629	5.498	6.355	7.083	7.800
TEI	18,269	0.680	0.466	0.000	0.000	1.000	1.000	1.000
AQC	18,269	0.382	0.486	0.000	0.000	0.000	1.000	1.000
MNE	18,269	0.440	0.496	0.000	0.000	0.000	1.000	1.000

Panel C: Logistic regression results for determinants of having a tax-savvy executive

Variable	Exp. Sign	(1)		(2)	
		Estimate	*p* value	Estimate	*p* value
Intercept		−3.771***	(0.000)	−3.046***	(0.000)
ETR_ADJ	?	−0.990***	(0.002)	−1.037***	(0.002)
SIZE	+	0.199***	(0.000)	0.241***	(0.000)
TURNOVER	+	0.178***	(0.000)	0.179***	(0.000)
RETURN	?	−0.102*	(0.060)	−0.090	(0.126)
ROA	?	−1.446***	(0.000)	−2.553***	(0.000)

Table 3 (continued)

VOLATILITY	?	−1.100***	(0.000)	−1.321***	(0.000)
FIRM CONNECTION	+	0.046***	(0.000)	0.040***	(0.000)
Log (Distance to DC)	–	−0.105***	(0.000)	−0.136***	(0.000)
TEI	+	0.078	(0.102)	0.126**	(0.025)
AQC	+	0.283***	(0.000)	0.304***	(0.000)
MNE	+	0.802***	(0.000)	0.462***	(0.000)
Year fixed effects		No		Yes	
Industry fixed effects		No		Yes	
Pearson Chi-square		18,165.11	1.000	20,201.02	0.191
Pseudo R^2		0.168		0.213	
Area under ROC curve		0.808		0.832	
Correctly classified		0.901		0.904	
Observations		20,208		20,094	

All variables (defined in the Appendix) are winsorized at the 1% and 99% levels to mitigate the influence of outliers. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively

pairs. For each industry (two-digit SIC) and fiscal year, we use propensity-score matching to match a firm that has placed, for the first-time, a tax-savvy senior executive to a firm that has not placed but otherwise has the closest propensity to place a tax-savvy senior executive. Additionally, we require control firms to have experienced a recent senior management change to eliminate potential imbalances caused by firms that were not recently looking to hire a senior manager. We form matched pairs within each industry and fiscal year to minimize inappropriate matches, and we use Regression (1) reported in Table 3 to form matched pairs for each year.[25] We then estimate Eq. (2) using ordinary least squares for our matched sample of firms to evaluate the treatment effects (i.e., differences in tax outcomes) associated with the presence of a tax-savvy senior executive. We explain each step in more detail below.

4.2.1 Covariate balance

Table 4 reports the covariate balance of the matched pairs after matching firms that have hired a tax-savvy executive in senior management (treatment firms) to firms that have never done so but recently experienced a senior management change and

[25] Note that not requiring exact matches within industry-year groups may result in inappropriate matches. For example, a retail firm in 2007 could be matched to a manufacturing firm in 2003 even after including baseline year and industry fixed effects in the first-stage regression model. We examine several different specifications in our propensity-score matching design. While a smaller caliper creates better matching quality in terms of covariate balancing, it potentially reduces the number of matched pairs. Hence there is a trade-off between match integrity and statistical power. We find our results hold across a range of calipers between 0.05 and 0.10. We also employ a within-firm design and conduct our tests only for firms that have had a tax-savvy executive in top management (i.e., treatment firms) and find our inferences hold. Thus our results are unlikely to be driven by unobserved characteristics of control firms.

otherwise appear similar on all observable characteristics (control firms). Panel A (B) reports the fiscal year (industry) distribution of the 240 matched pairs.[26] This procedure results in the same number of treatment and control firms for each fiscal year and industry reflecting an exact match within industry-year groups. For descriptive purposes, we also report the mean ETR for each two-digit SIC industry group (in descending order). We observe many of the industry average ETRs are within a few percentage points from the top statutory corporate tax rate and quite similar to means reported in related research.[27]

Panel C reports differences in means between treatment and control firms for the variables used to estimate Eq. (1). The differences in covariate means are not statistically significant, which reflects good covariate balance. Importantly, the means for *ETR_ADJ* and *ETR* are not statistically different, which suggests that both treatment and control firms have similar tax outcomes as of year *t*-1.[28] Next, we turn our attention to the effect of the initial placement of tax-savvy senior executives on tax outcomes.

4.2.2 Tax outcomes

Table 5 Panel A (B) reports descriptive statistics for the treatment (control) firm-years for our matched pair regression, and Table 6 reports results from estimating Eq. (2) for our matched sample of firms. As discussed previously, our coefficient of interest is *TAXFIRM*× *POST*, which captures the incremental difference in tax outcomes for treatment firms, relative to control firms, after adding a tax-savvy senior executive. Results reveal a statistically and economically significant reduction in effective tax rates following the first time hiring of a tax-savvy executive in senior management. Specifically, both *ETR* and *CETR* decrease following the addition of tax expertise to senior management (Estimate: −0.016, p value = 0.016, and Estimate: −0.021, p value = 0.029, respectively).[29] When we add the additional controls for innate managerial characteristics, we find comparable results for both *ETR* and *CETR* regressions (Estimate: −0.020, p value = 0.004, and Estimate: −0.025, p value = 0.016, respectively). Economically, a 1.6 and 2.1 percentage point reduction in *ETR* and *CETR* is associated with $12.72 million and $16.70 million reduction in tax expense and taxes paid, respectively. (Mean pretax book income is $795 million for our matched sample.) Overall, these results show that the introduction of tax expertise to the senior management team is associated with lower subsequent effective tax rates.

[26] The number of matched pairs is smaller than the number of tax-savvy executives in our first-stage employment model because we restrict the analysis to the initial hiring of tax-savvy executives.

[27] To mitigate concerns that our results might be driven by certain industries, we selectively drop certain industries as well as those that have the lowest mean ETRs and find our results continue to hold.

[28] We test the parallel-trends assumption underlying our difference-in-differences design by examining the change in effective tax rates for treatment and control firms during the years immediately preceding (i.e., year *t*-3 to *t*-1) the first-time hiring of a tax savvy executive in senior management. We observe no difference between the change in effective tax rates from year *t*-3 to *t*-1 for treatment firms, compared to control firms, which supports the assumption that the pre-treatment trends in effective tax rates are similar for both treatment and control firms.

[29] In untabulated tests, we find that the coefficient estimates are similar after including firm fixed effects, mitigating the possibility that unobserved, time-invariant firm characteristics may be affecting our results.

Table 4 Covariate balance

Panel A: Time distribution of matched sample

Fiscal year	Treatment	Control	Total
1994	11	11	22
1995	12	12	24
1996	5	5	10
1997	8	8	16
1998	9	9	18
1999	9	9	18
2000	12	12	24
2001	7	7	14
2002	5	5	10
2003	16	16	32
2004	13	13	26
2005	29	29	58
2006	14	14	28
2007	15	15	30
2008	9	9	18
2009	5	5	10
2010	10	10	20
2011	9	9	18
2012	18	18	36
2013	16	16	32
2014	8	8	16
Total	240	240	480

Panel B: Industry distribution of matched sample

Industry (Two-digit SIC)	Industry Name	Treatment	Control	Total	Mean ETR
56	Apparel and Accessory Stores	3	3	6	37.88%
27	Printing, Publishing and Allied Industries	4	4	8	37.65%
87	Engineering, Accounting, Research, Management & Related Services	6	6	12	37.20%
59	Miscellaneous Retail	3	3	6	36.92%
34	Fabricated Metal Products, Except Machinery And Transportation Equipment	4	4	8	35.87%
30	Rubber and Plastic Products	2	2	4	35.71%
26	Paper And Allied Products	1	1	2	35.61%
50	Wholesale Trade – Durable Goods	8	8	16	35.57%
48	Communications	5	5	10	35.43%
73	Business Services	21	21	42	34.25%
51	Wholesale Trade – Nondurable Goods	1	1	2	34.07%
20	Food and Kindred Products	9	9	18	33.54%
33	Primary Metal Industries	2	2	4	32.91%

Table 4 (continued)

37	Transportation Equipment	8	8	16	32.54%
58	Eating and Drinking Places	3	3	6	32.16%
49	Electric, Gas and Sanitary Services	21	21	42	32.09%
80	Health Services	1	1	2	31.06%
35	Industrial and Commercial Machinery and Computer Equipment	26	26	52	31.04%
13	Oil and Gas Extraction	11	11	22	30.68%
60	Depository Institutions	12	12	24	30.25%
28	Chemicals and Allied Products	21	21	42	30.12%
62	Security and Commodity Brokers, Dealers, Exchanges and Services	7	7	14	30.09%
36	Electronic And Other Electrical Equipment And Components, Except Computer Equipment	21	21	42	28.96%
63	Insurance Carriers	13	13	26	28.45%
38	Measuring, Analyzing, and Controlling Instruments; Photographic, Medical And Optical Goods; Watches And Clocks	11	11	22	28.45%
67	Holding and Other Investment Offices	16	16	32	2.48%
Total		240	240	480	

Panel C: Test of covariate balance

Variables	***N***	**Treatment**	**Control**	***p* value**
P-SCORE	240	−2.014	−2.014	(0.998)
ETR_ADJ (year *t*-1)	240	−0.004	−0.006	(0.753)
ETR (year *t*-1)	240	0.301	0.296	(0.610)
SIZE	240	7.420	7.444	(0.873)
TURNOVER	240	2.246	2.233	(0.926)
RETURN	240	0.281	0.300	(0.730)
ROA	240	0.108	0.115	(0.400)
VOLATILITY	240	0.318	0.317	(0.984)
FIRM CONNECTION	240	8.000	7.592	(0.457)
Log (Distance to DC)	240	6.230	6.173	(0.210)
TEI	240	0.729	0.721	(0.838)
AQC	240	0.504	0.446	(0.202)
MNE	240	0.663	0.646	(0.702)

Table 5 Descriptive statistics for matched sample

Variable	N	Mean	Std. Dev.	Min	25th Pctl	Median	75th Pctl	Max
Panel A: Treatment firm-years								
ETR	3248	0.304	0.115	0.000	0.265	0.330	0.375	0.695
CETR	3248	0.256	0.156	0.000	0.151	0.253	0.344	0.891
TAXFIRM	3248	1.000	0.000	1.000	1.000	1.000	1.000	1.000
POST	3248	0.483	0.500	0.000	0.000	0.000	1.000	1.000
ROA	3248	0.112	0.086	0.003	0.051	0.090	0.151	0.643
ACC	3248	0.004	0.105	−0.656	−0.035	−0.003	0.025	0.987
SIZE	3248	7.581	1.639	2.455	6.492	7.543	8.682	11.990
FI	3248	0.022	0.034	−0.019	0.000	0.001	0.033	0.187
EQINC	3248	0.256	0.437	0.000	0.000	0.000	1.000	1.000
INTAN	3248	0.174	0.210	0.000	0.003	0.086	0.276	1.161
PPE	3248	0.293	0.263	0.000	0.085	0.227	0.427	1.427
NOL	3248	0.337	0.473	0.000	0.000	0.000	1.000	1.000
ΔNOL	3248	0.002	0.024	−0.177	0.000	0.000	0.000	0.254
MTB	3248	3.056	2.647	0.310	1.615	2.308	3.539	30.659
LEV	3248	0.218	0.193	0.000	0.067	0.188	0.318	1.511
FCF	3248	0.062	0.076	−0.481	0.021	0.058	0.102	0.366
R&D	3248	0.024	0.042	0.000	0.000	0.000	0.028	0.292
LOG_TAX_HAVEN	3248	0.724	1.051	0.000	0.000	0.000	1.386	4.635
LOG_FOREIGN_SUB	3248	1.590	1.756	0.000	0.000	0.693	3.091	6.390
Panel B: Matched control firm-years								
ETR	3423	0.300	0.118	0.000	0.264	0.331	0.372	0.695
CETR	3423	0.240	0.158	0.000	0.126	0.240	0.333	0.891
TAXFIRM	3423	0.000	0.000	0.000	0.000	0.000	0.000	0.000
POST	3423	0.518	0.500	0.000	0.000	1.000	1.000	1.000
ROA	3423	0.120	0.094	0.003	0.055	0.097	0.158	0.643
ACC	3423	−0.006	0.095	−0.656	−0.041	−0.005	0.022	0.987
SIZE	3423	7.520	1.789	2.122	6.430	7.582	8.589	11.990
FI	3423	0.027	0.040	−0.019	0.000	0.003	0.044	0.201
EQINC	3423	0.247	0.431	0.000	0.000	0.000	0.000	1.000
INTAN	3423	0.165	0.210	0.000	0.001	0.074	0.268	1.161
PPE	3423	0.276	0.264	0.000	0.084	0.199	0.377	1.427
NOL	3423	0.280	0.449	0.000	0.000	0.000	1.000	1.000
ΔNOL	3423	0.001	0.025	−0.177	0.000	0.000	0.000	0.254
MTB	3423	3.420	3.201	0.310	1.573	2.441	3.962	30.659
LEV	3423	0.206	0.188	0.000	0.047	0.163	0.310	1.418
FCF	3423	0.064	0.087	−0.481	0.018	0.059	0.104	0.407
R&D	3423	0.029	0.050	0.000	0.000	0.000	0.044	0.292
LOG_TAX_HAVEN	3423	0.649	0.975	0.000	0.000	0.000	1.099	4.635
LOG_FOREIGN_SUB	3423	1.477	1.688	0.000	0.000	0.693	2.890	6.390

Table 6 Tax consequences of adding a tax-savvy executive to senior management

	ETR		*CETR*		*ETR*		*CETR*	
	Estimate	*p* value	Estimate	*p* value	Estimate	*p* value	Estimate	*p* value
Intercept	0.320***	(0.000)	0.306***	(0.000)	0.335***	(0.000)	0.314***	(0.000)
TAXFIRM	0.007	(0.330)	0.024***	(0.006)	0.009	(0.132)	0.032***	(0.001)
POST	0.012*	(0.068)	0.010	(0.249)	0.013**	(0.028)	0.016*	(0.087)
TAXFIRM×POST	**−0.016****	**(0.016)**	**−0.021****	**(0.029)**	**−0.020*****	**(0.004)**	**−0.025****	**(0.016)**
ROA	0.168***	(0.000)	−0.010	(0.811)	0.151***	(0.000)	−0.028	(0.559)
ACC	−0.065***	(0.000)	−0.154***	(0.000)	−0.044**	(0.021)	−0.152***	(0.000)
SIZE	−0.003*	(0.092)	0.001	(0.536)	−0.003*	(0.053)	−0.000	(0.917)
FI	−0.325***	(0.000)	−0.184*	(0.059)	−0.322***	(0.000)	−0.205**	(0.037)
EQINC	−0.016***	(0.005)	−0.011	(0.124)	−0.012**	(0.036)	−0.006	(0.454)
INTAN	0.042***	(0.010)	0.023	(0.310)	0.029**	(0.032)	−0.002	(0.930)
PPE	0.037*	(0.086)	−0.038	(0.149)	0.020	(0.235)	−0.086***	(0.004)
NOL	0.001	(0.798)	−0.021***	(0.002)	−0.004	(0.445)	−0.031***	(0.000)
ΔNOL	0.091	(0.109)	0.159*	(0.068)	0.121**	(0.041)	0.202**	(0.018)
MTB	0.002**	(0.032)	0.002	(0.195)	0.001	(0.400)	−0.000	(0.765)
LEV	−0.048***	(0.006)	−0.065***	(0.002)	−0.021	(0.215)	−0.052**	(0.030)
FCF	−0.107***	(0.003)	−0.172***	(0.000)	−0.062**	(0.035)	−0.165***	(0.000)
R&D	−0.232***	(0.000)	−0.444***	(0.000)	−0.212***	(0.000)	−0.411***	(0.000)
Additional Controls:								
CEO MILITARY					−0.009	(0.104)	−0.009	(0.286)
CEO AGGRESSIVE					0.002	(0.701)	0.007	(0.552)
RELIGIOSITY					0.832	(0.163)	2.025**	(0.023)
OVERCONFIDENCE					−0.002	(0.650)	0.010	(0.127)

Table 6 (continued)

	ETR		*CETR*		*ETR*		*CETR*	
	Estimate	*p* value	Estimate	*p* value	Estimate	*p* value	Estimate	*p* value
MANAGERIAL ABILITY					0.003	(0.631)	0.020**	(0.048)
LAW DEGREES					−0.017*	(0.085)	0.006	(0.796)
Industry fixed effects	Included		Included		Included		Included	
Year fixed effects	Included		Included		Included		Included	
Observations	6671		6671		4850		4850	
Adj. R-squared	0.471		0.233		0.230		0.132	

All variables (defined in the Appendix) are winsorized at the 1% and 99% levels to mitigate the influence of outliers. Standard errors are clustered by firm. Regressions with additional demographic controls have less observations, because of the unavailability of additional control variables. There are 240 treatment firms and 240 control firms in this matched sample. Among the 6671 observations, 3248 are treatment firms, 3423 are control firms, 3330 are pre-treatment years, 3341 are post-treatment years. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively

4.2.3 Channels through which effective tax rates are lowered

Our primary result in Table 6 indicates that effective tax rates are lower following the appointment of a tax-savvy executive to the senior management team. In this section, we isolate a mechanism through which effective tax rates can be lowered. Specifically, a lower effective tax rate can be accomplished through shifting income to low-tax foreign jurisdictions. We broadly capture this approach by examining the disclosure of material subsidiaries reported in Exhibit 21 of SEC 10-K filings. This process generates a time-series of subsidiary locations for each firm. For each fiscal year filing, we count the number of subsidiaries located in tax haven countries as well as foreign jurisdictions in general.[30] Then we use this measure as the dependent variable and re-estimate Eq. (2) for the matched sample. Each regression is estimated over subsamples of firm-years with high (top tercile) or low (bottom tercile) ETRs. We define tercile rank for each fiscal year and industry (two-digit SIC). The purpose of this sample split is to connect the lower ETRs of firms that hire tax-savvy executives to mechanisms through which ETRs can be lowered. In other words, we expect to observe greater use of subsidiaries in low tax foreign jurisdictions among firms that have lower ETRs.

Table 7 presents the results with ETR terciles presented in Panel A and CETR terciles presented in Panel B. Among the firms that exhibit low effective tax rates, firms have an increase in the number of tax haven and foreign subsidiaries following the appointment of a tax-savvy executive to the senior management team. For example, the coefficient of 0.147 and 0.245 in the bottom ETR tercile subsample regressions reported in Panel A indicates that treatment firms increase tax haven and foreign subsidiaries by 16% and 28%, respectively, once a tax savvy executive joins senior management. Welch test statistics for testing differences in *TAXFIRM*×*POST* across regression models reveal that the differences between top and bottom tercile ETR regression subsamples are significant (p value <0.10). Overall, these results provide some insights into the mechanisms used to lower ETRs.

5 Supplemental tests

5.1 Departure of tax-savvy senior executives

To investigate what happens to tax outcomes after tax-savvy senior executives leave a specific company, we perform an additional test on a subsample that includes all firms that have hired at least one tax-savvy executive during our sample period.[31] We use a similar test as Eq. (2) but replace *TAXFIRM*, *POST*, and *TAXFIRM*×*POST* with *DEPARTURE*, an indicator variable for the absence of tax-savvy senior executives

[30] We use the list of tax haven countries reported by Dyreng and Lindsey (2009) to identify tax havens. In untabulated univariate tests, we find that prior to the first-time employment of tax-savvy executives at treatment firms, the natural log of the number of foreign subsidiaries and subsidiaries in low tax jurisdictions are similar between the treatment firms and control firms. After the treatment firms employ a tax-savvy executive, treatment firms report greater foreign subsidiaries in low tax jurisdictions.

[31] The vast majority of firms appoint only one tax-savvy executive to the senior management team. However, anecdotally we observe 345 firm-years with two tax-savvy executives, 16 firm-years with three, and two firm-years with four tax-savvy executives.

Table 7 Tax channels utilized by tax-savvy executives

Panel A: ETRs	*LOG_TAX_HAVEN*				*LOG_FOREIGN_SUB*			
	Bottom ETR tercile		**Top ETR tercile**		**Bottom ETR tercile**		**Top ETR tercile**	
	Estimate	***p* value**	**Estimate**	***p* value**	**Estimate**	***p* value**	**Estimate**	***p* value**
Intercept	−0.657***	(0.000)	−0.680***	(0.000)	−1.304***	(0.000)	−1.335***	(0.000)
TAXFIRM	−0.069	(0.148)	0.108**	(0.034)	−0.089	(0.228)	0.073	(0.381)
POST	−0.069	(0.195)	0.023	(0.672)	−0.069	(0.403)	0.071	(0.425)
TAXFIRM×POST	**0.147****	**(0.015)**	**−0.056**	**(0.212)**	**0.245****	**(0.010)**	**−0.022**	**(0.424)**
ROA	−0.496	(0.107)	−0.987***	(0.000)	−1.256***	(0.009)	−1.798***	(0.000)
ACC	−0.356*	(0.060)	0.048	(0.798)	−0.133	(0.652)	0.210	(0.491)
SIZE	0.174***	(0.000)	0.180***	(0.000)	0.262***	(0.000)	0.301***	(0.000)
EQINC	6.096***	(0.000)	4.880***	(0.000)	8.367***	(0.000)	7.212***	(0.000)
INTAN	0.135***	(0.001)	0.205***	(0.000)	0.221***	(0.000)	0.307***	(0.000)
PPE	0.091	(0.433)	0.070	(0.496)	0.498***	(0.006)	0.540***	(0.001)
NOL	−0.542***	(0.000)	−0.138	(0.249)	−0.695***	(0.001)	−0.379*	(0.052)
ΔNOL	0.006	(0.890)	0.042	(0.311)	0.111*	(0.087)	0.116*	(0.088)
MTB	0.988	(0.134)	0.651	(0.322)	1.423	(0.166)	−0.194	(0.856)
LEV	−0.000	(0.981)	−0.020***	(0.004)	0.013	(0.273)	−0.026**	(0.026)
FCF	−0.064	(0.562)	0.296**	(0.028)	−0.244	(0.159)	0.184	(0.402)
R&D	−0.261	(0.372)	0.064	(0.823)	−0.400	(0.380)	−0.037	(0.937)
Year fixed effects	Included		Included		Included		Included	
Industry fixed effects	Included		Included		Included		Included	
Observations	2643		1955		2643		1955	
Adj. R-squared	0.430		0.322		0.498		0.419	
Coefficient difference test on *TAXFIRM× POST:*	*p* value = 0.018				*p* value = 0.043			

Table 7 (continued)

Panel B: CETRs								
Intercept	−0.781***	(0.000)	−0.833***	(0.000)	−1.528***	(0.000)	−1.616***	(0.000)
TAXFIRM	−0.033	(0.454)	0.072	(0.184)	−0.067	(0.332)	−0.056	(0.511)
POST	−0.134***	(0.004)	0.063	(0.298)	−0.201***	(0.007)	0.083	(0.380)
TAXFIRM×POST	**0.175*** **	**(0.002)**	**−0.141****	**(0.031)**	**0.225****	**(0.011)**	**0.010**	**(0.466)**
ROA	−0.758***	(0.004)	−0.898***	(0.002)	−1.349***	(0.001)	−1.647***	(0.000)
ACC	−0.216	(0.209)	−0.029	(0.886)	−0.018	(0.948)	0.070	(0.826)
SIZE	0.169***	(0.000)	0.176***	(0.000)	0.268***	(0.000)	0.309***	(0.000)
EQINC	5.794***	(0.000)	6.684***	(0.000)	8.524***	(0.000)	8.016***	(0.000)
INTAN	0.153***	(0.000)	0.195***	(0.000)	0.255***	(0.000)	0.230***	(0.002)
PPE	0.089	(0.367)	0.118	(0.327)	0.278*	(0.078)	0.432**	(0.023)
NOL	−0.467***	(0.000)	0.064	(0.668)	−0.676***	(0.000)	0.017	(0.943)
ΔNOL	−0.029	(0.436)	0.218***	(0.000)	0.027	(0.655)	0.384***	(0.000)
MTB	−0.354	(0.496)	1.812**	(0.035)	−0.697	(0.401)	2.839**	(0.036)
LEV	−0.007	(0.326)	−0.021**	(0.011)	0.000	(0.993)	−0.016	(0.205)
FCF	−0.117	(0.244)	0.450***	(0.003)	−0.270*	(0.093)	0.343	(0.145)
R&D	−0.457*	(0.073)	−0.046	(0.884)	−0.709*	(0.082)	−0.224	(0.652)
Year fixed effects	Included		Included		Included		Included	
Industry fixed effects	Included		Included		Included		Included	
Observations	2622		1941		2622		1941	
Adj. R-squared	0.403		0.358		0.478		0.443	
Coefficient difference test on *TAXFIRM× POST:*	*p* value = 0.001				*p* value = 0.083			

All variables (defined in the Appendix) are winsorized at the 1% and 99% levels to mitigate the influence of outliers. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively

only for the sample of firms that have had such an executive (i.e., *TAXFIRM* = 1) but after the first appointment (i.e., *POST* = 1). The results for both the GAAP and cash effective tax rates *(ETR* and *CETR)* are presented in Table 8 Panel A with year and industry fixed effects (Regression 1, Estimate: 0.013, p value = 0.001; Regression 2, Estimate: 0.009, p value = 0.068). Subject to the standard caveats of subsample testing, we find the tax benefits brought by tax-savvy executives tend to revert when they leave their senior management positions. Further, the magnitude is notably similar to the tax benefits reported in Table 6.

Having shown in Table 7 that an increase in subsidiary usage in low tax foreign jurisdictions is a mechanism through which tax-savvy executives' firms can lower effective tax rates, we examine whether the departure of tax-savvy executives result in a subsequent reduction in subsidiary usage. Table 8 Panel B shows that the departure of tax-savvy executives from senior management is associated with a subsequent reduction in subsidiaries located in foreign countries (Estimate = −0.110, p value <0.05) as well as in tax havens (Estimate = −0.066, p value <0.05). Overall, these results triangulate our evidence that effective tax rates revert following the departure of tax-savvy executives and corroborate the validity of foreign subsidiaries as a meaningful mechanism for affecting tax outcomes.

5.2 Additional robustness tests

5.2.1 General accounting, financial, or management expertise

We conduct a number of additional robustness tests. First, we assess whether our identification of tax-savvy executives is not inadvertently picking up financial or legal expertise. Accordingly, we re-estimate our determinants model (Eq. 1) to assess how well it explains the presence of general accounting expertise, general financial or managerial expertise, and legal expertise. We capture general accounting expertise if at least one member of senior management has a certified public accountant license (*CPA*) or a graduate business degree (*MBA*), and we capture legal expertise if at least one member of the senior management team has a law degree (*LAW*).

Untabulated results indicate that our tax-savvy determinants model performs poorly in explaining the presence of general accounting expertise (*CPA*), as the area under the ROC curve is less than 0.70 and correctly classifies only 64% of observations. In contrast, the model performs better in explaining the presence of general financial or management (*MBA*) or legal expertise (*LAW*); however, many of the coefficients for which we have directional predictions are insignificant or display the opposite sign of that observed in the tax-savvy model reported in Table 3. Further, the Pearson goodness-of-fit test statistic rejects the null hypothesis that the *LAW* model is not misspecified. Moreover, we find no significant difference in subsequent effective tax rates between treatment and control firms when we use these alternative models to form matched pairs. Overall, these results do not indicate that our tax-savvy determinants model is merely picking up general financial or legal expertise.

Table 8 Departure of tax-savvy senior executives and tax outcomes

Panel A: GAAP and cash effective rates

	ETR		*CETR*	
	Estimate	***p* value**	**Estimate**	***p* value**
Intercept	0.337***	(0.000)	0.271***	(0.000)
DEPARTURE	**0.013*** **	**(0.001)**	**0.009***	**(0.068)**
ROA	0.205***	(0.000)	−0.111***	(0.008)
ACC	−0.022	(0.108)	−0.075***	(0.000)
SIZE	0.001	(0.366)	0.004**	(0.019)
FI	−0.412***	(0.000)	−0.138*	(0.077)
EQINC	−0.020***	(0.000)	−0.014**	(0.016)
INTAN	0.026***	(0.009)	0.040***	(0.007)
PPE	0.020*	(0.095)	−0.050***	(0.006)
NOL	0.006*	(0.078)	−0.001	(0.797)
ΔNOL	0.219***	(0.000)	0.383***	(0.000)
MTB	−0.001	(0.227)	0.000	(0.978)
LEV	−0.025**	(0.025)	−0.056***	(0.001)
FCF	−0.032	(0.250)	−0.039	(0.355)
R&D	−0.195***	(0.000)	−0.223***	(0.001)
Year fixed effects	Included		Included	
Industry fixed effects	Included		Included	
Observations	3738		3738	
Adj. R-squared	0.343		0.187	

Panel B: Channels

	LOG_TAX_HAVEN		*LOG_FOREIGN_SUB*	
	Estimate	***p* value**	**Estimate**	***p* value**
Intercept	−0.421**	(0.023)	−0.565**	(0.044)
DEPARTURE	**−0.066****	**(0.033)**	**−0.110****	**(0.022)**
ROA	−1.114***	(0.000)	−1.984***	(0.000)
ACC	0.162	(0.205)	0.448**	(0.020)
SIZE	0.219***	(0.000)	0.329***	(0.000)
FI	6.373***	(0.000)	8.373***	(0.000)
EQINC	0.099***	(0.005)	0.129**	(0.016)
INTAN	0.322***	(0.001)	0.604***	(0.000)
PPE	−0.462***	(0.000)	−0.807***	(0.000)
NOL	0.140***	(0.000)	0.253***	(0.000)
ΔNOL	0.914**	(0.040)	1.215*	(0.071)
MTB	−0.009	(0.101)	−0.013	(0.117)
LEV	−0.038	(0.722)	−0.291*	(0.071)
FCF	0.097	(0.710)	0.354	(0.371)
R&D	−0.664	(0.103)	−3.615***	(0.000)
Year fixed effects	Included		Included	

Table 8 (continued)

Industry fixed effects	Included	Included
Observations	3738	3738
Adj. R-squared	0.392	0.449

All variables (defined in the Appendix) are winsorized at the 1% and 99% levels to mitigate the influence of outliers. ***, **, * denotes significance at the 1%, 5%, and 10% levels, respectively

5.2.2 Within-firm tests

In our difference-in-differences regression results reported in Table 6, the coefficient of *POST*, which captures the average subsequent effective tax rates for both treatment and control firms, is positive. To allay concerns that our estimator is reflecting stronger (opposite) movement in subsequent effective tax rates for control firms versus treatment firms, we estimate our regressions among treatment and control subsamples separately. In this specification, the coefficient of interest is *POST*, which captures the within-firm change in effective tax rates following the first-time hiring of a tax-savvy executive to the senior management team for treatment or control firms. Untabulated results reveal that treatment firms indeed experience a reduction in subsequent book (Estimate = −0.017, p value <0.01) and cash effective tax rates (Estimate = −0.022, p value <0.01) following the first-time appointment of a tax-savvy executive to senior management. In contrast, we observe no statistically significant effect on subsequent book or cash effective tax rates among control firms.

5.2.3 Tax roles versus nontax roles

Forty-four percent (288 out of 653) of the tax-savvy executives in our sample have a tax-specific title, and 56% (365 out of 653) have a non-tax-specific title (e.g., CFO, controller, etc.). In this section, we explore whether the effect of tax expertise on subsequent effective tax rates differs by the title held by the tax-savvy executive. With the usual caveat about examining small subsamples, we estimate two within-firm regressions (i.e., tax-savvy firms only), where the first regression includes only the firm-years where tax-savvy executives hold tax positions and the second is limited to firm-years where tax-savvy executives hold nontax positions.[32] In this specification, the coefficient of interest is *POST*, which captures the within-firm change in effective tax rates following the first-time hiring of a tax-savvy executive. Untabulated results are consistent with our main results. The estimated coefficients for *POST* are negative and statistically significant for both the tax-savvy executives in tax positions and for the tax-savvy executives in senior management positions holding nontax titles. The estimated *POST* coefficients in the nontax title regressions are smaller than those in tax title regressions, suggesting that tax-savvy executives in nontax positions cannot focus all their energy on tax considerations.

[32] We estimate these regressions with industry fixed effects and without clustering, due to the small sample sizes. When we cluster standard errors by firm, the estimated *POST* coefficient for the non-tax positions in the cash effective tax rate regression is negative but no longer statistically significant.

5.2.4 Improvements in internal information quality and changes in tax risk

We argue that tax-savvy executives can directly influence tax outcomes through their expertise and indirectly by improving communications within the firm about tax-related issues. To provide some evidence for the latter explanation, we examine whether internal information quality changes, once a tax-savvy executive is included on the senior management team. We follow an approach similar to that of Gallemore and Labro (2015) and examine subsequent tax-related misstatements and tax-related internal control weaknesses, auditor provided tax service fees for industry tax expert auditors, and earnings announcement lags. Untabulated results indicate that firms are less likely to have a future tax-related internal control weakness, once a tax-savvy executive is present in senior management. We do not find evidence that these firms are less likely to have a future tax-related misstatement or procure more auditor provided tax services from industry tax experts or have shorter earnings announcement lags, although the coefficient signs are consistent with those of Gallemore and Labro (2015). However, we cannot rule out the possibility that our smaller sample size reduces the power of our tests. Collectively, these results are consistent with some improvement in internal communication on tax-related matters (at least with respect to tax-related internal control weaknesses).

We also examine whether tax-savvy executives' firms exhibit changes in tax risk. We follow Guenther, Matsunaga, and Williams (2017) and measure tax risk as the volatility of cash effective tax rates. Accordingly, we interpret less volatility in cash effective tax rates to be consistent with less tax risk. We conjecture that tax expertise can translate into more sustainable tax positions and therefore less volatile tax outcomes. In untabulated analysis, we find cash effective tax rate volatility declines significantly after a tax-savvy executive joins senior management. Thus, the effect of expertise that we document (through lower ETRs) is not accompanied by greater tax risk.

5.2.5 Changes in other corporate policies

Finally, we examine other investment and financial outcomes to explore how other policy choices might be affected after placing a tax-savvy executive in senior management. We follow related literature (e.g., Coles et al. 2006) and examine capital expenditures, leverage, research and development, and cash holdings. Untabulated results reveal an increase in subsequent capital expenditures and a decrease in leverage. These results are broadly consistent with tax savings providing a source of funding for incremental investment (e.g., Law and Mills 2015; Edwards et al. 2016) and tax savings providing a substitute for debt tax shields (e.g., DeAngelo and Masulis 1980; Graham and Tucker 2006).

5.3 Falsification tests

To further confirm that the second-stage results we observe are due to tax-savvy executives' influence and not some unknown event prior to the placement of a tax-savvy executive in senior management, we perform a falsification test examining whether our results are sensitive to turning *POST* on for years prior to the placement of an executive in senior management. In other words, if the interpretation of our main

analysis is correct, we should expect to observe insignificant results for these pseudo events (Roberts and Whited 2013). In untabulated results, we do not find any evidence that subsequent tax outcomes of tax-savvy executives' firms are associated with unknown events prior to the tax-savvy executive's joining senior management. This robustness test reinforces the interpretation of our main analysis and alleviates concerns that our results may be driven by unknown past events prior to the tax-savvy executive's arrival.

As an additional falsification test, we consider the employment of audit-savvy executives identified analogously to tax-savvy executives, except these executives have significant (manager-level or higher) audit experience. We expect audit-savvy executives to have no direct influence over tax outcomes. Untabulated results confirm there is no relation between the addition of an audit-savvy executive and subsequent effective tax rates.

5.4 Compensation incentives of tax-savvy senior executives

Armstrong et al. (2012) use proprietary compensation data on tax directors and find a strong relation between GAAP effective tax rates and tax directors' incentive-based compensation. As an additional test, we use the BoardEx senior management compensation file to investigate the relationship between tax outcomes and tax-savvy executives' compensation structures. We find that the vast majority (92%) of tax-savvy executives (with BoardEx compensation coverage) have some level of equity-linked compensation. In untabulated analyses, we regress GAAP and cash effective tax rates against tax-savvy executives' equity linked compensation and find both the level and proportion of equity-based compensation for tax-savvy executives are negatively correlated with GAAP and cash effective tax rates, although the relation with cash effective tax rates is weaker.

We explore the sensitivity of tax-savvy executives' pay to tax outcomes. Accordingly, we regress the level of compensation and equity compensation mix of tax-savvy executives against employing firms' GAAP and cash effective tax rates. In untabulated analyses, we find tax-savvy executives' total compensation and equity-linked compensation are negatively correlated with GAAP and cash effective tax rates and again the relation with the cash effective tax rate is weaker. This result is consistent with the contention that tax-savvy executives are rewarded for favorable tax outcomes, as both total compensation and equity compensation mix are sensitive to tax outcomes.

We explore whether tax-savvy executives are compensated with a premium. We compare tax-savvy executives' compensation to the compensation paid to other nontax-savvy executives with similar titles and hired by the same firm. For example, we hold the role constant and compare compensation levels for years in which a tax-savvy CFO is employed to years in which a nontax savvy CFO is employed at the firm. Similarly, we also compare the compensation of a vice president of tax to the compensation of a vice president of sales for the same firm and year. Univariate tests suggest that tax-savvy executives are paid less than nontax-savvy executives with similar titles. These exploratory results are broadly consistent with the findings of Custódio et al. (2013), who report that specialist CEOs tend to be paid less than generalist CEOs. In further tests, we do not find evidence that other nontax-savvy executives' compensation changes after the tax-savvy executive joins the senior management team. However, we acknowledge the small samples reduce the power of these tests, and we interpret the results with these caveats in mind.

5.5 Presence versus addition of a tax-savvy executive

Our first-stage logit model is essentially a cross-sectional test of the presence of tax expertise in senior management, relative to firms that have never had a tax expert in senior management. This model identifies some of the important characteristics that explain why firms have this expertise in senior management. We focus on presence because it encompasses both hiring and retention. Thus, compared to a hiring model focused solely on additions, we view our model examining presence to be more complete. However, we acknowledge that our primary model is not designed to identify the precise events or conditions that trigger a firm's choice to add a tax-savvy executive to senior management.

Unfortunately, our limited sample of tax-savvy executives is insufficiently powerful to estimate a logit model limited to additions (not presence) of tax expertise. As an alternative, we examine the determinants of tax-savvy firms' decision to add a tax-savvy executive to senior management and estimate our first-stage logit model with firm fixed effects. In this within-firm design, coefficients are identified when the tax-savvy indicator changes from zero to one for firms adding a tax-savvy executive, thereby holding latent time-invariant characteristics of the firm constant. Thus this test allows us to examine which changes in pre-existing abilities and incentives to acquire tax expertise affect the decision to add a tax-savvy executive. This design also eliminates our time-invariant geographic variables (*TEI* and *log(distance-to-DC)*) that are absorbed into the firm fixed effects. Except for the estimated coefficients on *ACQ*, *ROA*, and *VOLATILITY* (which are statistically insignificant), the inferences from this alternative test (untabulated) otherwise support our main results. To summarize, results from this test corroborate our main inferences using a presence model, but we acknowledge the lack of power and that examining how changes in firm characteristics relate to the addition of tax expertise captures only one aspect of employing this expertise. We interpret the results from this test with these caveats in mind.

6 Conclusion

This study examines the determinants and consequences of having a tax-savvy senior executive in top management. Our results suggest that employing tax expertise in senior management is associated with firm performance, connections to other firms, geographic proximity to tax talent, and the level of effective tax rates, relative to industry peers. Using a propensity-score matched difference-in-differences design, we find that, after controlling for known determinants of effective tax rates, firms achieve at least one percentage-point reduction in effective tax rates following the addition of a tax-savvy executive to senior management. We connect the lower subsequent effective tax rates of tax-savvy executives' firms to an increase in use of subsidiaries in low tax foreign jurisdictions. In additional tests, we find GAAP and cash effective tax rates and subsidiary usage in low tax foreign jurisdictions revert following the departure of a tax-savvy senior executive.

Our study is subject to several caveats. First, as we explained earlier, our tests primarily focus on presence of tax expertise in senior management because presence captures both hiring and retention. Further, our small sample of tax-savvy executives precludes a thorough examination of additions of tax expertise to senior management. To illuminate which pre-existing incentives and abilities matter in acquiring tax

expertise, we explore and estimate a fixed effects model and find similar inferences. However, we acknowledge that our determinants model emphasizes presence, not explicit hires, and we caution the reader from over-generalizing our results. Second, while we carefully match our treatment firms (those with tax expertise in senior management) with control firms (those that have never had this expertise in senior management), we acknowledge that we cannot rule out the possibility of heterogeneity in hiring firms' recognition of the value of tax expertise. But, importantly, even in the presence of unobserved executive-firm matching, our results suggest that tax expertise is crucial for implementing these desired policies.

Finally, the factors motivating firms to have a tax expert in senior management are subtly different than those factors that motivate firms to seek additional tax assistance. Tax assistance is readily available for public firms from large accounting firms, law firms, consultants, and even from the audit firm. Instead, we find that having tax expertise in senior management depends critically on the ability of the firm to identify a suitable individual as well as the supply of tax talent. Thus our results suggest there are relevant constraints that preclude such firms (that would recognize a benefit from senior level tax expertise) from actually having tax expertise in senior management. After matching firms on these dimensions, we find that tax expertise in senior management significantly influences subsequent tax outcomes.

Our study contributes to several literature streams. First, we offer key insights into the determinants of acquiring tax expertise in senior management. Dittmar and Duchin (2016) note the lack of research, examining whether the professional experience of executives is important. Rather than relying on innate managerial characteristics, we advance this research stream by investigating the factors associated with employing executives with significant tax experience. Our empirical patterns reveal interesting differences in firms' ability and motivation to retain tax expertise in senior management. Second, we identify a distinct characteristic of senior management (significant tax-related experience) that matters for corporate tax policy, and, in doing so, we answer a specific call by Hanlon and Heitzman (2010) to further examine the "manager effect" in corporate tax outcomes. Third, our study demonstrates the consequences of bringing specialized expertise and experience into senior management, thereby complimenting research examining how managerial experience in general (but not specialized expertise) affects corporate outcomes (e.g., Bertrand and Schoar 2003; Bamber et al. 2010; Dyreng et al. 2010; Schoar and Zuo 2017).

Our findings should also be informative to corporate boards as well as stakeholders outside the senior management team involved in making or analyzing employment decisions at the senior executive level. Overall, our study reveals interesting insights into the factors associated with employing tax-savvy senior executives and the economic benefits such executives bring. Given the relative scarcity of senior-executive level tax talent, our study should be of interest to academics, corporate boards, policy analysts, and others interested in the effects of expertise and specifically tax experience on the senior management team.

Acknowledgements The authors acknowledge helpful comments from Patricia Dechow (editor), an anonymous reviewer, Jennifer Blouin Michael Ettredge, Matt Ege, Jen Glenn, Jeff Gramlich, Sean McGuire, Helen Miller (discussant), Amanda Marino (discussant), Jochen Pierk (discussant), Sarah Rice, and workshop participants at the 2017 Berlin-Vallendar Conference on Tax Research, the 2017 National Tax Association

annual meeting, the 2018 AAA annual meeting, Texas A&M University, the University of Kansas, Washington State University, and Colorado State University. Robinson gratefully acknowledges research support provided by the Mays School of Business. Kubick and Li gratefully acknowledge support from the University of Kansas.

Data availability We obtain data from the public sources identified in the paper.

Appendix

Variable	Source	Definition (Compustat data items in parentheses)
Dependent Variable:		
ETR	Compustat	GAAP effective tax rate (TXT/PI)
CETR	Compustat	Cash effective tax rate (TXPD/PI)
TAX_EXP	BoardEx	Equals one if the firm has a tax-savvy executive in senior management and zero if the firm has never had a tax-savvy executive in senior management
LOG_TAX_HAVEN	10-K filings	Natural log of the number of subsidiaries in tax havens
LOG_FOREIGN_SUB	10-K filings	Natural log of the number of subsidiaries in foreign countries
First Stage:		
ETR_ADJ	Compustat	GAAP ETR minus the mean GAAP ETR of companies in the same fiscal year, industry, and size decile, following Balakrishnan et al. (2019), in year *t*-1
SIZE	Compustat	Natural log of lagged market value of equity (PRCC_F × CSHO), in year *t*-1
TURNOVER	BoardEx	Total number of financial executive turnover events during the past three years
RETURN	Compustat	The change in market value of equity plus dividends, divided by prior period market value of equity, in year *t*-1
ROA	Compustat	Pretax book income divided by lagged total assets (PI/AT), in year *t*-1
VOLATILITY	CRSP	Abnormal daily stock return volatility, in year *t*-1
FIRM CONNECTION	BoardEx	Total number of firms connected by concurrently shared directors or senior management who also sit on another company's board, in year *t*-1
LOG (DISTANCE TO DC)	Compustat	Natural log of miles between the firm's headquarters and Washington D.C., in year *t*
TEI	TEI/Compustat	Equals one if there is a local TEI chapter within 25 miles, in year *t*
AQC	Compustat	Equals one if the cash outflow of funds used for, the costs relating to acquisition of a company, or both (Compustat item AQC) is nonzero.
MNE	Compustat/10-K filings	Equals one if the firms have foreign income (Compustat item PIFO) or foreign subsidiary reported in Exhibit 21
Second Stage:		
TAXFIRM	BoardEx	Equals one if the firm has hired a tax-savvy executive at any point during the sample period
POST	BoardEx	Equals one for all fiscal years following the addition of a tax-savvy senior executive for treatment firms (as well as matched control firms)

Variable	Source	Definition (Compustat data items in parentheses)
ROA	Compustat	Pretax book income divided by lagged total assets (PI/AT)
ACC	Compustat	Performance-matched discretionary accruals, following Frank et al. (2009, pp. 479–480)
SIZE	Compustat	Natural log of lagged market value of equity (PRCC_F × CSHO)
FI	Compustat	Pretax foreign income divided by lagged total assets (PIFO/AT)
EQINC	Compustat	Equals one if unconsolidated earnings (ESUB) is positive
INTAN	Compustat	Intangible assets divided by lagged total assets (INTAN/AT)
PPE	Compustat	Net property, plant, and equipment divided by lagged total assets (PPENT/AT)
NOL	Compustat	Equals one if tax loss carryforward (TLCF) is positive
ΔNOL	Compustat	Change in tax loss carryforward divided by lagged total assets (ΔTLCF/AT)
MTB	Compustat	Lagged market-to-book value of equity (PRCC_F × CSHO/CEQ)
LEV	Compustat	Long-term debt divided by lagged total assets (DLTT/AT)
FCF	Compustat	Operating cash flow minus capital expenditures, divided by lagged total assets ((OANCF-CAPX)/AT)
R&D	Compustat	Research and development expense divided by lagged total assets (XRD/AT)
Additional Test:		
DEPARTURE	BoardEx	Indicator variable for the absence of a tax-savvy executive for *TAXFIRM* in the *POST* period
CEO MILITARY	BoardEx	Indicator for the military experience of CEOs
CEO AGGRESSIVE	Thomson Financial Insiders	Indicator for personally aggressive CEOs, following Chyz (2013)
RELIGIOSITY	ARDA	State-level religiosity level from the Association of Religion Data Archives, following Dyreng et al. (2012) and Boone et al. (2013) for detail
OVERCONFIDENCE	Compustat	A firm-level measure of CEO overconfidence based on over-investment in capital expenditures, following Ahmed and Duellman (2013)
MANAGERIAL ABILITY	Peter Demerjian's faculty website	Managerial ability measure developed by Demerjian et al. (2012) and used in Koester et al. (2017)
LAW DEGREES	BoardEx	Indicator for the existence of legal expertise (e.g., law degree or bar association membership) in senior management

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