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Harald Amberger, Henning Giese, Kim Alina Schulz

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Harald Amberger[*]
WU Vienna University of Economics and Business

Henning Giese[†]
Paderborn University
KU Research Institute for Taxation

Kim Alina Schulz[‡]
Paderborn University

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[*] Welthandelsplatz 1, 1020 Wien, Austria ; +43-1-31336-5656; Harald.Amberger@wu.ac.at
[†] Warburger Str. 100, 33098 Paderborn, Germany; +49 5251 60-2926; henning.giese@upb.de
[‡] Warburger Str. 100, 33098 Paderborn, Germany; +49 5251 60-1788; kim.alina.schulz@upb.de

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ABSTRACT

This study examines whether and how workforce heterogeneity within corporate tax departments shapes firms' tax planning. Using employee-level data for U.S. firms from 1993 to 2024, we document a substantial increase in heterogeneity over time. In multivariate analyses, we find no robust association between overall tax department heterogeneity and firms' tax planning. However, this result masks important differences across underlying dimensions of heterogeneity. Specifically, cognitive heterogeneity, capturing variation in education, experience, tenure, and seniority, is positively associated with tax planning, whereas demographic heterogeneity, capturing variation in gender and ethnicity, exhibits a negative association. Additional analyses suggest that cognitively heterogeneous tax departments identify more sophisticated tax planning opportunities, utilize tax-related inputs more effectively, and maintain more stable tax strategies. In contrast, demographic heterogeneity is associated with greater variability in tax outcomes. Overall, these findings highlight a trade-off between the informational benefits and coordination costs of workforce heterogeneity within corporate tax departments.

Keywords: tax departments, tax planning, workforce heterogeneity

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Declaration of Generative AI and AI-assisted Technologies in the Writing Process

During the preparation of this work, the authors used ChatGPT to ensure grammatical accuracy, improve sentence structure, refine sentence clarity, identify and correct errors in the Stata code, and enhance the overall coherence of the text. After using these tools/services, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

I. INTRODUCTION

Heterogeneity within decision-making teams has been shown to foster innovation, enhance adaptability, and improve judgment (Adams and Ferreira 2009; Bernile, Bhagwat, and Yonker 2018; Plečnik and Wang 2021; Dang, Nwaeze, Sanchez, and Sanchez 2025). Despite this evidence, relatively little is known about how heterogeneity within functional departments affects firm behavior (e.g., Alshemmari & Al Monawer, 2023; Østergaard & Timmermans, 2023). Recent accounting research has begun to examine heterogeneity among key decision-makers, such as audit partners and board members (Condie, Lisic, Seidel, Truelson, and Zimmerman 2023, 2024). However, the role of heterogeneity within internal operational teams, particularly highly specialized functions such as corporate tax departments, remains largely underexplored. This gap is surprising because tax departments play a central role in implementing firms' tax strategies and ensuring compliance with complex and evolving tax regulations (Belnap, Hoopes, and Wilde 2024). At the same time, the accounting profession is placing increasing emphasis on workforce heterogeneity, raising questions about how the composition of internal teams and the resulting heterogeneity of the workforce affect decision-making and corporate outcomes (Anderson-Gough, Edgley, Robson, and Sharma 2024).

We address this gap in the literature by examining whether and how workforce heterogeneity within corporate tax departments shapes firm-level tax planning. This question is particularly important in a regulatory environment characterized by increasing complexity and heightened scrutiny of corporate tax practices (Gerdes, Harst, Schanz, and Sureth-Sloane 2025). Tax departments operate at the intersection of strategic planning, regulatory interpretation, and risk management (Donohoe, McGill, and Outslay 2014; Beardsley, Donohoe, Fischer, and Lisowsky 2026); settings in which expertise, judgment, and coordination are critical. Moreover, taxes represent a substantial expense for many firms, often accounting for a significant share of pre-tax income (Ege, Hepfer, and Robinson 2021). These features make tax departments an important setting to study how internal team composition influences firm outcomes.

Conceptually, we distinguish between two forms of heterogeneity: (i) *demographic heterogeneity*, reflecting observable characteristics such as gender and ethnicity, and (ii) *cognitive heterogeneity*, capturing differences in education, experience, tenure, and seniority. This distinction is well established in the management literature, which emphasizes that these two dimensions represent distinct sources of variation with potentially different implications for team decision-making (Williams and O'Reilly 1998; Harrison and Klein 2007; Behlau, Wobst, and Lueg 2024). Applying this framework to the tax function allows us to generate predictions about how heterogeneity and its dimensions are associated with tax planning.

The relation between tax department heterogeneity and tax planning is theoretically ambiguous and depends on the underlying heterogeneity dimension. On the one hand, variation theory (Campbell 1960) and related work in organizational behavior suggest that heterogeneous teams are better able to process complex information, adapt to uncertainty, and generate higher-quality decisions. Upper Echelons theory (Hambrick and Mason 1984) similarly predicts that heterogeneity in experiences and perspectives enhances problem-solving and promotes more innovative decision-making. These benefits should be particularly important in corporate tax departments, which operate in technically complex and frequently changing regulatory environments (Williams and O'Reilly 1998; Harrison and Klein 2007). From this perspective, greater cognitive heterogeneity should enhance tax planning by expanding the set of feasible tax strategies and improving the evaluation of available alternatives.

On the other hand, social categorization theory (Tajfel 1981; Turner 1985; Dahlin, Weingart, and Hinds 2005; Plečnik and Wang 2021; Cai, Chen, Rajgopal, and Azinovic-Yang 2024; Dang et al. 2025) and similarity-attraction theory (Byrne 1971; Kuwabara, Cao, Cho, and Ingram 2023) suggest that visible differences, especially demographic characteristics, can lead to subgroup formation, reduce team cohesion, and hinder communication. In tax departments, such coordination frictions could impair information sharing and the consistent implementation of tax strategies. From this perspective, greater demographic heterogeneity could constrain tax

planning and reduce the persistence of tax outcomes. Taken together, these arguments suggest that the effect of heterogeneity could vary across dimensions and induce a potential trade-off between the informational benefits and coordination costs associated with such heterogeneity.

Consistent with these competing theoretical predictions, prior empirical evidence on workforce heterogeneity and corporate outcomes is mixed. Studies focusing on leadership positions document that gender heterogeneity is associated with both lower tax aggressiveness and reduced firm risk (Francis, Hasan, Wu, and Yan 2014; Faccio, Marchica, and Mura 2016), while other studies find weaker or inconsistent effects (Adams and Ferreira 2009; Adhikari, Agrawal, and Malm 2019). These mixed findings underscore the importance of distinguishing between heterogeneity dimensions and examining settings in which teams are directly responsible for implementing and executing firm strategies, such as corporate tax departments.

To examine our research question, we construct a novel dataset on the composition of corporate tax departments in U.S. firms from 1993 to 2024 using LinkedIn-based career data from Revelio Labs (Ahn, Hoitash, Hoitash, and Krause 2025; Baker, Larcker, McClure, Saraph, and Watts 2024; Blann, Kleppe, and Moon 2024; Blouin, Zhou, and Zhu 2025; Cai et al. 2024).[1] These data provide detailed individual-level information on job titles, tenure, seniority, education, and demographic characteristics, allowing us to measure overall heterogeneity as well as its demographic and cognitive components. Notably, the data cover both publicly listed and private firms, enabling us to document broader trends in tax department heterogeneity across different types of firms.

We first examine how heterogeneity within corporate tax departments has evolved over time. Our evidence indicates a substantial increase in both demographic and cognitive heterogeneity throughout the sample period, particularly among publicly listed firms. Growth

[1] Revelio Labs has been scraping LinkedIn data since 2008; however, existing profiles date back to 1950, with a substantial number of profiles available from 1980 onwards. We begin our sample period in 1993 to ensure consistent accounting rules for income taxes, which are essential for applying ETR-based measures (Amberger 2023).

in demographic heterogeneity is primarily driven by shifts in gender composition and ethnic heterogeneity, while increases in cognitive heterogeneity reflect greater variation in educational backgrounds, seniority, and experience profiles. In fact, our evidence suggests that tax departments of publicly listed firms have increasingly shifted toward a workforce composed of early-career employees with less advanced education. Private firms, in contrast, exhibit more modest changes. We further find that metropolitan labor markets shape the balance between demographic and cognitive heterogeneity, as firms headquartered in metropolitan areas have tax departments characterized by greater demographic heterogeneity but lower cognitive heterogeneity. Collectively, these findings indicate that listing status and location are important determinants of tax department composition and its evolution over time.

We next examine the relationship between tax department heterogeneity and firm-level tax planning using a panel of publicly listed U.S. firms from Compustat. We measure tax planning using cash effective tax rates (ETRs); in additional specifications, we use GAAP ETRs, three-year cash ETRs, and three-year forward-looking cash ETRs as alternative measures. Our baseline results indicate that greater overall tax department heterogeneity is not significantly associated with contemporaneous levels of tax planning. When using long-run measures of tax planning, we find that firms with more heterogeneous tax departments exhibit lower long-run effective rates and, therefore, higher levels of tax planning.

Decomposing heterogeneity reveals stark differences across its individual dimensions. Cognitive heterogeneity is associated with higher levels of tax planning, driven primarily by variation in tenure and education. In contrast, demographic heterogeneity is associated with lower levels of tax planning. These findings are consistent with the notion that informational benefits associated with heterogeneity dominate for the cognitive dimension, whereas coordination costs dominate for demographic heterogeneity. Hence, distinguishing between heterogeneity dimensions is crucial for isolating their distinct effects on corporate tax planning.

Building on these findings, we conduct several additional analyses to better understand

the conditions under which heterogeneity affects tax planning. First, following Joecks et al. (2013), we examine whether the effects of heterogeneity depend on reaching a critical mass. We find that the positive associations between both overall and cognitive heterogeneity and tax planning emerge only at moderate levels of heterogeneity, consistent with the notion that informational benefits materialize only once sufficient heterogeneity is present. In contrast, the negative association between demographic heterogeneity and tax planning arises at relatively low levels of heterogeneity, suggesting that coordination frictions emerge early and intensify as demographic heterogeneity increases. Collectively, these results indicate that the relationship between tax department heterogeneity and tax planning is nonlinear and nonmonotonic.

Second, we conduct cross-sectional tests based on firm characteristics that could moderate the relative informational benefits and coordination costs associated with heterogeneity. These tests allow us to isolate the conditions under which heterogeneity and its dimensions might have a stronger or weaker impact on corporate tax planning. Larger firms, which tend to have more developed internal communication structures (Robinson and Stocken 2013; Shroff, Verdi, and Yu 2014), should be better able to mitigate coordination frictions. Consistent with this argument, we find that the negative effect of demographic heterogeneity on tax planning is attenuated for larger firms. We also exploit variation in the number of business segments, as more segments could signal improved internal coordination (Cho 2015). We find that the negative effect of demographic heterogeneity on tax planning is less pronounced for these firms, consistent with greater coordination capacity alleviating coordination frictions. Finally, we partition the sample by tax department size. Larger tax departments are likely to have more resources for tax planning (e.g., Barrios and Gallemore 2024; Belnap et al. 2024), which should allow cognitively heterogeneous teams to leverage their informational benefits and expertise more effectively. As expected, we document an amplified relationship between cognitive heterogeneity and the level of tax planning among firms with larger tax departments. Combined, these results suggest that a firms' organizational

environment plays an important role in determining whether the informational benefits of heterogeneity outweigh its coordination costs.

Finally, we examine three potential channels through which heterogeneity might translate into tax planning: (i) the identification of tax planning opportunities, proxied by firms' presence in tax havens; (ii) the productive use of tax-related inputs, captured by the tax effectiveness score developed by Schwab et al. (2022); and (iii) the consistency of tax outcomes, measured by cash ETR volatility. We find that cognitive heterogeneity is associated with greater use of tax havens, higher tax planning effectiveness, and lower cash ETR volatility. These findings indicate that cognitively heterogeneous teams are better able to identify tax planning opportunities, deploy available tax-related inputs more effectively, and implement tax strategies more consistently over time. In contrast, demographic heterogeneity is associated with higher cash ETR volatility, consistent with coordination frictions hindering the implementation of consistent tax strategies. Because tax department heterogeneity is not randomly assigned but reflects both firms' staffing decisions and the availability of suitable employees, we interpret our evidence as associational rather than causal.

Our study contributes to two streams of research. First, we extend the emerging literature on tax department composition and the organizational determinants of corporate tax behavior by introducing tax department heterogeneity as a novel determinant of firm-level tax planning. Prior research primarily focuses on the size, structure, and geographical dispersion of the tax function (Ege et al. 2021; Belnap et al. 2024; Amberger, Giese, Ortner, and Koch 2026; Beardsley et al. 2026). We show that the composition of the tax department workforce and its heterogeneity, not just its geographical or hierarchical dispersion, matter for corporate tax outcomes. Moreover, by showing that the effect of heterogeneity on firm-level tax planning differs across heterogeneity dimensions, we identify a trade-off between informational benefits and coordination costs associated with such heterogeneity.

Second, we add to the broader literature on workforce heterogeneity in accounting by

shifting the focus from heterogeneity at the top management and board level (e.g., Faccio et al. 2016; Bernile et al. 2018; Yang, Riepe, Moser, Pull, and Terjesen 2019) to operational teams directly responsible for implementing firm policies. Focusing on corporate tax departments, we show that heterogeneity within these teams has a meaningful impact on firm behavior that differs across heterogeneity dimensions. By focusing on operational teams rather than senior management, we show that the consequences of heterogeneity also depend on where such heterogeneity resides within the organization. As such, our findings should be of interest to researchers studying firm-level decision-making as well as practitioners seeking to design effective tax functions.

II. HYPOTHESES DEVELOPMENT

Overall Heterogeneity and Corporate Tax Planning

The composition of decision-making teams is a well-established determinant of organizational outcomes across finance, strategy, governance, and taxation (e.g., Dyreng, Hanlon, and Maydew 2010; Armstrong, Blouin, and Larcker 2012; Chyz, Ching Leung, Zhen Li, and Meng Rui 2013; Francis et al. 2014; Olsen and Stekelberg 2016; Law and Mills 2015; Koester, Shevlin, and Wangerin 2017; and Chyz, Gaertner, Kausar, and Watson 2019 for taxes). Workforce heterogeneity, in particular, can shape how teams process complex information, evaluate risks, and arrive at decisions (Hambrick and Mason 1984; Williams and O'Reilly 1998). Existing research, however, has focused primarily on top management teams and boards of directors (e.g., Adams and Ferreira 2009; Bernile et al. 2018), while relatively little is known about the role of heterogeneity within functional teams that directly implement firm policies. This omission is particularly important in the context of corporate tax departments, where specialized expertise and coordination are central to effective decision-making.

The impact of heterogeneity in corporate tax departments can be understood through two competing mechanisms. On the one hand, variation theory (Campbell 1960) and Upper

Echelons theory (Hambrick and Mason 1984) suggest that heterogeneous teams possess broader informational resources and a wider range of perspectives, enabling them to generate, evaluate, and implement solutions to complex problems more effectively. These informational benefits should be particularly valuable in corporate tax departments, which operate in technically sophisticated and rapidly evolving regulatory environments (Giese, Lynch, Schulz, and Sureth-Sloane 2025). Greater heterogeneity might therefore improve the identification of tax planning opportunities and enhance the evaluation of alternative tax strategies.

On the other hand, organizational behavior research highlights potential coordination costs associated with heterogeneity. Similarity-attraction theory (Byrne 1971; Kuwabara et al. 2023) and social categorization theory (Tajfel 1981; Turner 1985) predict that differences among team members can reduce cohesion, impede communication, and increase subgroup formation. Faultline theory (Lau and Murnighan 1998) further argues that these frictions intensify when multiple attributes align to create salient divisions within teams. As a result, heterogeneous teams might split into more homogeneous subgroups (Georgakakis, Greve, and Ruigrok 2017), which impairs coordination and information sharing. Such frictions are likely to be consequential in corporate tax departments because effective tax planning requires close collaboration and consistent information sharing across employees.

Taken together, these arguments suggest a trade-off between the informational benefits and coordination costs associated with heterogeneity. In corporate tax departments, greater heterogeneity may broaden the set of feasible tax strategies and improve their evaluation, thereby increasing tax planning. At the same time, heterogeneity may hinder the coordination necessary to implement tax strategies effectively, thereby reducing tax planning.[2] The net effect of overall tax department heterogeneity on tax planning is therefore theoretically ambiguous.

[2] It is important to note that strategic decisions are sometimes made at the executive level but are always implemented at the department level.

Accordingly, we state the following baseline hypothesis:

H1: Overall tax department heterogeneity is not associated with the level of corporate tax planning.

We next distinguish between *demographic heterogeneity*, which captures variation in gender and ethnicity, and *cognitive heterogeneity*, which captures variation in tenure, seniority, education, and professional experience. This distinction is important because prior research suggests that these dimensions represent different forms of heterogeneity with distinct implications for team interactions and decision-making (e.g., Liu 2018; Adhikari et al. 2019; Chyz et al. 2019; Ege et al. 2021; Condie et al. 2023; Dang et al. 2025).

Demographic Heterogeneity and Corporate Tax Planning

Demographic heterogeneity might influence corporate tax planning also through competing channels. On one hand, variation in demographic backgrounds may broaden perspectives and increase the range of information considered during decision-making (Hambrick and Mason 1984). On the other hand, demographic differences are typically highly visible and therefore more likely to trigger social categorization and subgroup formation (Tajfel 1981; Turner 1985). These dynamics can reduce team cohesion, increase communication frictions, and impair coordination (Byrne 1971).

Consistent with these competing arguments, prior empirical evidence on demographic heterogeneity is mixed. Several studies find that gender heterogeneity at the board level is associated with lower firm performance (Adams and Ferreira 2009; Yang et al. 2019), whereas other studies report positive effects on decision quality (Apesteguia, Azmat, and Iriberri 2012) and firm performance (Liang, Lourie, Nekrasov, and Shevlin 2025). Other research finds no systematic association between heterogeneity and accounting outcomes (Edmans, Flammer, and Glossner 2023). In the tax setting, Adhikari et al. (2019) show that female executives pursue less aggressive tax strategies, suggesting that demographic heterogeneity may be associated

with more conservative tax behavior. Experimental evidence further suggests that gender-balanced teams can outperform homogeneous groups (Hoogendoorn, Oosterbeek, and Van Praag 2013), although other studies document weaker or negative effects on productivity (Dang et al. 2025).

In corporate tax departments, close coordination is critical for transforming tax planning opportunities into realized outcomes. Effective tax planning requires collaboration among employees with different responsibilities and hierarchical positions, as well as the consistent execution of tax strategies over time. To the extent that demographic heterogeneity increases coordination frictions without directly expanding tax-specific expertise, its net effect is likely to constrain tax planning. We therefore state the following hypothesis:

H2: Higher demographic heterogeneity is associated with lower levels of corporate tax planning.

Cognitive Heterogeneity and Corporate Tax Planning

Cognitive heterogeneity captures differences in education, professional experience, tenure, and seniority among team members. Unlike demographic heterogeneity, these differences directly relate to the stock of knowledge and expertise available within teams. Variation theory (Campbell 1960) and related research (e.g., Williams and O'Reilly 1998; Harrison and Klein 2007) suggest that cognitively heterogeneous teams are better able to generate and evaluate alternative solutions, particularly in complex decision environments. Upper Echelons theory similarly predicts that broader expertise and experience improve problem-solving capacity and decision quality (Hambrick and Mason 1984).

The outlined informational benefits should be particularly important in corporate tax departments, where effective tax planning requires integrating technical tax knowledge, regulatory interpretation, and firm-specific information. Teams composed of individuals with heterogeneous educational backgrounds, career experiences, and tenure profiles may therefore

be better able to identify tax planning opportunities and evaluate their costs and benefits more comprehensively. Consistent with this argument, Plečnik and Wang (2021) find that functional heterogeneity within top management teams is associated with greater tax avoidance. Accordingly, we expect cognitive heterogeneity to facilitate tax planning:

H3: Higher cognitive heterogeneity is associated with higher levels of corporate tax planning.

Tax Planning Channels

While our hypotheses focus on the level of tax planning, heterogeneity might affect tax planning through several channels. First, heterogeneity could influence the identification of tax planning opportunities. Effective tax planning requires tax departments to recognize opportunities embedded in firms' organizational structures, geographic footprints, and transactions. Tax departments with more heterogeneous knowledge and perspectives may be better able to detect opportunities, connect them to firm-specific circumstances, and develop them into feasible tax strategies. We examine this channel using firms' presence in tax havens.

Second, heterogeneity may affect how effectively tax departments utilize existing tax-related inputs. Even when firms possess characteristics conducive to tax planning, such as organizational complexity, foreign operations, debt capacity, or intangible assets, realizing tax benefits requires combining these inputs with technical expertise and firm-specific knowledge. Cognitive heterogeneity, in particular, may enhance this process by broadening the range of expertise available within the department and improving the evaluation and implementation of alternative tax strategies. We capture this channel using tax effectiveness (Schwab et al. 2022), which reflects the extent to which firms convert tax planning opportunities into tax savings.

Third, heterogeneity may affect the consistency with which tax planning strategies are implemented and maintained over time. Sustainable tax planning requires not only identifying tax strategies, but also executing, monitoring, and adjusting them in response to changing

regulations and firm conditions. These activities depend critically on coordination within the tax department. Demographic heterogeneity might introduce coordination frictions that reduce the consistency of corporate tax planning activities, while cognitive heterogeneity may improve the department's ability to evaluate risks, challenge weak tax positions, and sustain effective tax strategies over time. We examine this channel using the volatility of cash ETRs over time.

Taken together, by examining these theoretical channels, we move beyond documenting *whether* tax department heterogeneity is associated with tax planning and provide evidence on *how* workforce composition within tax departments shapes corporate tax outcomes.

III. RESEARCH DESIGN

Data and Sample

We use Revelio Labs as our primary data source to construct measures of workforce heterogeneity within corporate tax departments. Revelio compiles global career histories and demographic profiles of employees using LinkedIn data, covering over 19 million public and private firms since 2008. Available employee-level information includes employee names, gender, ethnicity, education, work experience, and job roles.[3] Prior accounting research has used Revelio data to study the announcement and implications of publishing heterogeneity targets (Cai et al. 2024) and the effects of learning and development investments on recruitment success and employee retention (Blann et al. 2024).

We begin with an initial descriptive analysis that includes tax department employees from all U.S. firms, encompassing both privately held and publicly listed firms. To identify all relevant tax employees, we rely on Revelio Labs' job classification (role_k1500) and search within that classification for the word "*tax"*. For our subsequent multivariate analyses, which require detailed financial statement data, we restrict the sample to publicly listed U.S. firms.

[3] More information on Revelio Lab can be found here: https://www.reveliolabs.com/data/

Although Revelio began systematic data collection in 2008, its coverage incorporates retrospective employment histories drawn from publicly available LinkedIn profiles dating back to 1950, with broad sample coverage beginning in the 1980s. To ensure consistency in corporate income tax measurement and reporting, we focus on the period from 1993 to 2024 (Amberger 2023). As a robustness check, we further restrict the analysis to the post-2008 period—when Revelio formally began collecting LinkedIn-based data—to address potential concerns about incomplete pre-2008 coverage. We continue to obtain consistent results.

To isolate in-house corporate tax departments rather than external consultants, we exclude firms in tax services and public accounting.[4] Firms in finance and insurance (NAICS codes: 520000-529999) are also excluded to avoid industry-specific distortions. The final sample for the descriptive analysis (Descriptive Sample) comprises 3,545 publicly listed firms with 142,303 positions in tax departments and 74,728 private U.S. firms with 232,461 positions (see Table 1, Panel A). To obtain the Regression Sample, we merge publicly listed firms from the Descriptive Sample with financial statement data from Compustat. After excluding firms with missing data, this sample includes 2,548 unique firms with 126,075 positions in tax departments (see Table 1, Panel B).

Measuring Heterogeneity within Tax Departments

Following prior research, we construct three measures of tax department heterogeneity for each firm-year in the Descriptive Sample: (i) overall heterogeneity, (ii) demographic heterogeneity, and (iii) cognitive heterogeneity (Harjoto, Laksmana, and Lee 2015; Behlau et al. 2024). To this end, we first compute individual indices using the Blau Index (1977), which we then aggregate into composite measures. The Blau Index is defined as:

$$Blau = 1 - \sum_{j=1}^{k} P_j^2$$

[4] We exclude with NAICS codes 541213, 541211, 541214, 541219, and 561320.

where P is the proportion of employees in category j, and k is the number of categories for the respective heterogeneity dimension (Blau 1977).

To ensure comparability across dimensions, we normalize the index as follows:

$$Normalized\ Blau\ Index_{i,t} = \left(1 - \sum_{j=1}^{k} P_j^2\right) \times \frac{k}{k-1} \quad (1)$$

As a result, all indices are scaled between 0 (no heterogeneity) and 1 (maximum heterogeneity).

We capture demographic heterogeneity using the dimensions $Gender_{it}$ and $Ethnicity_{it}$. $Gender_{it}$ reflects heterogeneity across two categories, female and male. $Ethnicity_{it}$ measures heterogeneity across six categories of ethnic backgrounds provided by Revelio, which include Asian and Pacific Islander, Black, Hispanic, Native American, White, and Multi (two or more ethnicities). Cognitive heterogeneity captures variation in employees' experience and educational backgrounds, including $Tenure_{it}$, $Experience_{it}$, $Seniority_{it}$, and $Education_{it}$. $Tenure_{it}$ reflects firm-specific experience, defined as the number of years an employee has worked at the current firm. $Experience_{it}$ measures heterogeneity in total work experience. Following Harjoto et al. (2015), we discretize both variables into six three-year intervals, ranging from less than three years to more than fifteen years. $Seniority_{it}$ reflects hierarchical roles within the tax department using the seven hierarchy levels provided by Revelio: Entry Level, Junior Level, Associate Level, Manager Level, Director Level, Executive Level, and Senior Executive Level (Ege et al. 2021).[5] $Education_{it}$ measures heterogeneity in the highest educational attainment across six categories: High School, Associate, Bachelor, Master, MBA, and Doctorate.

Using these six indices, we construct three composite measures. First, $Overall_{it}$ captures overall heterogeneity and is calculated as the normalized average of all six individual indices.

[5] Details on the job titles included in each category can be found here: https://www.data-dictionary.reveliolabs.com/methodology.html#seniority

Second, $Demographic_{it}$ measures demographic heterogeneity and is computed as the normalized average of the gender and ethnicity indices. Third, $Cognitive_{it}$ captures cognitive heterogeneity and is calculated as the normalized average of experience, tenure, seniority, and education heterogeneity. The Appendix provides detailed definitions of all variables.

Regression Design

To examine the association between tax department heterogeneity and corporate tax planning in the Regression Sample, we estimate the following ordinary least squares (OLS) regression:

$$TaxPlanning_{it} = \beta_0 + \beta_1 Heterogeneigty_{it} + \beta_z Z_{it} + \delta\ Industry\text{-}FE_j + \gamma\ Year\text{-}FE_t + \varepsilon_{it} \quad (2)$$

We use $CashETR_{it}$ as our primary measure of $TaxPlanning_{it}$, defined as cash taxes paid divided by pretax book income before special items. Missing special items are set to zero, and the remaining non-missing cash ETRs are winsorized at 0 and 1. Because higher values of $CashETR_{it}$ indicate higher effective tax burdens, the extent of tax planning is inversely related to $CashETR_{it}$. In additional analyses, we use three alternative tax planning measures, including (i) $GAAPETR_{it}$, defined as income taxes divided by pretax book income before special items, (ii) the three-year cash ETR ($CashETR\ (3y)_{it}$) for the years t to t-2, and (iii) the three-year forward-looking cash ETRs ($ForwCashETR_{it}$) for the years t to t+2. The annual ETRs for all three measures are calculated consistent with $CashETR_{it}$.

Vector $Heterogeneity_{it}$ includes the heterogeneity indices described above. To the extent that a given heterogeneity dimension is associated with more (less) tax planning, we expect β_1 to be negative (positive).

Following prior research on the determinants of tax planning (Frank, Lynch, and Rego 2009; Dyreng et al. 2010; Plečnik and Wang 2021), we control for a range of firm characteristics captured by vector Z_{it}. These controls include book-tax differences (BTD_{it}), capital expenditures ($CAPEX_{it}$), cash and cash equivalents ($Cash_{it}$), equity income ($Equity_{it}$), foreign income

($Foreign_{it}$), free cash-flow (FCF_{it}), leverage ($Leverage_{it}$), the market-to-book ratio (MTB_{it}), decreases in net operating losses ($NOLDecrease_{it}$), and firm size measured as the natural logarithm of total assets ($SIZE_{it}$). We further control for the size of the tax department, measured as the number of tax employees per firm-year included in the Revelio database ($TaxDepSize_{it}$), and the share of tax-department employees that remained unchanged compared to the previous year ($SameTaxDep_{it}$). To account for firm-wide heterogeneity trends (Byker, Malik, Patel, and Sandvik 2025), we control for overall firm heterogeneity ($OverallFirm_{it}$). We calculate $OverallFirm_{it}$ analogously to $Overall_{it}$ but use all positions recorded for a given firm in the Revelio database.

We additionally include controls related to firms' tax outcomes, including intangible intensity (INT_{it}), investment in property, plant, and equipment (PPE_{it}), and research and development expenditures ($R\&D_{it}$). Finally, we include industry fixed effects to account for time-invariant industry factors and year fixed effects to capture macroeconomic shocks (Roberts and Whited 2012). Given that tax department heterogeneity varies at the firm level, we estimate heteroskedasticity-robust standard errors clustered at the firm level (Abadie, Athey, Imbens, and Wooldridge 2022). All controls are winsorized at the 1% and 99% levels. Variable definitions are provided in the Appendix.

IV. DESCRIPTIVE EVIDENCE

Descriptive Sample

Table 2, Panel A reports descriptive information for the Descriptive Sample, which includes 232,461 positions in tax departments of private firms and 142,303 positions in tax departments of publicly listed firms (see Table 1, Panel A). Compared to private firms, publicly listed firms operate larger tax departments and exhibit significantly higher levels across all heterogeneity measures. These differences suggest that publicly listed firms have larger and more heterogeneous tax departments.

We next examine how tax department heterogeneity evolves over time. Figure 1 presents trends separately for private firms (Panel A) and publicly listed firms (Panel B). Among private firms, all six heterogeneity measures increase modestly over the sample period, although the magnitude of these changes remains limited. This pattern likely reflects the small size of tax departments in private firms, which average only two employees per firm-year in our sample (see Table 2). In contrast, publicly listed firms exhibit more pronounced and consistent increases in heterogeneity across all indices. The strongest increases occur in $Gender_{it}$ and $Seniority_{it}$, both of which rise more rapidly than the composite measure $Overall_{it}$. $Experience_{it}$ and $Tenure_{it}$ increase steadily until 2020, decline between 2020 and 2023, and rebound in 2024. $Education_{it}$ and $Ethnicity_{it}$ also trend upward over time, although at a more moderate pace. Collectively, these patterns indicate that tax departments in publicly listed firms have become substantially more heterogeneous over time.

Panel C of Figure 1 compares heterogeneity within tax departments to firm-wide heterogeneity. Across all dimensions and throughout our sample period, tax departments remain consistently less heterogeneous than firms overall. This finding suggests that tax departments remain functional units with more homogeneous workforce, despite the pronounced increase in heterogeneity documented over time.

We next investigate whether heterogeneity varies systematically across geographic regions. Figure 2 maps the regional distribution of $Overall_{it}$ based on firms' headquarters ZIP codes. For both private firms (Panel A) and publicly listed firms (Panel B), headquarters are concentrated in the western United States and major metropolitan areas. However, visual inspection suggests that higher level of heterogeneity are not exclusively concentrated in large metropolitan areas, indicating that geographic location alone is unlikely to fully explain observed differences in tax department composition.

To further investigate these patterns, we estimate untabulated regressions relating our heterogeneity indices to characteristics of the tax department's highest-seniority employee and

firms' headquarters locations. We find that firms with a non-white highest-seniority tax department employee exhibit significantly higher $Overall_{it}$ and $Demographic_{it}$ heterogeneity and lower $Cognitive_{it}$ heterogeneity. In contrast, firms with female or female non-white highest-seniority employees exhibit significantly higher $Demographic_{it}$ heterogeneity only. We further find that firms headquartered in one of the 20 largest metropolitan areas exhibit significantly higher $Demographic_{it}$ heterogeneity but lower $Cognitive_{it}$ heterogeneity. Taken together, these results suggest that demographic characteristics of senior tax personnel are primarily associated with $Demographic_{it}$ heterogeneity within tax departments, whereas metropolitan labor markets appear to impact the balance between cognitive and demographic heterogeneity.

Finally, Figure 3 examines the underlying workforce composition driving the observed increase in heterogeneity among publicly listed firms. The evidence indicates that the aggregate trends documented in Figure 1 reflect substantial shifts in tax department composition over time. Gender composition becomes more balanced, while the share of white employees declines as representation of other ethnic groups increases. At the same time, the seniority distribution shifts toward more associate-level roles and fewer director-level positions. Similarly, the share of employees with short tenure (less than three years) and limited work experience (less than three years) increases substantially. Educational composition also changes over time, with rising representation of employees holding bachelor's degrees, a temporary increase in master's degrees until 2020, and a continuous decline in MBA holders.

Overall, these findings point to a structural shift in the composition of tax departments among publicly listed U.S. firms. While departments have become more heterogeneous in terms of demographic characteristics, they have also shifted toward a workforce composed increasingly of early-career employees with less advanced educational specialization. This pattern may reflect firms' responses to rising tax reporting and compliance demands (Giese et al. 2025). Rather than relying primarily on highly specialized experts focused on complex tax planning activities, firms appear to be expanding tax departments with broader and more

flexible workforces to manage routine tax compliance and reporting functions.

Regression Sample

Table 2, Panel B reports descriptive statistics for the Regression Sample and the variables included in Equation (2). The sample includes 126,075 positions in tax departments for 2,548 publicly listed firms (see Table 1, Panel B). The means for our outcome variables are similar to those reported in prior studies (Frank et al. 2009; Dyreng et al. 2010; Neuman, Omer, and Schmidt 2020; Plečnik and Wang 2021). We observe slightly higher mean values for *CashETR*. The average tax department in our sample has 14 employees, which is comparable to the 11 employees reported by Chen et al. (2021).

V. TAX DEPARTMENT HETEROGENEITY AND TAX PLANNING

Tests of H1: Overall Heterogeneity

We begin our multivariate analyses by testing H1 and examining the association between overall tax department heterogeneity and firm-level tax planning. To do so, we estimate several variations of Equation (2), using alternative measures of tax planning, and report the results in Table 3.

In column (1), we use $CashETR_{it}$ as the dependent variable and find a positive but statistically insignificant coefficient on $Overall_{it}$. We obtain a similar result when using $GAAPETR_{it}$ in column (2). Consistent with H1, these results suggest that overall tax department heterogeneity is not systematically associated with contemporaneous levels of tax planning. In columns (3) and (4), we turn to long-run measures of tax planning by examining three-year cash ETRs ($CashETR\ (3y)_{it}$) and three-year forward-looking cash ETRs ($ForwCashETR_{it}$), respectively. For both measures, the coefficient on $Overall_{it}$ is negative and statistically significant. This pattern suggests that, to the extent workforce heterogeneity improves the identification and implementation of tax strategies, benefits may materialize with a time lag

rather than immediately within the current year. [6]

Taken together, the results in Table 3 provide partial support for H1. While overall heterogeneity is not significantly associated with short-run tax planning outcomes, it is positively associated with long-run measures of tax planning. These findings are consistent with Upper Echelons theory (Hambrick and Mason 1984) and variation theory (Campbell 1960), which suggest that heterogeneous teams are particularly valuable in complex and uncertain decision environments such as corporate taxation. Yet, the net informational benefits associated with heterogeneity are realized gradually and become large enough to impact tax planning only over longer horizons.

Tests of H2 and H3: Demographic and Cognitive Heterogeneity

We next examine whether the relationship between tax department heterogeneity and tax planning differs across heterogeneity dimensions. To do so, we simultaneously include demographic ($Demographic_{it}$) and cognitive heterogeneity ($Cognitive_{it}$) in Equation (2) and report the results in Table 4.[7]

We begin by testing H2 and examining the association between demographic heterogeneity and firm-level tax planning. Column (1) shows that $Demographic_{it}$ is positively and significantly associated with $CashETR_{it}$, indicating that firms with more demographically heterogeneous tax departments exhibit higher cash ETRs and therefore engage in less tax planning. This result is consistent with the notion that demographic heterogeneity might increase coordination frictions, leading to higher effective tax burdens (Faccio et al., 2016). The positive association remains statistically significant across all alternative tax planning measures reported in columns (2) through (4). Collectively, these findings provide support for H2: Higher demographic heterogeneity is associated with lower levels of tax planning.

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[6] The results are also consistent with longer-window ETR measures being less sensitive to transitory year-specific shocks and therefore better capturing persistent tax planning (Dyreng, Hanlon, and Maydew 2008).

[7] We include both indices simultaneously, as we observe high correlations among the subindices (untabulated).

We next test H3 by examining the association between cognitive heterogeneity and tax planning. In column (1), $Cognitive_{it}$ is negatively and significantly associated with $CashETR_{it}$, implying that firms with greater variation in tenure, education, seniority, and professional experience exhibit lower effective tax rates and therefore higher levels of tax planning. The relation remains statistically significant across all alternative specifications in columns (2) through (4). These findings support H3 and suggest that cognitively heterogeneous tax departments are better able to identify, evaluate, and implement tax planning strategies.[8]

The estimated effects are also economically meaningful. Based on the estimates in column (1), a one standard deviation increase in $Demographic_{it}$ ($Cognitive_{it}$) is associated with a 1.63 (1.33) percentage point increase (decrease) in firms' cash ETRs. For the average firm in our sample, these estimates translate into approximately $12.1 ($9.9) million higher (lower) annual tax payments associated with a one standard deviation increase in demographic (cognitive) heterogeneity.

Overall, these results suggest that focusing on aggregate heterogeneity masks important differences in how the composition of tax department workforce affects firm-level tax planning. While overall heterogeneity has only limited impact on tax planning, demographic and cognitive heterogeneity have significant effects that differ in directions. Our findings are consistent with the notion that greater heterogeneity related to expertise and experience can enhance information sharing and facilitate decision-making (Dahlin et al. 2005; Plečnik and Wang 2021), whereas demographic heterogeneity may generate coordination frictions that

[8] In untabulated analyses, we perform several robustness tests to assess the sensitivity of our main results. First, we restrict the sample period from 2008 to 2024, corresponding to the period during which Revelio actively collected Linked-In based employment data. Second, we require tax departments to consist of at least five employees to mitigate concerns that our inferences are influenced by very small teams. Third, we include controls for foreign education to account for potential variation in international expertise. Across specifications, the estimated associations between $CashETR_{it}$ and both $Overall_{it}$ and $Demographic_{it}$ remain qualitatively unchanged relative to the results reported in Table 3 and Table 4. The coefficient estimates on $Cognitiv_{it}$ also remain negative across specifications, although the effect falls marginally short of statistical significance when restricting the sample to tax departments with at least five employees. Overall, these results suggest that our main findings are robust to alternative sample restrictions and controls.

constrain the implementation of effective tax planning strategies.

Additional Analysis: Individual Heterogeneity Components

To better understand the drivers of the results in the previous section, we next decompose overall heterogeneity into its six underlying component indices and report the results in Table 5. Using $CashETR_{it}$ as the dependent variable, we find that $Ethnicity_{it}$ is associated with higher effective tax rates, while the coefficient on $Gender_{it}$ is not statistically significant. These findings suggest that the negative relationship between overall demographic heterogeneity and tax planning is primarily driven by variation in ethnic backgrounds rather than gender composition.

Among the cognitive heterogeneity components, $Tenure_{it}$ exhibits a strong negative and statistically significant association with $CashETR_{it}$, indicating that firms with greater variation in firm-specific tenure engage in more tax planning. In contrast, $Experience_{it}$ is positively associated with $CashETR_{it}$, consistent with heterogeneity in prior work experience being related to less tax planning. The coefficients on $Education_{it}$ and $Seniority_{it}$ are not statistically significant. Collectively, these findings indicate that heterogeneity in firm-specific experience, rather than all forms of cognitive heterogeneity, appears to be the main driver of corporate tax planning, underlining the importance of firm-specific knowledge and organizational experience in identifying tax planning opportunities and implementing tax strategies.

Critical Mass Analysis

The analysis so far assumes that the relationship between tax department heterogeneity and tax planning is linear. In this section, we relax this linearity assumption and test for the presence of critical mass effects. Specifically, we examine whether the association between heterogeneity and tax planning changes once heterogeneity exceeds certain threshold levels. Following prior research on heterogeneity-performance dynamics (Joecks, Pull, and Vetter 2013), we estimate quadratic specifications that allow the marginal effect of heterogeneity to

vary across different levels of heterogeneity. Specifically, we extend Equation (2) as follows:

$$TaxPlanning_{ijt} = \beta_0 + \beta_1 Heterogeneigty_{it} + \beta_2 Heterogeneity_{it}^2 + \beta_z Z_{it} + \delta\ Industry\text{-}FE_j + \gamma\ Year\text{-}FE_t + \varepsilon_{it} \quad (3)$$

where $Heterogeneity_{it}^2$ captures the nonlinear component of $Heterogeneity_{it}$. To determine whether a turning point exists within the observed data rage, we calculate the interior critical point of the quadratic function as:

$$x^* = -\frac{\beta_1}{2\beta_2} \quad (4)$$

If $x^* \in [0,1]$, we interpret the turning point as a critical mass, i.e., a level of heterogeneity at which the marginal association between heterogeneity and tax planning changes sign.

Figure 4 visualizes the estimated relations using predicted values of $CashETR_{it}$. The x-axis spans the full [0, 1] data range of overall heterogeneity, demographic heterogeneity, and cognitive heterogeneity, respectively; the y-axis reports predicted cash ETR values. Shaded regions represent 95 percent confidence intervals, and dashed vertical lines indicate the estimated critical mass points at which the marginal effect changes sign.

Figure 4 indicates that the relationships between $CashETR_{it}$ and both $Overall_{it}$ and $Cognitive_{it}$ are nonlinear and downward sloping. For both measures, the estimated turning points lie within the observed data range, at approximately 0.35 for overall heterogeneity and at 0.2 for cognitive heterogeneity. These patterns suggest that the informational benefits associated with heterogeneity become sufficiently large only after tax departments reach moderate levels of heterogeneity. Below the thresholds, these benefits may be insufficient to outweigh potential coordination costs. Once the thresholds are reached, however, greater heterogeneity is associated with lower cash ETRs and higher levels of tax planning.

In contrast, the association between $Demographic_{it}$ and $CashETR_{it}$ does not exhibit evidence of a comparable critical mass effect. This result suggests that the coordination frictions

associated with visible demographic differences may emerge even at relatively low levels of heterogeneity where they dominate potential informational benefits.

Overall, the results of our critical mass analysis indicate that the relationship between tax department heterogeneity and tax planning is neither strictly linear nor monotonic. In particular, moderate levels of cognitive heterogeneity are required to enhance tax planning, whereas already low levels of demographic heterogeneity induce coordination frictions that constrain tax planning.

Cross-sectional Tests

We next conduct several cross-sectional tests based on firm characteristics that may moderate the relative informational benefits and coordination costs associated with tax department heterogeneity. These tests allow us to identify settings in which heterogeneity and its dimensions are more or less strongly associated with corporate tax planning. Table 6 reports the results. Panel A presents analysis for overall tax department heterogeneity, while Panel B separately examines demographic and cognitive heterogeneity.

Table 6Column (1) examines whether the association between tax department heterogeneity and tax planning differs by firm size, measured using a median split based on total assets. Prior research suggests that larger firms have more developed organizational structures, communication channels, and internal processes (Robinson and Stocken 2013; Shroff et al. 2014). These features may allow larger firms to mitigate coordination frictions associated with demographic heterogeneity and more effectively realize the informational benefits associated with more heterogeneous tax departments. Consistent with this argument, we find that the coefficients on the interaction terms $Split_{it} \times Overall_{it}$ in Panel A and $Split_{it} \times Demographic_{it}$ in Panel B are negative and statistically significant, indicating that larger firms with more heterogeneous tax departments exhibit lower cash ETRs and engage in more tax planning. In contrast, the coefficient on the interaction term $Split_{it} \times Cognitive_{it}$ is not

significant.

Table 6Column (2) examines whether the relation between heterogeneity and tax planning varies with a firm's number of business segments (Goncharov and Peter 2019). Prior research suggests that firms with more business segments have more developed internal coordination systems and therefore greater coordination capacity (Cho 2015). Consistent with this argument, we find that firms with a larger number of business segments and higher levels of $Overall_{it}$ and $Demographic_{it}$ heterogeneity exhibit significantly lower cash ETRs. In contrast, the coefficient on the interaction term $Split \times Cognitive_{it}$ is positive but statistically insignificant. Similar to the firm-size results, these findings suggest that firms with greater coordination capacity are better able to reduce coordination frictions associated with demographic heterogeneity, allowing informational benefits associated with heterogeneity to dominate in tax planning.

Table 6Finally, column (3) examines whether the effects of heterogeneity vary with tax department size. Larger tax departments likely have greater resources for tax planning, allowing them to leverage informational benefits and expertise more effectively when identifying and implementing tax planning strategies. Consistent with this argument, we find that the coefficients on the interaction terms *Split* × *Overall* in Panel A and *Split* × *Cognitive* in Panel B are negative and statistically significant, whereas the coefficient on the interaction term *Split* × *Demographic* is insignificant (Panel B). Hence, firms with larger tax departments and greater cognitive heterogeneity exhibit lower cash ETRs and therefore engage in more tax planning.

Taken together, these cross-sectional results suggest that the effects of tax department heterogeneity vary with firm characteristics that influence the relative informational benefits and coordination costs of such heterogeneity. In settings with more developed organizational structures, coordination capacity, or greater resources for tax planning, the informational benefits of heterogeneity appear more likely to outweigh potential coordination frictions.

VI. CHANNEL ANALYSIS

In our final set of analysis, we examine three potential channels through which tax department heterogeneity might affect corporate tax planning. Specifically, we investigate whether heterogeneity influences (i) the identification of tax planning opportunities, (ii) the productive use of tax-related inputs, and (iii) the consistency of tax outcomes over time.

Identification of Tax Planning Opportunities

Greater heterogeneity, particularly cognitive heterogeneity, may enhance firms' ability to identify and implement sophisticated tax planning strategies. To examine this channel, we investigate whether tax department heterogeneity is associated with a firm's tax haven presence. To so do so, we use Exhibit 21 data from the Compustat subsidiary database and classify jurisdictions as tax havens based on the list provided by Bennedsen and Zeume (2018). Table 7, columns (1) through (4), report the results. Columns (1) and (2) use $TaxHavenInd_{it}$ as the dependent variable, defined as an indicator variable equal to one if a firm maintains at least one subsidiary in a tax haven in a given year, and zero otherwise. Columns (3) and (4) examine $TaxHaven_{it}$, measured as the number of tax haven subsidiaries. Because $TaxHaven_{it}$ is a count variable, we estimate the specifications in columns (3) and (4) using Poisson regressions.

In columns (1) and (3), we find that the coefficient on $Overall_{it}$ is positive and statistically significant, indicating that firms with more heterogeneous tax departments are more likely to maintain tax haven subsidiaries and have a larger number of such subsidiaries. When demographic and cognitive heterogeneity are included simultaneously in columns (2) and (4), we find that the positive association between heterogeneity and tax haven presence is primarily driven by $Cognitive_{it}$. In contrast, $Demographic_{it}$ is only weakly positively associated with $TaxHavenInd_{it}$ and exhibits no statistically significant association with the number of tax haven subsidiaries. Taken together, these findings suggest that cognitive heterogeneity enables firms to identify and implement sophisticated tax planning structures, whereas demographic

heterogeneity does not appear to facilitate such activities.

Productive Use of Tax-related Inputs

We next examine whether tax department heterogeneity affects not only the level of tax planning, but also the effectiveness with which firms convert tax planning opportunities and resources into tax savings. Table 7, columns (5) and (6), report the results.

Following Schwab et al. (2022), we measure tax planning effectiveness ($TaxEffectiveness_{it}$) using Data Envelopment Analysis (DEA), a nonparametric linear programming approach that evaluates the efficiency of decision-making units (DMUs) (Ji and Lee 2010); firms in the context of our study. Consistent with Schwab et al. (2022), we estimate an output-oriented DEA model that evaluates firms' ability to generate after-tax return on equity from a set of tax-related inputs, including research and development expenses (R&D), property, plant, and equipment (PPE), tax haven use, intangible assets, inventory, and total debt.[9] To account for scale differences, we implement a variable returns-to-scale specification and benchmark firms annually against peers within modified Fama–French 30 industries. Conceptually, $TaxEffectiveness_{it}$ captures how efficiently firms transform tax planning opportunities and tax-related resources into after-tax performance, relative to industry peers. In contrast to cash ETRs, which capture the level of tax planning, $TaxEffectiveness_{it}$ measures the efficiency with which firms utilize available tax planning inputs relative to industry peers.

We find that $Overall_{it}$ is positively and significantly associated with tax planning effectiveness in column (5) of Table 7. However, when $Demographic_{it}$ and $Cognitive_{it}$ are included simultaneously in column (6), the results vary across dimensions. Specifically, the coefficient on $Cognitive_{it}$ is positive and significant, whereas $Demographic_{it}$ is negatively associated with tax planning effectiveness. Combined, these findings suggest that cognitively

[9] To capture tax haven activity, we use Exhibit 21 data and the tax haven list of Bennedsen and Zeume (2018). A firm is classified as having tax haven operations beginning in the year such operations are first disclosed and in all subsequent years.

heterogeneous tax departments are better able to convert available tax planning opportunities and resources into tax savings. Hence, variation in expertise, experience, and professional backgrounds, rather than demographic heterogeneity per se, matters for effective tax planning.

Consistency of Tax Outcomes Over Time

Finally, we investigate whether tax department heterogeneity affects the consistency of firms' tax outcomes over time. We measure the consistency of tax outcomes using the five-year standard deviation of cash ETRs, calculated over the period *t-4* to *t* ($SDCashETR\ (5y)_{it}$), with higher values reflecting less consistent tax outcomes over time. In addition to our baseline controls, we include controls for the five-year average cash ETR ($CashETR\ (5y)_{it}$) and the volatility of pre-tax return on assets ($SDROA\ (5y)_{it}$) to account for the level of tax planning and operating volatility, respectively. We present the results in Table 7, columns (7) and (8).

In column (7), the coefficient on $Overall_{it}$ is negative but insignificant, suggesting no clear association between overall heterogeneity and the consistency of tax outcomes. When examining demographic and cognitive heterogeneity separately in column (8), differences emerge. $Demographic_{it}$ is positively and significantly associated with tax volatility, indicating that firms with more demographically heterogeneous tax departments exhibit less consistent tax outcomes over time. In contrast, the coefficient on $Cognitive_{it}$ is negative and statistically significant, suggesting that cognitively heterogeneous tax departments achieve more consistent tax outcomes. These results suggest that demographic heterogeneity introduces coordination frictions that hinder the consistent implementation of tax strategies, while cognitive heterogeneity may improve tax departments' ability to evaluate risks, monitor tax positions, and maintain consistent tax strategies and hence contribute to more consistent tax outcomes.

Taken together, the results in this section indicate that different dimensions of tax department heterogeneity affect corporate tax outcomes through distinct channels. Cognitively heterogeneous teams appear better able to identify tax planning opportunities, utilize available

tax-related resources more effectively, and implement tax strategies more consistently over time. Demographic heterogeneity, in contrast, is associated with greater tax volatility, which suggests that coordination frictions may impair the implementation of consistent tax strategies.

VII. CONCLUSION

This study examines whether and how workforce heterogeneity within corporate tax departments shapes tax planning. Using a novel dataset that links employee-level information from LinkedIn profiles compiled by Revelio Labs to firm-level tax outcomes, we document that the effects of tax department heterogeneity depend critically on the underlying heterogeneity dimension. Specifically, we find that cognitive heterogeneity is associated with higher levels of tax planning, while it decreases with demographic heterogeneity. These findings are consistent with a trade-off between the informational benefits and coordination costs associated with heterogeneity within tax departments.

We further show that the effects of heterogeneity vary with firm characteristics that influence the relative informational benefits and coordination costs of heterogeneity. The positive association between cognitive heterogeneity and tax planning is stronger among firms with greater tax planning resources. In contrast, the negative association between demographic heterogeneity and tax planning is attenuated among firms with more developed organizational structures and greater coordination capacity. These results suggest that the organizational environment plays an important role in determining whether the informational benefits of heterogeneity outweigh its coordination costs.

Additional analyses provide evidence on the channels through which tax department heterogeneity affects corporate tax outcomes. We find that firms with more cognitively heterogeneous tax departments are better able to identify and implement sophisticated tax planning structures, utilize tax-related resources more effectively, and achieve more stable tax outcomes. Yet, demographic heterogeneity is associated with less consistent tax outcomes,

likely due to coordination frictions impairing the consistent implementation of tax strategies.

Our study is subject to several limitations. First, we document associations between tax department heterogeneity and corporate tax planning rather than causal effects, as tax department heterogeneity reflects both firms' staffing decisions and the availability of suitable employees. Although our empirical design controls for a broad set of established determinants of corporate tax planning, unobserved factors correlated with both heterogeneity and tax outcomes could still influence our results. Second, because our data rely on LinkedIn profiles, we might not fully observe the composition of tax departments and thus fail to capture the full extent of heterogeneity. While the average tax department size in our sample is comparable to that reported in prior research (Chen et al. 2021), we cannot rule out measurement error in our heterogeneity measures.

This study contributes to the literature on the organizational determinants of tax planning by identifying tax department composition as a previously underexplored determinant of firm-level tax outcomes. More broadly, the study extends the literature on workforce heterogeneity in accounting by showing that heterogeneity within operational teams, such as the corporate tax department, has implications for firm behavior, beyond the effects documented at the executive or board level. The findings also have practical implications. As firms and policymakers continue to emphasize workforce heterogeneity, our results highlight that different dimensions of heterogeneity can have distinct consequences. Designing effective tax functions therefore requires not only altering heterogeneity but also developing the coordination mechanisms necessary to realize its informational benefits while mitigating potential coordination frictions.

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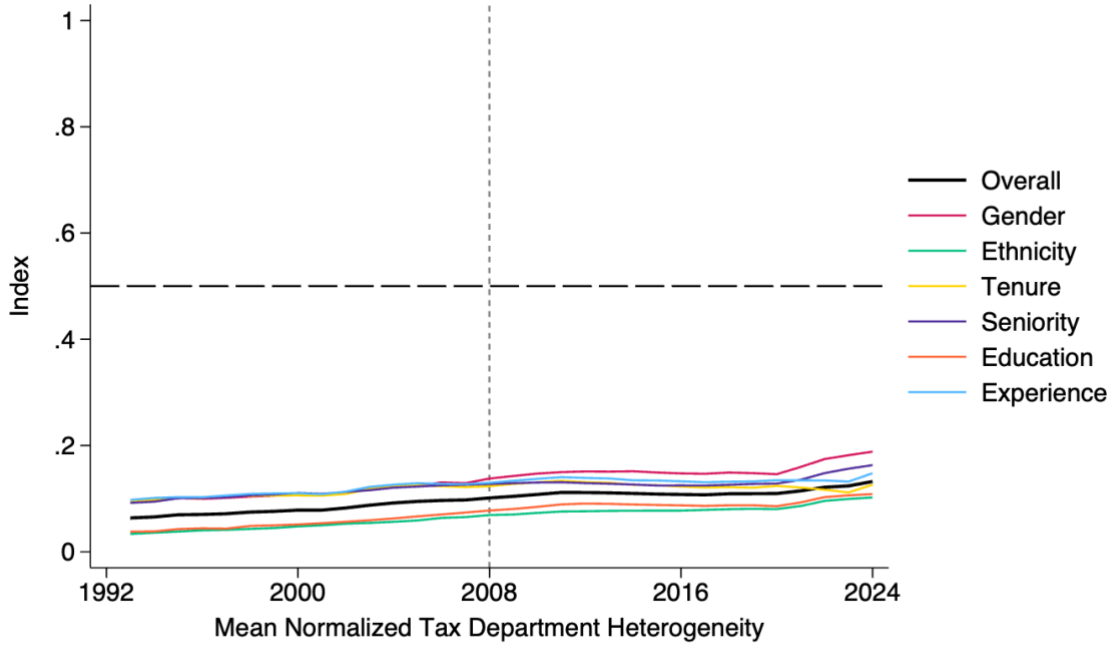
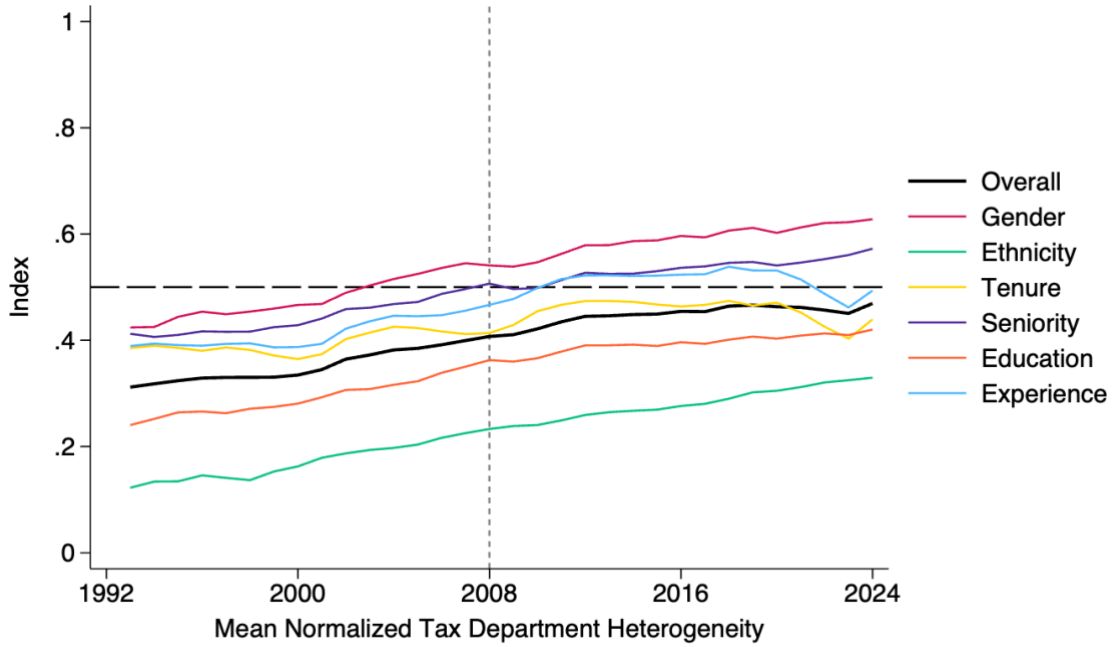
Figures and Tables

Figure 1
Time-Series Development of Heterogeneity

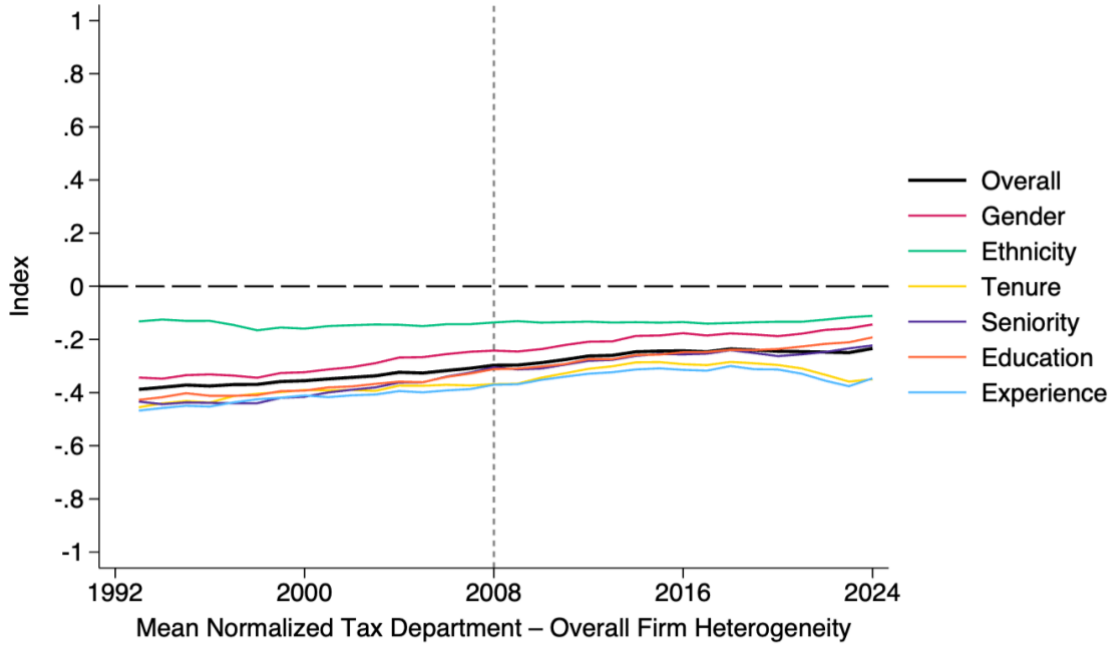
Panel A: Tax Department Heterogeneity for Private Firms



Panel B: Tax Department Heterogeneity for Publicly Listed Firms



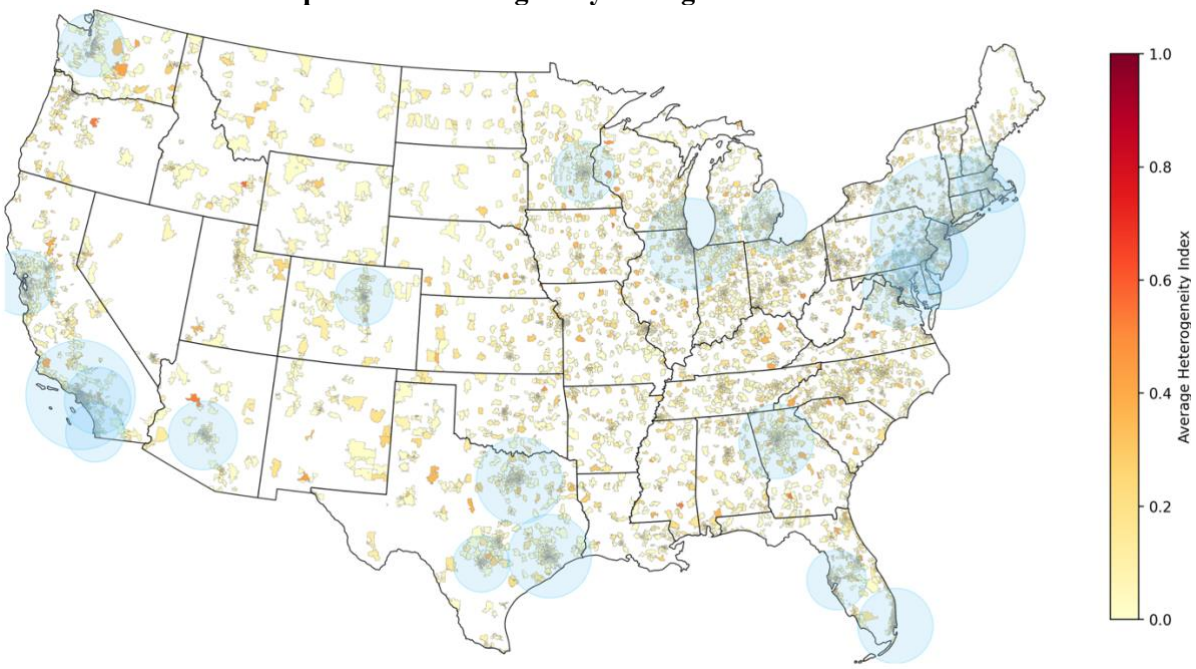
Panel C: Difference between Tax Department and Overall Firm Heterogeneity for Publicly Listed Firms



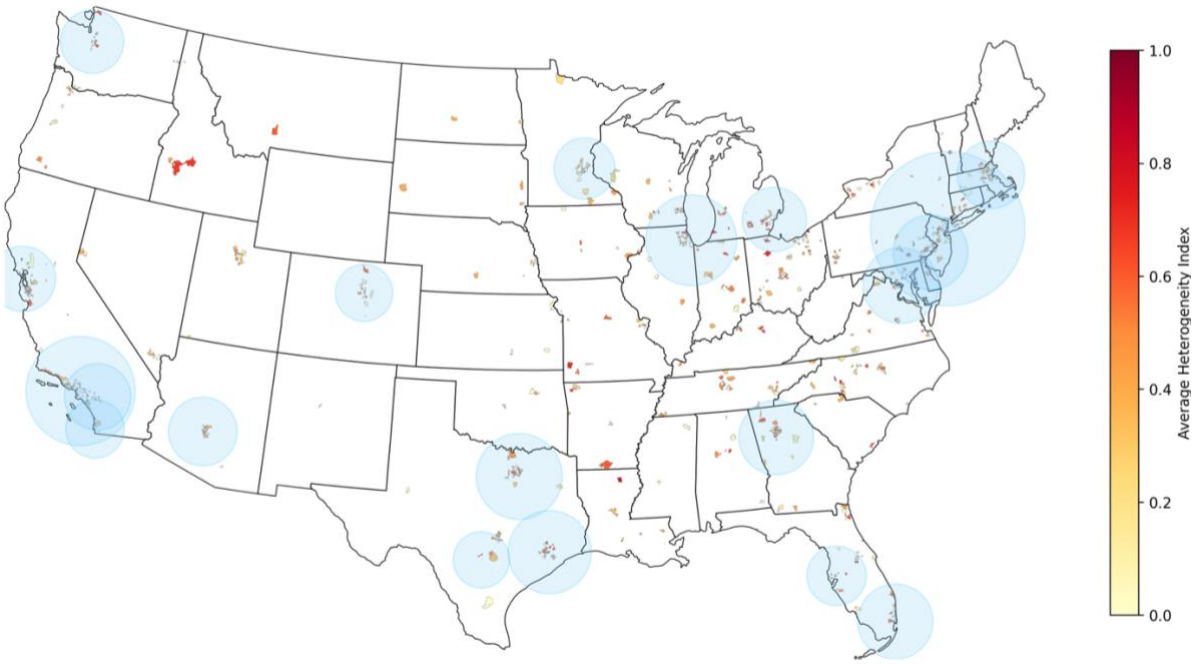
Notes: The figure illustrates the evolution of the heterogeneity indices for U.S. firms from 1993 to 2024. Panel A (B) presents the over-time development of heterogeneity within tax departments for private (publicly listed) U.S. firms. Panel C reports the difference between heterogeneity publicly listed firms' tax departments and overall firm-wide heterogeneity.

Figure 2
Regional Distribution of Tax Department Heterogeneity

Panel A: Overall Tax Department Heterogeneity among Private Firms

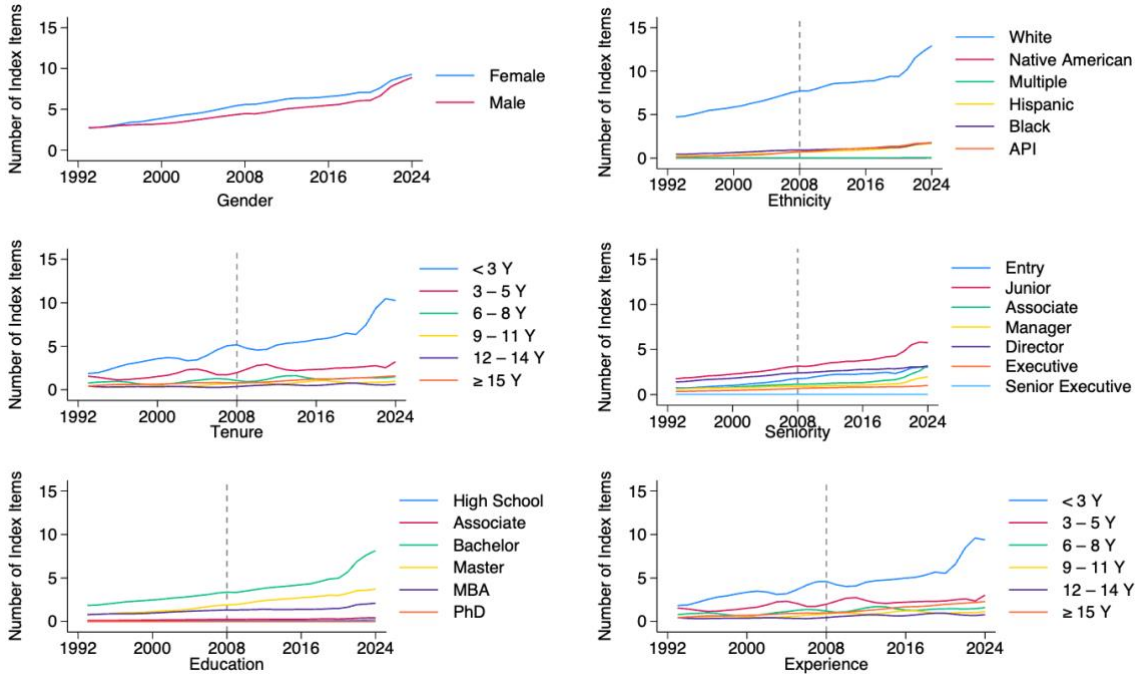


Panel B: Overall Tax Department Heterogeneity among Publicly Listed Firms



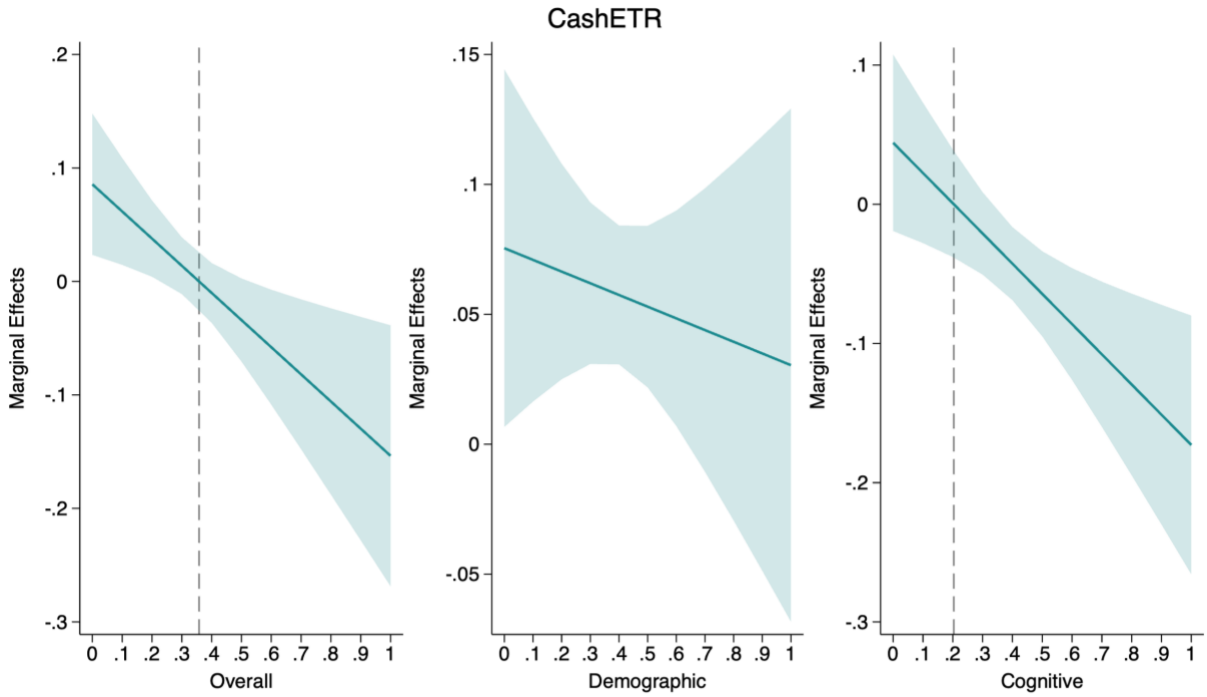
Notes: This figure shows the regional distribution of overall tax department heterogeneity (*Overall*) based on the firm's headquarters ZIP code. Panel A shows the results for private firms and Panel B for publicly listed firms. Heterogeneity ranges from 0 (light yellow = low) to 1 (dark red = high). The blue circles indicate the 20 largest metropolitan areas in the U.S.

Figure 3
Time-Series Development of Heterogeneity Categories for Publicly Listed Firms



Notes: The figure shows the time-series development of the individual heterogeneity categories used to calculate the heterogeneity indices shown in Figure 1. The sample includes publicly listed U.S. firms for the years 1993 to 2024.

Figure 4
Critical Mass Analysis



Notes: The figure illustrates the estimated relationships between predicted tax planning and (i) overall heterogeneity, (ii) demographic heterogeneity, and (iii) cognitive heterogeneity. We measure tax planning using cash ETRs (*CashETR*). Each graph plots fitted values from estimating Equation (3). All regressions include industry and year fixed effects. Standard errors are clustered at the firm level. Shaded regions represent 95 percent confidence intervals. Dashed vertical lines indicate the estimated critical mass points where the marginal association between heterogeneity and tax planning changes sign. The absence of a dashed vertical line indicates that no critical mass is observed for the respective heterogeneity dimension.

Table 1
Sample Selection

Panel A: Descriptive Sample	**Private Firms** N	**Public Firms** N
Universe of positions in U.S. corporate tax departments	935,284	310,198
Less:		
Position with missing start date	*47,602*	*11,610*
Positions missing profile data	*16,614*	*4,944*
Accounting, tax preparation, financial and insurance firms[13] *and positions outside sample period*	*638,607*	*151,341*
Number positions in tax departments	**232,461**	**142,303**
Number firm-level observations	**475,612**	**51,784**
Number firms	**74,728**	**3,545**

Panel B: Regression Sample	**Public Firms** N
Number of positions in U.S. corporate tax departments in Descriptive Sample	142,303
Less:	
Exclude positions with missing controls	*16,228*
Number positions in tax departments	**126,075**
Number firm-level observations	**35,406**
Number firms	**2,548**

Notes: This table outlines the sample selection procedure. The Descriptive Sample includes positions in U.S. corporate tax departments of both privately held and publicly listed firms. The Regression Sample is limited to publicly listed U.S. firms.

[13] We exclude tax service and accounting firms with the NAICS codes 541213, 541211, 541214, 541219, and 561320, as well as finance and insurance firms with the NAICS code ranging from 520000 to 529999.

Table 2
Summary Statistics

Panel A: Descriptive Sample			**Private Firms**						**Public Firms**				
Variables	N	Mean	SD	Min	P50	Max	N	Mean	SD	Min	P50	Max	Mean Diff.
TaxDepSize	475,612	2.043	4.097	1	1	225	51,784	11.472	26.623	1	4	1,072	-8.793***
Overall	475,612	0.109	0.208	0	0	0.906	51,784	0.420	0.305	0	0.521	0.919	-0.292***
Demographic	475,612	0.107	0.221	0	0	0.960	51,784	0.367	0.297	0	0.375	0.942	-0.242***
Cognitive	475,612	0.113	0.220	0	0	0.943	51,784	0.443	0.327	0	0.546	0.932	-0.312***
Gender	475,612	0.152	0.341	0	0	1	51,784	0.559	0.449	0	0.816	1	-0.385***
Ethnicity	475,612	0.079	0.200	0	0	0.960	51,784	0.251	0.278	0	0.114	0.912	-0.157***
Experience	475,612	0.132	0.266	0	0	1	51,784	0.479	0.368	0	0.600	1	-0.328***
Tenure	475,612	0.121	0.253	0	0	1	51,784	0.435	0.358	0	0.539	1	-0.300***
Seniority	475,612	0.133	0.260	0	0	0.972	51,784	0.508	0.364	0	0.620	0.985	-0.357***
Education	475,612	0.087	0.218	0	0	0.960	51,784	0.364	0.331	0	0.533	0.948	-0.257***

Panel B: Regression Sample						
Variables	N	Mean	SD	Min	P50	Max
		Dependent Variables				
CashETR	35,406	0.328	0.323	0	0.238	1
CashETR (3y)	35,406	0.366	0.334	0	0.261	1
ForwCashETR (3y)	35,406	0.416	0.365	0	0.277	1
GAAPETR	35,406	0.300	0.281	0	0.262	1
SDCashETR (5y)	35,406	0.112	0.158	0	0.032	0.707
TaxEffectiveness	35,406	0.522	0.386	0	0.530	1
TaxHaven	35,406	3.237	9.517	0	0	231
TaxHavenInd	35,406	0.430	0.495	0	0	1
		Control Variables				
BTD	35,406	0.006	0.128	-1.074	0	0.882
CAPEX	35,406	0.053	0.061	0	0.034	0.442
Cash	35,406	0.140	0.167	0	0.075	0.828
CashETR (5y)	35,406	0.413	0.353	0	0.281	1
Equity	35,406	0.001	0.004	-0.011	0	0.024
FCF	35,406	0.055	0.123	-0.902	0.059	0.384

INT	35,406	0.067	0.110	0	0.018	0.692
Leverage	35,406	0.292	0.233	0	0.270	1.355
MNC	35,406	0.981	0.135	0	1	1
MTB	35,406	3.288	6.048	-20.485	2.172	36.630
NOLDecrease	35,406	0.272	0.445	0	0	1
PPE	35,406	0.294	0.264	0	0.211	1.238
R&D	35,406	0.033	0.072	0	0	0.526
SameTaxDep	35,406	0.713	0.263	0	0.741	1
SDROA (5y)	35,406	0.019	0.030	0	0.011	0.775
SIZE	35,406	7.493	1.816	-1.339	7.461	13.590
TaxDepSize	35,406	14.281	30.915	1	5	1,072
		Indices				
OverallFirm	35,406	0.764	0.058	0	0.772	0.913
Overall	35,406	0.481	0.288	0	0.583	0.902
Demographic	35,406	0.415	0.286	0	0.462	0.942
Cognitive	35,406	0.508	0.310	0	0.613	0.932
Gender	35,406	0.634	0.426	0	0.889	1
Ethnicity	35,406	0.283	0.277	0	0.262	0.912
Experience	35,406	0.546	0.349	0	0.672	1
Tenure	35,406	0.494	0.345	0	0.600	1
Seniority	35,406	0.578	0.342	0	0.729	0.985
Education	35,406	0.425	0.322	0	0.562	0.948

Notes: This table presents descriptive summary statistics for the variables used in our descriptive analyses (Panel A) and in our multivariate regression analyses (Panel B).

Table 3
Tests of H1: Overall Tax Department Heterogeneity and Tax Planning

	(1) CashETR	(2) GAAPETR	(3) CashETR (3y)	(4) ForwCashETR (3y)
Overall	**0.002**	**0.012**	**-0.039*****	**-0.033****
	(0.13)	**(1.25)**	**(-2.74)**	**(-2.35)**
SIZE	-0.013***	-0.015***	-0.025***	-0.023***
	(-4.76)	(-7.03)	(-8.11)	(-7.87)
MNC	0.039**	0.034**	0.025	0.021
	(2.14)	(2.33)	(1.18)	(0.91)
NOLDecrease	-0.060***	-0.021***	-0.028***	-0.039***
	(-13.34)	(-5.35)	(-5.89)	(-8.05)
R&D	0.349***	0.231***	0.466***	0.416***
	(5.20)	(3.92)	(6.80)	(5.95)
INT	0.091***	-0.139***	0.064*	0.104***
	(2.89)	(-5.82)	(1.91)	(3.10)
Leverage	0.057***	0.044***	0.112***	0.061***
	(3.26)	(3.10)	(6.00)	(3.32)
MTB	-0.000	0.000	0.000	-0.000
	(-0.95)	(0.70)	(0.02)	(-1.04)
FCF	-0.496***	-0.249***	-0.542***	-0.572***
	(-14.64)	(-9.32)	(-16.18)	(-17.16)
Cash	0.137***	0.166***	0.158***	0.129***
	(5.43)	(7.75)	(5.77)	(4.83)
Equity	-2.811***	-0.912*	-1.858**	-1.305*
	(-4.59)	(-1.66)	(-2.42)	(-1.83)
PPE	-0.010	0.004	-0.056**	-0.009
	(-0.46)	(0.27)	(-2.42)	(-0.37)
CAPEX	-0.531***	-0.092*	-0.504***	-0.480***
	(-7.76)	(-1.69)	(-6.78)	(-6.57)
BTD	-0.232***	-0.080***	-0.143***	-0.149***
	(-9.75)	(-3.75)	(-6.01)	(-6.57)
TaxDepSize	-0.000***	-0.000***	-0.000	-0.000
	(-2.79)	(-3.09)	(-1.42)	(-1.35)
OverallFirm	-0.067	-0.008	-0.334***	-0.211***
	(-1.09)	(-0.15)	(-4.78)	(-3.08)
SameTaxDep	-0.016**	-0.016**	-0.041***	-0.008
	(-2.20)	(-2.39)	(-5.21)	(-1.12)
Fixed Effects	Industry & Year	Industry & Year	Industry & Year	Industry & Year
SE Cluster	Firm	Firm	Firm	Firm
Observations	35,406	35,406	34,478	31,901
Adjusted R^2	0.168	0.103	0.215	0.195

Notes: This table presents results for the association between overall tax department heterogeneity and tax planning using the Regression Sample. The dependent variable in column 1 is the cash effective tax rate (*CashETR*), in column 2 the GAAP effective tax rate (*GAAPETR*), in column 3 the three-year cash ETR (*CashETR (3y)*), and column 4 the forward-looking three-year cash ETR (*ForwCashETR (3y)*). All specifications include industry and year fixed effects. We define variables in the Appendix. We report heteroskedasticity-robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4
Tests of H2 and H3: Cognitive and Demographic Tax Department Heterogeneity and Tax Planning

	(1) CashETR	(2) GAAPETR	(3) CashETR (3y)	(4) ForwCashETR (3y)
Demographic	**0.057*** **	**0.044*** **	**0.061*** **	**0.045*** **
	(4.11)	**(3.93)**	**(3.96)**	**(2.93)**
Cognitive	**-0.043*** **	**-0.023** **	**-0.085*** **	**-0.068*** **
	(-3.22)	**(-2.22)**	**(-5.60)**	**(-4.44)**
SIZE	-0.013***	-0.015***	-0.025***	-0.023***
	(-4.74)	(-7.01)	(-8.11)	(-7.83)
MNC	0.041**	0.035**	0.027	0.023
	(2.23)	(2.41)	(1.27)	(0.99)
NOLDecrease	-0.060***	-0.021***	-0.028***	-0.039***
	(-13.43)	(-5.42)	(-5.99)	(-8.13)
R&D	0.343***	0.227***	0.458***	0.411***
	(5.13)	(3.85)	(6.71)	(5.88)
INT	0.089***	-0.140***	0.063*	0.102***
	(2.86)	(-5.87)	(1.88)	(3.07)
Leverage	0.056***	0.044***	0.112***	0.061***
	(3.25)	(3.08)	(6.01)	(3.31)
MTB	-0.000	0.000	-0.000	-0.000
	(-1.04)	(0.63)	(-0.08)	(-1.12)
FCF	-0.494***	-0.248***	-0.540***	-0.570***
	(-14.63)	(-9.30)	(-16.16)	(-17.16)
Cash	0.133***	0.163***	0.153***	0.126***
	(5.29)	(7.66)	(5.61)	(4.71)
Equity	-2.821***	-0.920*	-1.863**	-1.323*
	(-4.63)	(-1.67)	(-2.44)	(-1.86)
PPE	-0.008	0.005	-0.054**	-0.007
	(-0.40)	(0.33)	(-2.36)	(-0.31)
CAPEX	-0.536***	-0.095*	-0.510***	-0.486***
	(-7.83)	(-1.76)	(-6.86)	(-6.63)
BTD	-0.233***	-0.080***	-0.143***	-0.150***
	(-9.78)	(-3.77)	(-6.05)	(-6.60)
TaxDepSize	-0.000***	-0.000***	-0.000	-0.000
	(-2.84)	(-3.10)	(-1.46)	(-1.37)
OverallFirm	-0.079	-0.017	-0.349***	-0.222***
	(-1.28)	(-0.32)	(-5.00)	(-3.25)
SameTaxDep	-0.012*	-0.013**	-0.036***	-0.004
	(-1.65)	(-1.97)	(-4.54)	(-0.59)
Fixed Effects	Industry & Year	Industry & Year	Industry & Year	Industry & Year
SE Cluster	Firm	Firm	Firm	Firm
Observations	35,406	35,406	34,478	31,901
Adjusted R^2	0.169	0.104	0.216	0.196

Notes: This table presents results for the association between cognitive and demographic tax department heterogeneity and tax planning using the Regression Sample. The dependent variable in column 1 is the cash effective tax rate (*CashETR*), in column 2 the GAAP effective tax rate (*GAAPETR*), in column 3 the three-year cash ETR (*CashETR (3y)*), and column 4 the forward-looking three-year cash ETR (*ForwCashETR (3y)*). All specifications include industry and year fixed effects. We define variables in the Appendix. We report heteroskedasticity-robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 5
Heterogeneity Index Components and Tax Planning

	(1) CashETR
Gender	0.002
	(0.24)
Ethnicity	0.040***
	(3.48)
Experience	0.077***
	(3.67)
Tenure	-0.111***
	(-5.75)
Seniority	0.009
	(0.67)
Education	-0.005
	(-0.46)
Fixed Effects	Industry & Year
Controls	Yes
SE Cluster	Firm
Observations	35,406
Adjusted R^2	0.171

Notes: This table presents results for the association between then individual heterogeneity index components and tax planning. The dependent variable is the cash effective tax rate (*CashETR*). The specification includes industry and year fixed effects. We define variables in the Appendix. All columns include control variables. We report heteroskedasticity-robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6
Cross-Sectional Tests

Panel A: Overall Tax Department Heterogeneity

	(1) CashETR	(2) CashETR	(3) CashETR
Split	Median: Firm Size	Median: Number of Business Segments	Median: Tax Department Size
Overall	0.047***	0.028*	0.020
	(2.71)	(1.79)	(1.47)
Split	-0.024**	0.020*	0.070***
	(-2.23)	(1.91)	(2.70)
Split × Overall	**-0.078*** **	**-0.054*** **	**-0.125*** **
	(-3.75)	**(-3.01)**	**(-3.10)**
Fixed Effects	Industry & Year	Industry & Year	Industry & Year
Controls	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm
Observations	35,406	31,662	35,406
Adjusted R^2	0.171	0.169	0.168

Panel B: Demographic and Cognitive Tax Department Heterogeneity

	(1) CashETR	(2) CashETR	(3) CashETR
Split	Median: Firm Size	Median: Number of Business Segments	Median: Tax Department Size
Demographic	0.106***	0.103***	0.058***
	(4.66)	(5.57)	(3.69)
Cognitive	-0.044**	-0.060***	-0.028*
	(-1.96)	(-3.41)	(-1.78)
Split	-0.025**	0.020*	0.077***
	(-2.28)	(1.93)	(2.98)
Split × Demographic	**-0.084*** **	**-0.104*** **	**-0.027**
	(-3.15)	**(-4.18)**	**(-1.04)**
Split × Cognitive	**-0.002**	**0.037**	**-0.104*** **
	(-0.08)	**(1.61)**	**(-2.94)**
Fixed Effects	Industry & Year	Industry & Year	Industry & Year
Controls	Yes	Yes	Yes
SE Cluster	Firm	Firm	Firm
Observations	35,406	31,662	35,406
Adjusted R^2	0.172	0.170	0.169

Notes: This table presents results of cross-sectional tests for the association between tax department heterogeneity and tax planning using the Regression Sample. Panel A examines overall tax department heterogeneity and Panel B demographic and cognitive tax department heterogeneity. We split the sample based on the median of total firm assets in column (1), the median of the number of business segments in column (2), and the median of total tax department employees in column (3). The dependent variable is the cash effective tax rate (*CashETR*). All specifications include industry and year fixed effects. All columns include control variables. We define variables in the Appendix. We report heteroskedasticity-robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7
Channel Analysis

	(1) TaxHavenInd	(2) TaxHavenInd	(3) TaxHaven	(4) TaxHaven	(5) TaxEffectiveness	(6) TaxEffectiveness	(7) SDCashETR (5y)	(8) SDCashETR (5y)
Overall	0.195***		0.801***		0.135***		-0.008	
	(7.70)		(4.91)		(7.57)		(-1.17)	
Demographic		0.048*		0.277		-0.035*		0.013*
		(1.71)		(1.29)		(-1.82)		(1.80)
Cognitive		0.148***		0.542***		0.155***		-0.018**
		(5.21)		(2.99)		(7.98)		(-2.44)
Fixed Effects	Industry & Year	Industry & Year	Industry & Year	Industry & Year	Industry & Year	Industry & Year	Industry & Year	Industry & Year
SE Cluster	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Observations	35,406	35,406	34,940	34,940	35,406	35,406	35,406	35,406
Adjusted (Pseudo) R^2	0.278	0.278	0.386	0.387	0.193	0.194	0.165	0.165

Notes: This table presents results for the channel analysis examining the association between tax department heterogeneity and additional outcome variables using the Regression Sample. The dependent variable *TaxHavenInd* in columns 1 and 2 is an indicator equal to one if a firm has at least one subsidiary in a tax haven in the respective year. The dependent variable *TaxHaven* in columns 3 and 4 is the number of firm-year subsidiaries in tax havens. Due to count nature of the dependent variable, we estimate the models in columns 3 and 4 using Poisson regressions. The dependent variable *TaxEffectiveness* in columns 5 and 6 is the tax planning effectiveness measure developed by Schwab et al. (2022), which we calculate for each firm year. The dependent variable *SDCashETR (5y)* in columns 7 and 8 is the five-year standard deviation of annual cash ETRs. All specifications include industry and year fixed effects. We define variables in the Appendix. We report heteroskedasticity-robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Appendix

Variable Definitions

Variables	Source	Definition
		Dependent variables
$CashETR_{it}$	Compustat	Cash effective tax rate defined as cash tax paid divided by pretax book income before special items (TXPD/(PI-SPI)). Missing items for SPI are set to zero. The remaining non-missing cash ETRs are winsorized to the range [0,1].
$CashETR\ (3y)_{it}$	Compustat	Three-year cash effective tax rate defined as cash tax paid divided by pretax book income before special items (TXPD/(PI-SPI)) for the year t to t-2. Missing items for SPI are set to zero. The remaining non-missing cash ETRs are winsorized to the range [0,1]. We exclude the first two years of the sample period, as we can't calculate the three-year ETR for these years.
$ForwCashETR\ (3y)_{it}$	Compustat	Three-year forward-looking cash effective tax rate defined as cash tax paid divided by pretax book income before special items (TXPD/(PI-SPI)) for the year t to t+2. Missing items for SPI are set to zero. The remaining non-missing cash ETRs are winsorized to the range [0,1]. We exclude the last two years of the sample period, as we can't calculate the three-year forward-looking ETR for these years.
$GAAPETR_{it}$	Compustat	GAAP effective tax rate defined as income taxes divided by pretax book income before special items (TXT/(PI-SPI)). Missing items for SPI are set to zero. The remaining non-missing GAAP ETRs are winsorized to the range [0,1].
$SDCashETR\ (5y)_{it}$	Compustat	Five-year standard deviation of cash ETR using the standard deviation of the variable $CashETR_{it}$ from t to t-4.
$TaxEffectiveness_{it}$	Compustat	Tax planning effectiveness measure of Schwab et al. (2022), estimated using a data envelopment analysis that maximizes *After-Tax Return* using the input factors *R&D, PP&E, Tax Havens, Intangible Assets, Inventory, and Total Debt*.
$TaxHaven_{it}$	Compustat	Total number of subsidiaries located in a tax haven. To capture tax haven activity, we use Exhibit 21 data and the tax haven list of Bennedsen and Zeume (2018).
$TaxHavenInd_{it}$	Compustat	Indicator equal to one if a firm has at least one subsidiary that is located in a tax haven, as defined in the variable $TaxHaven_{it}$ and 0 otherwise.
		Control Variables
BTD_{it}	Compustat	Total book-tax difference calculated as book income less taxable income scaled by lagged total assets. Book income is pretax income (PI). Taxable income is calculated by grossing up the sum of the current federal tax expense (TXFED) and the current foreign tax expense (TXFO) and subtracting the change in loss carryforward (TLCF).
$CAPEX_{it}$	Compustat	Capital expenditures scaled by lagged total assets (CAPX/AT).
$CashETR\ (5y)_{it}$	Compustat	Five-year cash effective tax rate defined as cash tax paid divided by pretax book income before special items (TXPD/(PI-SPI)) from t to t-4. Missing items for SPI are set to zero. The remaining non-missing cash ETRs are winsorized to the range [0,1].
$Cash_{it}$	Compustat	Cash, calculated by cash and cash equivalents scaled by total assets (CHE/AT).
$Equity_{it}$	Compustat	Equity income scaled by total assets (ESUB/AT).

FCF_{it}	Compustat	Pretax free cash flows, calculated as the total of operating cash flows minus capital expenditures plus cash taxes paid scaled by total assets ((OANCF-CAPX+TXPD)/AT).
$Foreign_{it}$	Compustat	Foreign indicator, equal to 1 if pretax foreign income from operations (PIFO) is nonzero and coded equal to 0 otherwise.
INT_{it}	Compustat	Intangible assets minus goodwill scaled by lagged assets ((INTANG-GDWL)/AT).
$Leverage_{it}$	Compustat	Leverage ratio defined as long-term debt plus long-term debt in current liabilities scaled by total assets ((DLTT+DLC)/AT).
MTB_{it}	Compustat	Market-to-book ratio, calculated as the ratio of market value of equity over book value of equity (CSHO*PRCC_F/CEQ).
$NOLDecrease_{it}$	Compustat	Indicator variable coded equal to 1 if the value of the net operating loss carryforward (TLCF) decreased in year t and 0 otherwise.
PPE_{it}	Compustat	Property, plant, and equipment scaled by lagged assets (PPENT/AT).
$R\&D_{it}$	Compustat	Research and development expense divided by lagged total assets (XRD/AT). Missing values set to 0.
$SameTaxDep_{it}$	Revelio Labs	Percentage that measures the proportion of the tax department that has remained unchanged compared to the previous year.
$SDROA\ (5y)_{it}$	Compustat	Five-year standard deviation of return on assets. Return on assets is calculated as pre-tax book income scaled by lagged total assets (PI/AT) from t to t-4.
$SIZE_{it}$	Compustat	Firm size, measured as the natural logarithm of total assets (AT).
$TaxDepSize_{it}$	Revelio Labs	Number of tax department employees, measured as the number of positions at LinkedIn for that firm.
	Index Variables	
	(The indices take values between 0 and 1; a higher value indicates greater heterogeneity)	
$OverallFirm_{it}$	Revelio Labs	Overall firm heterogeneity index, calculated as the normalized sum of all subindices (Gender, Ethnicity, Experience, Tenure, Seniority, Education) for all positions excluding positions in the tax department of the respective firm.
$Overall_{it}$	Revelio Labs	Overall heterogeneity index, calculated as the normalized sum of all subindices (Gender, Ethnicity, Experience, Tenure, Seniority, Education).
$Demographic_{it}$	Revelio Labs	Demographic heterogeneity index, calculated as the normalized sum of all demographic subindices (Gender, Ethnicity).
$Cognitive_{it}$	Revelio Labs	Cognitive heterogeneity index, calculated as the normalized sum of all cognitive subindices (Experience, Tenure, Seniority, Education).
$Gender_{it}$	Revelio Labs	Normalized gender heterogeneity index, based on the proportions of female and male employees within a given year.
$Ethnicity_{it}$	Revelio Labs	Normalized ehtnicity heterogeneity index, based on the proportions of Black, White, Native American, Hispanic, Asian/Pacific, and employees with multiple ethnicities within a given year.
$Experience_{it}$	Revelio Labs	Normalized experience heterogeneity index, based on the proportions of employees in the six experience ranks within a given year. Experience is measured as the total number of years of work experience. Each rank covers three years: 1 (less than three years of work) to 6 (more than 15 years of work).

$Tenure_{it}$	Revelio Labs	Normalized tenure heterogeneity index, based on the proportions of employees in the six tenure ranks within a given year. Tenure is measured as the number of years of work experience within the current firm. Each rank covers three years: 1 (less than three years of work) to 6 (more than 15 years of work).
$Seniority_{it}$	Revelio Labs	Normalized seniority heterogeneity index, based on the proportions of Entry, Junior, Associate, Manager, Director, Executive, and Senior Executive employees within a given year.
$Education_{it}$	Revelio Labs	Normalized education heterogeneity index, based on the proportions of employees with the highest education being High School, Associate, Bachelor, Master, MBA, and PhD within a given year.

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Kontaktadresse:
Prof. Dr. Dr. h.c. Dr. h.c. Caren Sureth-Sloane,
Universität Paderborn, Fakultät für Wirtschaftswissenschaften,
Warburger Str. 100, 33098 Paderborn,
www.arqus.info, Email: info@arqus.info

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