Arbeitskreis Quantitative Steuerlehre
Quantitative Research in Taxation – Discussion Papers

Harald Amberger, Henning Giese,
Reinald Koch, Lukas Ortner

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arqus Discussion Paper No. 313
February 2026

www.arqus.info
ISSN 1861-8944

Tax Department Design, Tax Planning, and Tax Risk

Harald Amberger
WU Vienna University of Economics and Business

Henning Giese
Paderborn University
KU Research Institute for Taxation

Reinald Koch
Catholic University of Eichstaett-Ingolstadt
KU Research Institute for Taxation

Lukas Ortner
Catholic University of Eichstaett-Ingolstadt
KU Research Institute for Taxation

ABSTRACT: Despite the central role of corporate tax departments in managing multinational enterprises' (MNEs) global tax positions, little is known about how their internal design shapes corporate tax behavior. Drawing on hand-collected data on more than 8,000 tax employees across 309 publicly listed European MNEs, we examine the association between tax department centralization and firm-level tax outcomes. We find no evidence for tax department centralization being associated with the overall level of tax planning. However, firms with more centralized tax departments engage in greater cross-border profit shifting, respond less to local tax incentives, and face higher tax risk. These findings suggest that tax department design shapes the *means* rather than the *intensity* of corporate tax planning. Our study extends the emerging literature on tax department design and provides insights for managers responsible for corporate tax strategies as well as for policymakers anticipating organizational responses to international tax reforms.

Keywords: management structure, tax planning, tax risk

JEL Classifications: H25, H26, M12

We thank Ana Albuquerque (discussant), Laura Arnemann, Nathan Goldman, Brian Grant, Rainer Niemann, Michael Overesch, Alina Pfrang (discussant), Christian Renelt, Martina Rechbauer, Nadine Riedel, Georg Thunecke (discussant), Farid Toubal, Andrea Tulli, Kim-Alina Schulz, and Cinthia Valle-Ruiz as well as participants of the 48th Annual Congress of the European Accounting Association, the 2024 Annual Meeting of the Tax Section of the German Academic Association for Business Research (VHB), the 14th EIASM Conference on Current Research in Taxation, the RSIT Conference 2024, and the Virtual Doctoral Tax Seminar. Reinald Koch and Lukas Ortner gratefully acknowledge financial support from the Fritz Thyssen Stiftung (Az. 10.22.1.030WW). The authors thank Christoph Spengel, Jost Heckemeyer, and their team for sharing data from their MannheimTaxation Project.

I. INTRODUCTION

We investigate whether and how the internal design of a firm's tax department—specifically its degree of centralization—is associated with corporate tax outcomes. Despite the central role that tax departments play in managing multinational enterprises' (MNEs') global tax positions, little is known about how their internal structure influences corporate tax behavior. This gap is surprising given that investment in tax employees represents one of the largest inputs for tax planning (Slemrod and Venkatesh, 2002), managers exert substantial influence on tax outcomes (Belnap et al., 2024a, 2024b), and organizational design is recognized as a key determinant of performance in other management domains (Hage and Aiken, 1967; Carzo and Yanouzas, 1969; Glueck, 1972; Harris and Raviv, 2002; Malenko, 2024).

Prior research emphasizes managers' personal characteristics, incentives, and the "tone at the top" as primary drivers of corporate tax behavior, highlighting how managers balance tax aggressiveness against tax compliance (e.g., Dyreng et al., 2010; Chyz, 2013; Francis et al., 2014; Olsen and Stekelberg, 2016; Law and Mills, 2017). However, as tax regimes (Harst et al., 2021) and business models (Foss and Saebi, 2017) have become more complex over time, tax planning outcomes increasingly depend not only on individual managers' intent and incentives but also on how tax expertise and decision rights are allocated within the organization (Osswald and Pierk, 2024). Consistent with this shift, recent work points to the importance of the tax department itself, in particular its size, human capital, and organizational position, in shaping firm-level effective tax rates and tax risk (Chen et al., 2021; Barrios and Gallemore, 2024; Robinson et al., 2010; Feller and Schanz, 2017; Ege et al., 2021). This evidence suggests that organizational design is likely to be a critical determinant of how firms implement tax strategies.

However, direct evidence on whether and how the internal structure of tax departments—particularly their degree of centralization—relates to corporate tax outcomes remains limited.

Existing studies typically focus on specific outcomes, functions, or decision rights. For example, Wang et al. (2025) show that stronger centralization of decision rights increases firms' speed in aligning tax outcomes with target levels of tax avoidance. Kohlhase and Wielhouwer (2022) examine how MNEs allocate authority over tax and tariff planning between headquarters and business units, and Baersch et al. (2023) show that more centralized transfer pricing is associated with greater tax disputes and more severe coordination challenges. Our study extends this literature by providing the first comprehensive analysis of how the internal design of tax departments relates to both tax planning and tax risk, thereby responding directly to the call by Hanlon and Heitzman (2010) for more research on the internal workings of corporate tax departments.

Theoretically, the relationship between tax department centralization and firm-level tax outcomes is ambiguous, as both centralized and decentralized structures entail distinct costs and benefits. Centralization can reduce coordination costs and facilitate the consistent implementation of firm-wide tax strategies, particularly those requiring alignment across jurisdictions. However, centralized tax functions might limit firms' ability to respond to country-specific tax rules, enforcement environments, and locally targeted tax incentives. In contrast, decentralized structures embed tax expertise closer to local operations, enabling greater adaptation to national tax regimes and more direct engagement with local tax authorities; yet such structures involve higher coordination and monitoring costs. Building on efficient organizational design theory (Nagar, 2002), we argue that decision rights should be aligned with relevant knowledge. Because many international tax planning strategies—such as cross-border profit shifting through transfer pricing or intra-group financing—require coordination across affiliates (Sikka and Hampton, 2005), centralization could facilitate their execution. Decentralization, in turn, might support alternative forms of tax planning, including the effective use of local tax incentives, and might reduce tax risk by improving firms' responsiveness to local tax enforcement. Thus, while the internal design of

tax departments is likely to shape *how* firms plan their taxes, its net effect on firms' overall tax outcomes—including both the level and riskiness of tax planning—remains an empirical question.

To address this question, we leverage unique, hand-collected data on tax employees of 309 publicly listed European MNEs. Using LinkedIn, we assemble a detailed dataset containing information on the country of employment, hierarchy level, functional specialization, and educational background of more than 8,000 individual tax employees.[1] Our descriptive analysis shows that, on average, 39.7% of tax employees are located in the headquarters country, with the remainder being primarily distributed across Europe and North America. Notably, in 129 of the 309 firms, the largest share of tax employees holds a position outside the headquarters country, consistent with offshoring patterns documented by Kroeger (2024) for public accounting firms. High-ranking tax employees and transfer pricing specialists are disproportionately located at the headquarters country, while the overall geographic distribution of the remaining tax employees is largely independent of hierarchy level or functional specialization.

Based on these data, we construct four measures of tax department centralization that capture both the geographic concentration and international dispersion of tax employees within an MNE. In particular, these measures reflect variation in (i) the share of tax employees located in the MNE's headquarters country; (ii) the share of tax employees located in the country with the largest tax function; (iii) the geographic concentration of tax employees, measured by a Herfindahl-Index, and (iv) the spatial dispersion of tax teams, capturing intra-firm coordination costs proxied by geographical distance. We then examine whether and how each of these measures relates to firm-

[1] Compared to data from commercial providers such as Revelio Labs, our hand-collected LinkedIn data offers several advantages. First, it provides more granular information at the individual level, including job titles, hierarchical position, functional specialization, and geographic location. These details are often unavailable or aggregated in commercial datasets. Second, our approach allows for full transparency and manual validation, enabling us to verify the relevance of each employee to corporate tax functions and to exclude unrelated roles (e.g., payroll or indirect tax positions). Third, because we collect data directly from professional profiles, we are not limited by the sampling, imputation, or proprietary algorithms used in third-party datasets, which can obscure the true organizational structure.

level tax outcomes, including the overall level of tax planning (measured by effective tax rates; ETRs) and tax risk (measured by ETR volatility). We also assess whether tax department centralization is associated with firms' reliance on specific tax planning channels.

Our empirical analysis proceeds in two steps. First, we focus on aggregate tax outcomes at the MNE level and find no systematic association between tax department centralization and firms' overall tax planning. However, greater centralization is associated with higher tax risk. In economic terms, a one–standard-deviation increase in centralization is linked to a 10.2–14.4 percent increase in tax risk, when evaluated at the sample mean. These results are robust to (i) alternative measures of overall tax planning, (ii) modified time periods to calculate dependent variables, and (iii) matching firms with centralized and decentralized tax departments based on observable characteristics. Taken together, these initial results are consistent with tax department centralization affecting a firm's tax risk while not altering the overall level of tax planning.

Second, using affiliate-level data, we examine how tax department centralization relates to firms' reliance on specific tax planning channels. Consistent with our theoretical predictions, we find that firms with more centralized tax departments rely more heavily on cross-border profit shifting, particularly through transfer pricing and intra-group debt. Economically, a one–standard-deviation increase in centralization raises the responsiveness of affiliate profitability (leverage) to profit shifting incentives by approximately 43% (40%), respectively. In contrast, firms with more centralized tax departments exhibit significantly weaker investment responses to country-specific tax incentives, consistent with tax department centralization constraining firms' ability to exploit local tax incentives.

Collectively, our findings indicate that while tax department design is not associated with firms' overall level of tax planning, it shapes the means through which such tax planning occurs. More centralized tax departments facilitate international profit-shifting strategies, whereas more

decentralized structures increase firms' responsiveness to local tax incentives and mitigate tax risk by promoting compliance with local tax regimes.

Our study makes several contributions to the literature examining the role of corporate tax departments in shaping firms' tax outcomes (Chen et al., 2021; Kohlhase and Wielhouwer, 2022; Baersch et al., 2023). First, we provide novel large sample evidence on the internal design of tax departments, documenting where tax employees are located, what roles they perform, and how hierarchy and specialization vary across locations. Second, we offer the first comprehensive analysis of how tax department design relates to firm-level tax outcomes, extending prior work that focused on specific functions and outcomes (Wang et al., 2025; Kohlhase and Wielhouwer, 2022; Baersch et al., 2023). Third, we integrate theories of organizational design with empirical evidence on corporate tax behavior. In doing so, we contribute to the growing literature on firms' internal organization of the tax function (Hanlon and Heitzman, 2010) and introduce tax department design as a novel lens through which to understand heterogeneity in tax outcomes.

Although our setting focuses on the internal design of firms' tax functions, the mechanisms we identify have broader implications for the organization of corporate functions. Our results suggest that the degree of organizational centralization determines which activities a function emphasizes. Specifically, greater centralization fosters the reallocation of effort toward coordination-intensive strategies at the cost of reduced locally adaptive behavior and increased outcome risk. Similar trade-offs are likely to arise in other accounting-related functions, such as financial reporting, regulatory compliance, and risk management, where centrally designed frameworks are implemented and enforced locally. In these settings, local institutional environments shape how rules are interpreted, risks materialize, and regulators respond, underlining the critical role of local expertise. Thus, our results suggest that organizational design can influence functional outcomes beyond formal authority structures or managerial incentives.

Finally, our findings have implications for executives, policymakers, and researchers. For executives, we show that the spatial organization of tax employees can materially affect tax outcomes; an insight that is increasingly relevant given rising tax complexity and the scarcity of qualified tax professionals. For policymakers, our results suggest that anti-profit shifting measures may induce changes in tax department design, potentially encouraging decentralization and amplifying the effectiveness of local tax incentives. For researchers, we highlight the importance of incorporating tax department design into studies of corporate tax behavior and provide a foundation for future work examining the organizational dimension of firms' tax strategies.

The remainder of the paper proceeds as follows. Section 2 reviews related literature and develops our hypotheses. Section 3 describes the sample selection process, tax employee data, measurement of tax department centralization, and reports corresponding descriptive statistics. Sections 4 presents the MNE-level tests of the relationship between tax department design and overall tax outcomes. Section 5 examines the affiliate-level variation in the use of specific tax planning channels. Section 6 concludes.

II. HYPOTHESES DEVELOPMENT

The degree to which decision-making authority is centralized or decentralized within MNEs shapes how they manage global operations and the associated tax affairs. Subsidiary-level tax employees typically possess superior knowledge about local operations, tax laws, and tax enforcement practices (Kohlhase and Wielhouwer, 2022). When tax decision-making is centralized, this local knowledge must be effectively transmitted to headquarters to support coordination. In contrast, decentralized structures grant subsidiaries greater autonomy, requiring firms to align local decisions with overall firm objectives. This alignment typically occurs through incentive systems that balance local discretion and coordination (Smith, 2002; Baldenius et al., 2004; Ortmann and Schindler, 2022). From an organizational design perspective, the optimal degree of centralization

balances information transfer costs against monitoring and control costs (Nagar, 2002), which differ across corporate functions depending on informational frictions and coordination needs (Koester and Xia, 2024).

We investigate whether and how tax department design—specifically, the degree of centralization—is associated with two key tax outcomes: overall tax planning and tax risk. Effective tax planning requires access to high-quality information (Gallemore and Labro, 2015), coordinated decision-making (Kohlhase and Wielhouwer, 2022), and effective engagement with local tax authorities. However, the relative importance of coordination versus local expertise likely varies across tax planning strategies, implying that centralization and decentralization might shape not only the extent, but also the form, of tax planning behavior. Consistent with this view, prior empirical evidence suggests that international and local tax planning strategies operate as substitutes rather than complements (Beuselinck and Pierk, 2024).

Among the most prominent tax planning strategies, international profit shifting is particularly coordination intensive. Profit shifting relates to both a firm's operational and accounting dimensions (De Simone et al., 2017) and requires decision-makers to gather and integrate information across multiple jurisdictions. For instance, designing a transfer pricing policy requires a sound understanding of product markets and cost structures across the supply chain (McGuire et al., 2023). Similarly, income allocation from intellectual property involves jurisdiction-specific valuations and legal considerations (De Simone and Sansing, 2018). While local tax employees are well-positioned to interpret domestic tax rules, central management has a broader perspective on firm strategy (van den Steen, 2010) and can better coordinate cross-country activity (Bilicka and Scur, 2024). At the same time, subsidiary managers may pursue objectives that diverge from the overall firm strategy (Jensen and Meckling, 1976; Hoenen and Kostova, 2015;

Kostova et al., 2018), making them reluctant to share information with headquarters or to implement coordinated tax strategies (Stein, 2003; Amberger et al., 2021).

Consistent with this trade-off, prior studies show that firms with stronger profit-shifting incentives are more likely to centralize transfer pricing decisions (Chen et al., 2015), and that coordination challenges further reinforce this tendency (Baersch et al., 2023). Centralized coordination can reduce overall tax burdens by facilitating coherent tax strategies across subsidiaries (Blouin et al., 2018). However, centralization is not a panacea: information frictions and agency conflicts might persist under centralized structures (Kohlhase and Wielhouwer, 2022).

In contrast, tax planning strategies based on local tax incentives, such as investment tax credits or accelerated tax depreciation, require less interjurisdictional coordination but rely heavily on local tax expertise. Given that countries frequently revise such tax incentives (Ward, 2020), their central monitoring is likely to be inefficient and costly (Christie et al., 2003). Accordingly, decentralized tax departments with local tax employees are likely better positioned to identify and exploit local tax incentives.

Taken together, centralization and decentralization of tax departments offer distinct advantages across different tax planning strategies. These benefits may offset each other at the aggregated MNE-level, making the association between centralization and overall tax planning theoretically ambiguous. We therefore hypothesize:

> *H1: There is no association between the degree of tax department centralization and an MNE's overall tax planning.*

The same organizational mechanisms are also likely to affect a firm's overall tax risk, defined as the uncertainty surrounding tax outcomes (Neuman et al., 2020). On the one hand, centralized tax departments might improve consistency and oversight, potentially reducing tax risk. On the other hand, decentralization could provide access to more accurate local tax expertise and

facilitate faster and more targeted responses to tax audits or regulatory changes. If local tax expertise is not effectively communicated to headquarters due to information frictions or agency conflicts (Kohlhase and Wielhouwer, 2022), centralization might increase overall tax risk. Indeed, Baersch et al. (2023) document that centralized transfer pricing is associated with more frequent tax disputes and greater coordination challenges. We therefore predict:

H2: MNEs with more centralized tax departments exhibit higher overall tax risk.

Finally, we examine whether tax department design determines which tax planning strategies MNEs implement, specifically, their use of international profit shifting versus local tax incentives. As discussed, centralized structures are more suited for cross-border strategies requiring coordination. Profit shifting via transfer pricing or intra-group debt financing creates internal agency conflicts, particularly in high-tax jurisdictions (Smith, 2002; Baldenius et al., 2004; Ortmann and Schindler, 2022; Giese et al., 2024). Hence, implementing such strategies in decentralized organizations might require complex contracting (Christie et al., 2003), making centralized structures more conducive to cross-border profit shifting. We therefore hypothesize:

H3a: MNEs with more centralized tax departments engage in greater international profit shifting.

In contrast, tax planning strategies that exploit local tax incentives require detailed jurisdiction-specific knowledge and close interactions with local tax authorities. Investment incentives such as accelerated tax depreciation or tax credits often involve administrative registration or require documentation that is more easily managed and prepared at the local level (Hoppe et al., 2018). Tax employees embedded in local affiliates are therefore better positioned to identify and respond efficiently to these opportunities. Accordingly, we expect firms with more centralized tax departments to be less able to exploit such tax incentives. One way this effect might

manifest is through local investment decisions that are less responsive to local tax incentives. Hence, we predict:

> *H3b: Local investment by MNEs with more centralized tax departments is less responsive to local tax incentives.*

III. DATA, SAMPLE SELECTION, AND DESCRIPTIVE STATISTICS

Our empirical analysis draws on data from multiple sources. First, we identify European MNEs included in the STOXX Europe 600 index (MNE Sample). Second, for these firms, we collect detailed information on tax employees from LinkedIn, which we use to analyze the internal design of tax departments and to construct our measures of tax department centralization. Third, we obtain affiliate-level data from Orbis to examine specific tax-planning strategies. In the following, we describe the sample selection for the MNE Sample, outline the collection and validation of the LinkedIn data, and present descriptive statistics on tax department design of firms included in our sample. We detail the construction of the affiliate-level samples in Section 5.

Selection of MNE Sample

Our MNE sample consists of firms included in the STOXX Europe 600 index. We focus on these firms for several reasons. First, they represent the largest and most influential companies in the European economy, accounting for approximately 90% of the region's equity market capitalization. Their tax practices are therefore of broad economic and public interest. Second, these MNEs typically operate in complex and uncertain tax environments, making the internal design of tax departments particularly relevant for understanding tax planning and tax compliance outcomes. Third, the index encompasses a broad range of industries and European regions, allowing us to capture meaningful heterogeneity in organizational structures across sectors and institutional settings. Finally, due to their size and public visibility, these firms are more likely to maintain dedicated tax departments and to employ tax professionals with LinkedIn profiles.

Table 1 reports the sample selection procedure. We exclude 173 firms in the real estate, oil and gas, and financial sector due to industry-specific regulatory environments that differ from those of other industries. We further exclude one firm with a dual listing, one advisory firm providing tax services, eight firms without foreign operations, and three firms that are majority-owned by another STOXX Europe 600 company. We also drop 26 firms for which our LinkedIn search (see below) identifies no tax employees, as well as two firms without any *corporate* tax employees, which are required to compute our centralization measures. In addition, we remove twelve firms reporting negative pre-tax income (before special items) over five consecutive years and 65 firms with missing data on dependent, independent, or control variables used in the subsequent regression analyses (see Sections 4 and 5). These restrictions result in a final sample of 309 MNEs.

[Insert Table 1 about here]

Table 2 presents the distribution of sample firms by size, industry, and headquarters country. We observe substantial variation in terms of size with firms in the bottom (top) quintile reporting mean total assets of EUR 2.2 (EUR 110.3) billion. Most sample firms are classified as industrial firms. As expected, we observe the largest number of firms for the United Kingdom, France, and Germany, reflecting the relative economic size of these countries.

[Insert Table 2 about here]

Data on Tax Department Design

Data Collection from LinkedIn

For each firm in the MNE Sample, we identify employees working in tax-related positions using LinkedIn. As our focus is on the global design of tax departments, we screen both the parent company and all subsidiaries listed in the firm's 2018 annual report. For each entity, we conduct

keyword searches for "tax"[2] to identify tax-related positions. We exclude temporary positions such as "interns" and collect information on (i) the job title, (ii) the period of employment, and (iii) the country of employment for each identified employee. To enhance data reliability, we retain only "active" LinkedIn profiles, defined as profiles with at least 50 connections. These procedures yield an initial sample of 8,496 tax-related employees. As our sampling is based on 2018 annual reports, our LinkedIn data reflect the cross-sectional structure of tax departments as of that year.

Given our research question relates to corporate income taxation, we restrict our sample to tax employees working in transfer pricing or corporate tax more broadly. Accordingly, we exclude 934 employees whose job titles indicate functions unrelated to corporate income taxation such as payroll tax, property tax, or value-added tax. The final dataset comprises 7,562 corporate tax employees. We use this information to calculate our tax department centralization measures described below and merge the resulting measures with the MNE sample.

Data Reliability and Validation

Using data from professional networking platforms comes with several challenges. First, such data may not fully represent the entire workforce of a given firm. Second, social media usage varies across countries, potentially introducing regional biases. Third, résumé information is self-reported and not independently verified, raising concerns about data accuracy.

To mitigate these concerns, we perform extensive validation exercises assessing the representativeness, completeness, and plausibility of our LinkedIn data. Specifically, we compare the size and geographic composition of tax departments inferred from LinkedIn with benchmark information from firm reports and public disclosures. These comparisons reveal no evidence of systematic bias and are consistent with Berry et al. (2024), who demonstrate that LinkedIn data can

[2] To avoid missing employees due to translation issues, we use the keywords in English as well as in the subsidiary's local language.

be used to obtain reasonably reliable measures of workforce demographic composition by race, ethnicity, and gender. We provide detailed descriptions and results of our validation exercises in the Online Appendix.

Descriptive Evidence on Tax Department Design

Before turning to our multivariate analysis, we begin with a descriptive analysis of the design of tax departments included in our MNE sample. Specifically, we document how firms organize their tax functions, focusing on tax department size, functional specialization, hierarchy, and geographic allocation (Figures 1–3). Figure 1 shows the distribution of tax departments by size. While the median tax department employs 13 tax professionals, the largest department in our sample has 266 tax employees, highlighting substantial heterogeneity in firms' organizational investment in tax expertise.

[Insert Figure 1 about here]

We next use job titles and job descriptions to classify tax employees by functional specialization[3] and hierarchy. Figure 2 shows that nearly half of all tax employees (47.3%) work in transfer pricing (19.8%) or corporate taxation more broadly (27.5%), underscoring the central role of income-tax-related functions within tax departments. Another 42.8% specialize in indirect taxes, such as value-added tax, reflecting the economic importance of these taxes in the EU. Only a small fraction of employees focus on property or payroll taxes. Regarding hierarchy, 36.4% of tax employees are associates, 42.0% are tax managers, and 21.6% are tax executives.

[Insert Figure 2 about here]

Figure 3 presents the geographic distribution of tax functions, distinguishing between the headquarters country and the country hosting the largest tax department outside the headquarters.

[3] Detailed information on functional specialization is available for only around 20% of the tax employees in our sample. All other job profiles include generic terms such as "tax employee" or "tax manager" without specifying the specific function.

In 58.3% of the firms (180 of 309), the largest share of tax employees is located in the headquarters country. This concentration varies by function and hierarchy. Transfer pricing specialists are disproportionately located at the headquarters, whereas indirect, payroll, and property tax roles are more frequently located outside the headquarters, likely reflecting the use of regional service centers (Kroeger, 2024). Hierarchical patterns align with this functional allocation. Specifically, we observe that executive-level tax employees are primarily based at headquarters while associates and tax managers are more evenly dispersed across countries.

Taken together, these descriptive patterns suggest that routine tax tasks are often offshored and located outside the headquarters country, whereas strategic tax decision-making remains more strongly concentrated at the headquarters. We discuss additional descriptive patterns of tax department structure in the Online Appendix.

[Insert Figure 3 about here]

Measuring Tax Department Centralization

Four Distinct Measures

To examine the implications of tax department centralization, we define four measures that capture distinct dimensions of the tax department's internal structure. *Centralization I* and *Centralization II* reflect the geographic concentration of tax employees in a single country, while *Centralization III* and *Centralization IV* capture the overall international dispersion of the tax workforce.

Centralization I is defined as the share of corporate tax employees located in the single country that employs the largest number of tax employees within the MNE, regardless of whether it is the firm's headquarters. This measure adopts a functional perspective and allows for the possibility that the operational center of tax expertise is located outside the headquarters country; a pattern observed for 129 of the 309 MNEs in our sample. Accordingly, *Centralization I* captures

functional centralization, accounting for the fact that tax decision-making authority does not need to coincide with formal administrative management and control.

Centralization II focuses on *formal centralization* and measures the share of corporate tax employees located in the MNE's headquarters country. In contrast to *Centralization I*, this proxy does not capture functional centralization but rather measures the extent to which decision rights formally reside at the headquarter level.

Centralization *III* and Centralization *IV* broaden the scope by explicitly accounting for the international dispersion of tax employees. Centralization *III* is calculated as a normalized Herfindahl-Index based on the country-level distribution of tax employees. Higher values of this measure indicate a more concentrated tax workforce (i.e., stronger centralization), while lower values reflect a more geographically dispersed (i.e., decentralized) tax department structure.

Centralization IV builds on theoretical models highlighting the role of organizational and physical distance in coordination (King, 1983). To capture geographic dispersion explicitly, we define this measure as the average geographical distance (in thousands of kilometers) between all corporate tax employee pairs within a firm, scaled by the number of pairs.[4] By construction, *Centralization IV* reflects the spatial complexity of coordination and potential frictions arising from cultural, linguistic, and time-zone differences (Bauernschuster et al., 2014; Langosch and Tumlinson, 2020). In this way, the measure captures the costs of knowledge transfer and intra-firm communication in globally distributed tax teams.

The univariate pairwise Pearson correlations among the four measures range from 0.69 to 0.91 (untabulated). These statistics suggest that the four measures share a common conceptual foundation while capturing different dimensions of tax department centralization. To ensure

[4] We multiply the result by -1 to achieve a consistent directional interpretation across all four centralization measures. We obtain information on geographic distance from CEPII's GeoDist database (see www.cepii.fr/CEPII/en/welcome.asp).

comparability in our empirical analysis, we standardize all measures to have mean zero and standard deviation one prior to estimating regressions.

Descriptive Statistics on Tax Department Centralization

Table 3 summarizes our tax department centralization measures by firm size, industry, and headquarters country. We observe that centralization declines with firm size, consistent with larger and more complex firms adopting more decentralized structures. Utilities exhibit the highest degree of tax department centralization, followed by industrial firms. Cross-country comparisons reveal that firms headquartered in Poland and Portugal tend to have highly centralized tax departments, whereas firms in France, Switzerland, and Germany exhibit more decentralized structures. One potential explanation is that firms located in the latter group of countries more actively exploit international labor cost differentials. The observed patterns are consistent across all four centralization measures.

[Insert Table 3 about here]

Untabulated cross-sectional OLS regressions with industry and MNE-headquarters-country fixed effects confirm that the degree of tax department centralization varies systematically with firm characteristics. Specifically, we find that larger firms, firms with higher leverage, and firms operating across more countries and more complex tax environments exhibit significantly less centralized tax departments.[5] In contrast, more profitable firms, firms with greater capital intensity, and firms with more centralized overall organizational structures tend to centralize their tax departments more strongly. Interestingly, neither R&D intensity nor tax department size—two commonly used proxies for profit-shifting potential—are significantly associated with

[5] We thank Caren Sureth-Sloane, Deborah Schanz, and their team for sharing tax system complexity data from their Global MNC Tax Complexity Project. Data can be retrieved from www.taxcomplexity.org. For further information on the survey and index construction, see Hoppe et al. (2023).

centralization, suggesting that tax department design captures an organizational dimension distinct from firms' overall tax planning potential (Schwab et al., 2022).

IV. MNE-LEVEL ANALYSIS

Research Design

In the first part of our empirical analysis, we test Hypotheses 1 and 2 using the following MNE-level OLS specification:

$$Tax\ Outcome_i = \beta_0 + \beta_1 Centralization_i + \mu\ Controls_i + \gamma\ Industry_i + \delta\ MNE\ Country_i + \varepsilon_i \quad (1)$$

We use this model to examine the association between tax department centralization and two key tax outcomes: (i) overall tax planning (Hypothesis 1) and (ii) overall tax risk (Hypothesis 2). We measure tax planning using the five-year cash effective tax rate (*CETR*).[6] Following Chen et al. (2021), we winsorize *CETR* at 0 and 1 and exclude firms with negative denominators (Dyreng et al., 2008). We measure tax risk as the five-year standard deviation of the cash ETR (*VolCETR*), consistent with McGuire et al. (2013) and Guenther et al. (2017). Both *CETR* and *VolCETR* are defined over the forward-looking period 2018–2022. As robustness checks, we redefine these measures using alternative time horizons and employ two additional proxies for tax planning: the five-year GAAP ETR (*GETR*) and the Henry and Sansing (2018) measure (*H&S*).[7] We also conduct 1:3 propensity-score and Mahalanobis-distance matching procedures to mitigate concerns that observable differences between firms with centralized and decentralized tax departments drive our results.

The vector of control variables largely follows Chen et al. (2021) and includes known determinants of firm-level tax outcomes. Specifically, we include five-year averages of return on

[6] We calculate *CETR* as the sum of an MNE's total cash taxes paid over 2018–2022, divided by the sum of total pre-tax income less special income over the same period (Dyreng et al., 2008). To circumvent interpretation challenges associated with negative cash ETRs, we exclude MNEs with five-year negative pre-tax income before special items.
[7] To facilitate presentation, we multiply all dependent variables in our MNE- and affiliate-level analyses by 100.

assets (*RoA*), firm size (*Size*), leverage (*Leverage*), market-to-book ratio (*MtB*), property, plant, and equipment (*PPE*), intangible assets (*Intangibles*), R&D intensity (*R&D*), inventory (*Inventories*), business complexity (*BusinessComplexity*), and auditor-provided tax services (*APTS*).[8] We additionally control for the size of the tax department (*TaxEmployees*) and for overall organizational centralization (*MNECentralization*), measured analogously to tax department centralization but based on the geographic distribution of the firm's subsidiaries. For regressions with *VolCETR* as the dependent variable, we further control for the level of tax planning (*CETR*) and earnings volatility (*VolRoA*), following De Simone et al. (2015) and Guenther et al. (2017).

All MNE-level regressions include one-digit GICS industry fixed effects and headquarter-country fixed effects. These fixed effects control for unobserved sector- and country-level heterogeneity, including differences in statutory corporate tax rates. We cluster standard errors at the headquarter-country level. Variable definitions are provided in the Appendix.

Additional Data and Descriptive Statistics

To construct the final dataset for our MNE-level analysis, we obtain financial data for firms in our sample from Compustat Global, Thomson Reuters, and Audit Analytics, supplemented with hand-collected data where necessary. Industry classifications follow Thomson Reuters' definitions. Table 4 presents descriptive statistics for the 309 MNEs in our sample. Because our LinkedIn data are based on information from firms' 2018 annual reports, the analysis is cross-sectional, with each firm contributing a single observation. The mean cash ETR (*CETR*) is 25.9%, with a standard deviation of 15.7%, which is comparable to values reported in prior U.S.-based studies (Dyreng et al., 2008; Guenther et al., 2017). This similarity supports the external validity and representativeness of our sample. Across all four centralization measures, tax departments

[8] All of these control variables (except for logarithmized *Size and BusinessComplexity*) are winsorized at the 1% and 99% levels to mitigate the influence of outliers.

(*Centralization I-IV*) are, on average, more centralized than firms' overall organizational structures (*MNECentralization I-IV*). Moreover, the pairwise Pearson correlations between tax department centralization and overall organizational centralization range from 0.455 to 0.619 (untabulated). Combined, these comparisons indicate that firms that centralize tax expertise do not necessarily centralize other corporate activities (and vice versa), underscoring the distinct role the tax function plays in firms' organizational design.

[Insert Table 4 about here]

In terms of magnitude, an average of 53.0% of corporate tax employees are located in the country hosting the largest tax function (*Centralization I*), while 39.7% are based in the headquarters country (*Centralization II*). The mean normalized Herfindahl index is 0.284 (*Centralization III*), which is 98.6% higher than the corresponding index for firms' overall organizational centralization (*MNECentralization III)*. Finally, the mean value of -3.915 (*Centralization IV*) corresponds to an average geographic distance of 3,915 kilometers between tax employees within an MNE.

Regression Results

We estimate two sets of regressions based on Equation (1) that examine the relationship between tax department centralization and (i) overall tax planning (*CETR*) and (ii) overall tax risk (*VolCETR*).

[Insert Table 5 about here]

Table 5 reports the regression results using our primary tax planning measure, the five-year cash ETR, and the four proxies for tax department centralization. We find no significant association between tax department centralization and firms' overall tax planning. This result holds across all four measures of tax department centralization with the corresponding coefficients being

statistically insignificant and economically small. However, consistent with prior work (Chen et al., 2021), we find that tax department size is negatively associated with firms' tax burden.

Taken together, the results in Table 5 are consistent with Hypothesis 1: tax department centralization does not materially influence a firm's overall tax planning. However, this finding does not imply that tax department design is irrelevant for corporate tax strategies. Rather, the evidence could be consistent with the notion that centralization affects how firms plan taxes, not how much they plan. We further explore this idea in the affiliate-level analysis in Section 5.

We next turn to Hypothesis 2, which predicts that firms with more centralized tax departments exhibit higher tax risk due to limited access to local expertise. The idea is that local tax employees maintain stronger relationships with tax authorities and possess jurisdiction-specific expertise, reducing exposure to audit disputes and tax uncertainty (Giese et al., 2024).

[Insert Table 6 about here]

Table 6 presents the regression results for specifications using the five-year standard deviation of the cash ETR (*VolCETR*) as the dependent variable. The coefficients on *Centralization* are positive across all four columns, indicating that greater tax department centralization is associated with higher tax risk. Two of the four coefficients are also statistically significant at the five percent level.

Comparing regression results across centralization measures sheds light on the underlying mechanism. *Centralization I*, which captures the share of tax employees located in the single largest tax department, is positively and significantly associated with tax risk, whereas *Centralization II*—the share based in the headquarters country—is not. This pattern suggests that concentration of tax expertise in a single location increases tax risk, particularly if centralization occurs outside the firm's headquarters. In economic terms, a one–standard-deviation increase in *Centralization I* is

associated with about ten percent greater tax risk, when evaluated at the sample mean.[9] The dispersion-based proxies (*Centralization III* and *Centralization IV*) yield similar inferences, with increases in tax risk ranging from 10.2 to 14.4 percent for a one–standard-deviation increase in tax department centralization.

Interestingly, tax department size (*TaxEmployees*) is unrelated to tax risk in all specifications, suggesting that how tax departments are structured matters more than how many tax employees a firm employs. The results for the remaining control variables are generally consistent with expectations: tax risk increases with business complexity, profit volatility, firm size, and cash ETR, while higher profitability and capital intensity are associated with lower risk.

Taken together, the results in Table 6 support H2: more centralized tax departments are associated with greater tax risk due to less jurisdiction-specific tax expertise.

Robustness Tests

Table 7 presents several sets of robustness tests for the findings in Tables 5 and 6. First, we address potential selection bias because MNEs can self-select into centralized or decentralized tax department structures. To mitigate this concern, we employ a 1:3 propensity score matching procedure (caliper = 0.03, with replacement)[10] and a 1:3 Mahalanobis-distance matching procedure (with replacement), matching firms with above- and below-median levels of tax department centralization based on observable firm characteristics. Following Overesch et al. (2020), we match observations on firm size (*Size*), profitability (*RoA*), leverage *(Leverage)*, R&D intensity (*R&D*), and the ratio of intangible assets to total assets (*Intangibles*). The matched-sample results are similar to our baseline findings. Specifically, seven out of eight coefficients on *Centralization* remain statistically insignificant in the tax planning regressions (Panel A, lines (1) and (2)) but

[9] = 1.096 / 10.711 (sample mean, see Table 4).

[10] Austin (2011) suggests that the optimal caliper width corresponds to 20% of the standard deviation of the propensity score, noting that calipers of 0.02 or 0.03 yield the best matching performance.

seven out of eight turn positive and statistically significant in the tax risk regressions (Panel B, lines (1) and (2)). The results using the matched sample are also more consistent across the different centralization measures and somewhat larger in economic magnitude. Consistent with the baseline results in Table 6, *Centralization I* appears more informative about overall tax risk than *Centralization II*.

[Insert Table 7 about here]

Second, we re-estimate our models using alternative five-year windows for computing the outcome measures for overall tax planning (*CETR)* and tax risk (*VolCETR*). In the baseline regressions, we calculate both variables in a forward-looking manner for the period 2018–2022, a period marked by significant economic disruptions such as the COVID-19 pandemic and the Russia–Ukraine war. To ensure that our results are not driven by such disruptions, we re-estimate both measures for the periods 2016–2020 and 2014–2018, respectively. Because tax department design tends to be rather sticky over time, we expect similar results across periods. The results reported in lines (3) and (4) of Table 7 are in line with this prediction. Specifically, tax department centralization remains unrelated to overall tax planning but positively associated with tax risk, particularly when using *Centralization I* and *Centralization IV* as a measure.

Finally, we test the robustness of our tax planning results using two alternative measures for a firm's overall tax planning. Specifically, we replace the cash ETR with (i) the GAAP ETR (*GETR*) and (ii) the Henry and Sansing (*H&S*) measure, both calculated as five-year forward-looking measures. The latter approach also allows us to retain loss observations in the sample. When using these alternative measures in lines (5) and (6) of panel A, seven out of eight coefficients remain statistically insignificant, confirming that our null result for overall tax planning is not driven by measurement choice.

Taken together, our MNE-level analyses provide consistent evidence that tax department centralization is unrelated to firms' overall tax planning but positively associated with tax risk. This pattern supports our broader argument that tax department design does not affect the overall level of tax planning but could shape how firms engage in tax planning. We explore this channel more directly in the next section using affiliate-level data.

V. AFFILIATE-LEVEL ANALYSIS

Research Design

We complement the MNE-level analysis with affiliate-level regressions to test whether tax department centralization affects firms' reliance on specific tax planning channels. To test Hypothesis 3a, we analyze whether MNEs with more centralized tax departments rely more heavily on international profit shifting. If centralized tax coordination facilitates profit shifting, affiliates of MNEs with more centralized tax departments should exhibit greater sensitivity of affiliate-level outcomes to profit shifting incentives. Accordingly, we examine how affiliate *j*'s profitability and leverage respond to variation in such incentives using the following fixed effects regression model:

$$\begin{aligned} \textit{Affiliate-Level Outcome}_{jt} = {} & \beta_0 + \beta_1\, \textit{Centralization}_i + \beta_2\, \textit{AffTaxDiff}_{jt} + \\ & \beta_3\, \textit{Centralization}_i \times \textit{AffTaxDiff}_{jt} + \mu\, \textit{Controls}_{jct} + \\ & \gamma\, \textit{Industry}_j + \eta\, \textit{MNE}_i + \delta\, \textit{Year}_t + \varepsilon_{jt} \end{aligned} \quad (2)$$

The dependent variables are the (i) natural logarithm of affiliate profitability, measured as its return on assets (*AffRoA*; Huizinga and Laeven, 2008; De Simone et al., 2017), and (ii) affiliate leverage (*AffLeverage*; Huizinga et al., 2008). To capture profit shifting incentives, we define *AffTaxDiff*, as the difference between the statutory corporate income tax rate at the location of affiliate *j* and the MNE's asset-weighted average statutory corporate income tax rate across all countries in which MNE *i* operates. If affiliates engage in cross-border profit shifting, β_2 should be *negative* in the profitability specification and *positive* in the leverage specification. This pattern

would be consistent with MNEs in response to greater profit shifting incentives (i) *reducing* profits in high-tax affiliates, in particular through strategically setting transfer prices for intra-firm goods, services, and royalty payments, and (ii) *increasing* these affiliates' reliance on debt financing to generate tax-deductible interest payments to low-tax affiliates.

To test whether firms with more centralized tax departments engage in more profit shifting, we include tax department centralization (*Centralization*) and its interaction with profit shifting incentives (*AffTaxDiff*). Consistent with Hypothesis 3a, we expect the coefficient on the interaction term (β_3) to be negative (positive) when the dependent variable is profitability (leverage).

Control variables follow Huizinga and Laeven (2008) and De Simone et al. (2017) in the profitability regression, and Huizinga et al. (2008) in the leverage regression. Specifically, we include the natural logarithm of fixed assets (*AffFixedAssets*), the natural logarithm of staff expenses (*AffStaff*), and the affiliate country GDP per capita (*GDPcapita*) in the profitability regression. In the leverage regression, we control for the share of fixed assets (*AffTangibility*), turnover (*AffSales*), profitability (*AffProfitability*), industry-specific revenue growth (*Growth*), inflation (*Inflation*), and political stability (*PoliticalStability*).

All specifications include MNE fixed effects. This design choice controls for time-invariant MNE characteristics while exploiting variation in profit shifting incentives across affiliates and over time within a given MNE. We additionally include affiliate industry and year fixed effects to capture time-invariant industry differences (e.g., profit shifting potential) and the impact of the business cycle. We cluster standard errors at the MNE-level.

To test Hypothesis 3b, we examine whether MNEs with more centralized tax departments respond less strongly to local tax incentives using the following two-way fixed effects model:

$$AffInvestment_{jt} = \beta_0 + \beta_1\, Centralization_i + \beta_2\, EffectiveTaxGap_{ct} +$$

$$\beta_3\, Centralization_i \times EffectiveTaxGap_{ct} + \mu\, Controls_{jct} +$$

$$\eta\ MNE_i + \delta\ Year_t + \varepsilon_{jt} \quad (3)$$

The dependent variable, *AffInvestment*, measures the gross change in tangible fixed assets at the affiliate level over the current and two subsequent years, scaled by prior-year total assets. By focusing on tangible fixed assets, our model captures real investment responses rather than pure accounting effects. We proxy for local tax incentives using *EffectiveTaxGap*, defined as the difference between the statutory corporate income tax rate in the affiliate country *c* in year *t* and the corresponding country-level effective average tax rate (EATR), calculated by Gundert et al. (2024) and following the Devereux and Griffith methodology. The EATR is a forward-looking effective tax rate measure that incorporates tax incentives for investment. Higher values of *EffectiveTaxGap* indicate lower EATRs relative to the statutory corporate income tax rate, consistent with more generous local tax incentives. Thus, *EffectiveTaxGap* isolates the impact of local tax base provisions, such as accelerated depreciation allowances or investment tax credits, on affiliates' tax burden. Given that prior research finds ample evidence for firm-level investment responding to tax incentives (see Lester and Olbert (2025) for a review), we expect β_2 to be positive.

If proximity to local tax authorities and jurisdiction-specific expertise enables affiliates to better identify and exploit local tax incentives, investment of affiliates belonging to MNEs with more centralized (decentralized) tax departments should respond less (more) strongly to *EffectiveTaxGap*. Hence, consistent with H3b, we expect the coefficient on the interaction term *Centralization* × *EffectiveTaxGap* (β_3) to be negative.

Control variables follow Amberger et al. (2026). We include affiliate leverage (*AffLeverage*), profitability (*AffProfitability*), turnover (*AffSales*), cash and cash equivalents (*AffCash*), and capital intensity (*AffCapitalIntensity*). To control for differences across affiliate countries, we also include the statutory corporate income tax rate (*StatutoryTaxRate*), GDP per

capita (*GDPcapita*), GDP growth rate (*GDPgrowth*), inflation rate (*Inflation*), and unemployment rate (*Unemployment*). We again cluster standard errors at the MNE-level.

Additional Data and Descriptive Statistics

The sample for our affiliate-level analyses consists of all firms that are majority-owned by one of the 309 firms in our MNE sample (Section 4). For these affiliates, we collect unconsolidated financial statement data from Moody's Orbis database for the period 2015–2021. We exclude affiliates in the financial sector due to industry-specific regulatory environments that differ from other industries. We also drop affiliates with total assets below €10 million because financial reporting requirements for unconsolidated financial statements vary across EU countries by firm size (Chen et al., 2023).[11] The local investment incentives sample additionally excludes loss-making observations. Finally, we exclude observations with missing data on dependent, independent, or control variables. Table 8 provides detailed information on the construction of the affiliate-level samples. We obtain country-level statutory corporate tax rates from the Tax Foundation[12] and effective average tax rates from the Mannheim Tax Index (MannheimTaxation Project).[13] We obtain macroeconomic[14] and institutional[15] indicators from the World Bank's World Development Indicators.

We present descriptive statistics for all variables used in the three affiliate-level tests in Table 9. Panel A (B) reports the sample used to examine profit shifting through affiliate profitability (debt financing), while Panel C presents the sample used to study investment responses to local tax incentives. Overall, the descriptive statistics indicate that our sample is comparable to

[11] Since affiliate profitability and investment is scaled by lagged total assets, we additionally exclude affiliates with lagged total assets below €10 million from these regressions.
[12] Data can be retrieved from www.taxfoundation.org.
[13] We thank Christoph Spengel, Jost Heckemeyer, and their team for sharing data from their MannheimTaxation Project with us. Data can be retrieved from www.zew.de/mannheim-tax-index. For further information on the index construction, see Spengel et al. (2025).
[14] Data can be retrieved from databank.worldbank.org/source/world-development-indicators.
[15] Data can be retrieved from www.worldbank.org/en/publication/worldwide-governance-indicators.

those used in prior Orbis-based studies in terms of tax rates, macroeconomic conditions, and affiliate location. The affiliates in the transfer pricing sample in Panel A exhibit a mean return on assets of 8.5%, closely aligned with the 8.4% reported by De Simone et al. (2017). The average affiliate in the investment sample in Panel C faces a statutory corporate income tax rate of 27.0%, similar to 25.1% reported by Amberger et al. (2026).[16] With respect to country-level characteristics, mean inflation and unemployment rates are 1.1% and 8.4%, respectively. Across all three samples, we observe the largest number of firm-year observations for France, Italy, Spain and Germany. This distribution is consistent with prior work using Orbis data (e.g., De Simone, 2016[17]; Bethmann et al., 2017[18]) and reflects the underlying coverage of the Orbis database (Bajgar et al., 2020).[19]

Regression Results

Hypothesis 3a predicts that firms with more centralized tax departments engage in greater international profit shifting, as centralized tax coordination facilitates information sharing and strategic alignment across affiliates. To test this prediction, we estimate Equation (2) and report the results in Table 10.

[Insert Table 10 about here]

Table 10, Panel A focuses on affiliate-level profitability and analyzes whether MNEs with more centralized tax departments shift more profits through transfer pricing, i.e., the strategic pricing of intra-firm trade or royalty payments. As expected, the coefficients on *AffTaxDiff* are negative and significant, consistent with affiliate profitability being sensitive to profit shifting incentives. The estimated coefficients imply a tax semi-elasticity of -1.238 to -1.317, which

[16] Their data cover the period 2012-2019 and are obtained from Orbis.
[17] Her data span the years 2003–2012 and are obtained from Amadeus, which has since been incorporated into Orbis.
[18] Their data span the years 2005–2012 and are obtained from Amadeus, which has since been incorporated into Orbis.
[19] Since we require firms to file unconsolidated financial statements, our sample does not include countries without such a reporting requirement (e.g., the United States). Firms from the United Kingdom lack data on sales (*AffSales*) and thus are only included in the sample reported in Table 9, panel A (transfer pricing).

suggests that a ten–percentage-point higher tax rate differential is associated with approximately 12.4–13.2% lower affiliate profitability.

The coefficients on the interaction term *AffTaxDiff* × *Centralization* are negative and statistically significant for two of the four centralization measures. These estimates indicate that MNEs with more centralized tax departments exhibit stronger transfer pricing responses to tax rate differentials. In economic terms, the estimated coefficients (–0.548 and –0.588) imply that a one–standard-deviation increase in the degree of tax department centralization strengthens the tax semi-elasticity of profitability with respect to *AffTaxDiff* by approximately 42.0–44.6%.

Interestingly, although transfer pricing decisions are typically concentrated at headquarters (see Figure 3), the most relevant dimensions of centralization are not formal decision authority at the headquarters (*Centralization II*). Instead, functional concentration within the largest tax department (*Centralization I*) and geographic proximity among tax employees (*Centralization IV*) appear to exert the strongest influence on profit shifting. This pattern suggests that the concentration of expertise and the ease of interaction among tax employees are more important for effective coordination than the formal location of decision rights.

Table 10, Panel B reports specifications examining the debt-financing channel of international profit shifting and provides strong support for Hypothesis 3a. As expected, the coefficient on *AffTaxDiff* is positive and significant in all four columns, consistent with affiliates in high-tax jurisdictions relying more heavily on debt financing. More importantly, the coefficients on the interaction term *AffTaxDiff* × *Centralization* are all positive and statistically significant at the five-percent level (or better). This finding implies that the sensitivity of affiliate leverage to tax rate differentials is systematically stronger for firms with more centralized tax departments.[20]

[20] Our data does not allow us to differentiate between intra-group and external debt financing. However, we interpret the results as being more consistent with internal debt shifting, which requires firm-wide coordination and knowledge of affiliate profitability.

Economically, a one–standard-deviation increase in tax department centralization amplifies the responsiveness of affiliate leverage to tax rate differentials by approximately 36.3–46.9%.

[Insert Table 11 about here]

Table 11 examines whether more centralized tax departments are less able to exploit local investment tax incentives (Hypothesis 3b). The estimated coefficients on *StatutoryTaxRate* and *EffectiveTaxGap* align with our expectations and support the validity of our empirical specification. Specifically, affiliate-level investment is negatively associated with statutory tax rates (negative coefficients on *StatutoryTaxRate*) but positively associated with local tax incentives (positive coefficients on *EffectiveTaxGap*). The coefficients on the interaction term *Centralization* × *EffectiveTaxGap* are negative; with two estimates being statistically significant. These results are consistent with Hypothesis 3b and indicate that greater tax department centralization attenuates the positive investment response to local tax incentives. In economic terms, a one–standard-deviation increase in centralization is associated with a 78.5–87.2% weaker investment response to local tax incentives.[21]

Taken together, the findings in Tables 10 and 11 support Hypotheses 3a and 3b: tax department design affects *how* firms engage in tax planning rather than *how much* tax planning they do. Specifically, centralized tax departments appear more effective at coordinating cross-border tax planning strategies, while decentralized tax departments are better equipped to exploit local tax incentives.

[21] The coefficients on *EffectiveTaxGap* and *Centralization* × *EffectiveTaxGap* in column 2 (3) imply that a one standard deviation increase in *Centralization* mutes the responsiveness of investment to local tax incentives by 0.204 / 0.260 = 78.5% (0.224 / 0.257 = 87.2%).

VI. CONCLUSION

This study provides the first comprehensive analysis of how the internal design of corporate tax departments, specifically, their degree of centralization, is associated with firm-level tax outcomes and the choice of tax planning strategies. Using a novel, hand-collected dataset of tax employees from LinkedIn, we map the geographic distribution, functional specialization, and hierarchical structure of tax personnel at 309 publicly listed European MNEs. This granular organizational data enables us to directly link tax department design to observable tax outcomes, addressing the call for more research on the internal workings of corporate tax functions (Hanlon and Heitzman, 2010).

Our analysis yields several key insights. First, we provide new descriptive evidence on how large European MNEs structure their tax departments across countries and functions, documenting substantial variation in both size and geographic distribution. Second, we show that tax department design shapes the *choice* of tax planning strategies rather than the *overall intensity* of tax planning. Firms with more centralized tax departments engage more heavily in cross-border profit-shifting, while firms with more decentralized tax departments are better positioned to exploit local tax incentives. Importantly, we find no systematic association between tax department design and overall tax planning, indicating that, conditional on organizational structure, MNEs substitute between international and local tax planning. Third, we document that greater tax department centralization is associated with higher tax risk. Firms with more geographically dispersed tax departments experience lower volatility in effective tax rates, consistent with stronger local tax compliance and more effective engagement with host-country tax authorities. These findings highlight the dual role of tax departments in facilitating tax planning while managing compliance, and they underscore the importance of organizational design in moderating tax-related risk.

Taken together, our findings demonstrate that how MNEs organize their tax departments has implications for the management of global tax positions. For executives, our findings

emphasize the strategic importance of aligning tax department design with broader corporate objectives, balancing the benefits of global coordination against the value of local expertise. For policymakers, our results suggest that firms' organizational responses can moderate the effectiveness of tax policy reforms and influence how firms respond to local tax incentives. For researchers, our study advances the understanding of corporate tax behavior by incorporating organizational structure as a determinant of firm-level heterogeneity in tax outcomes.

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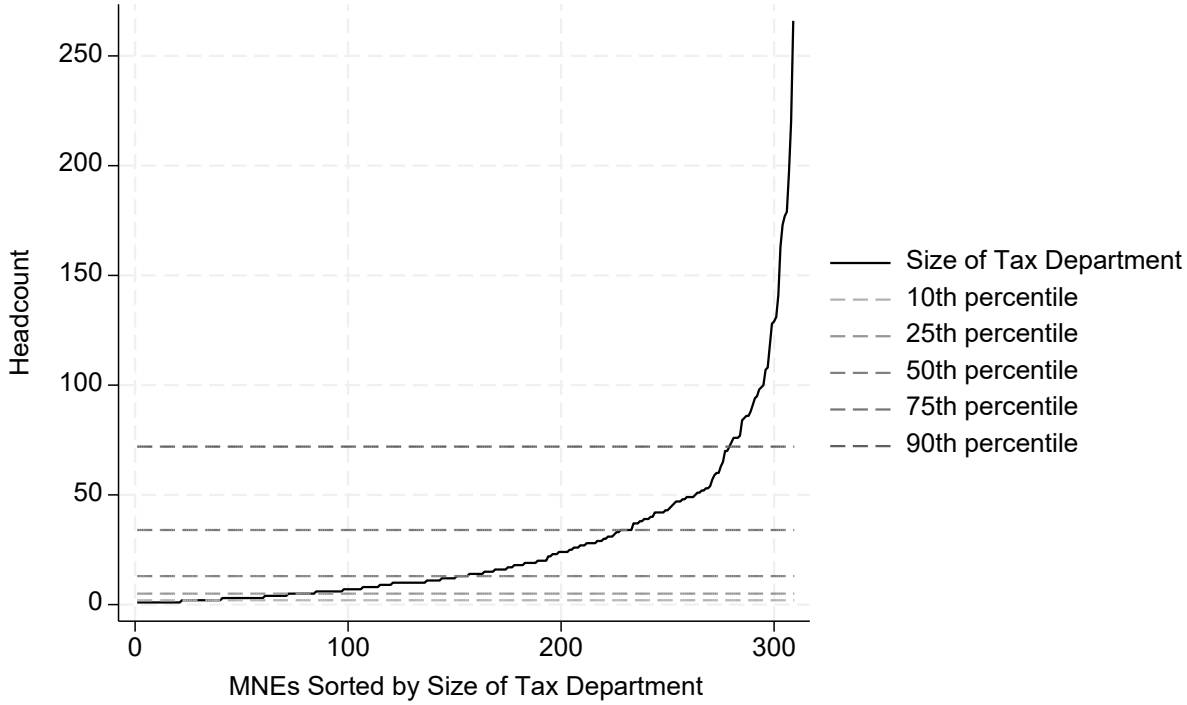
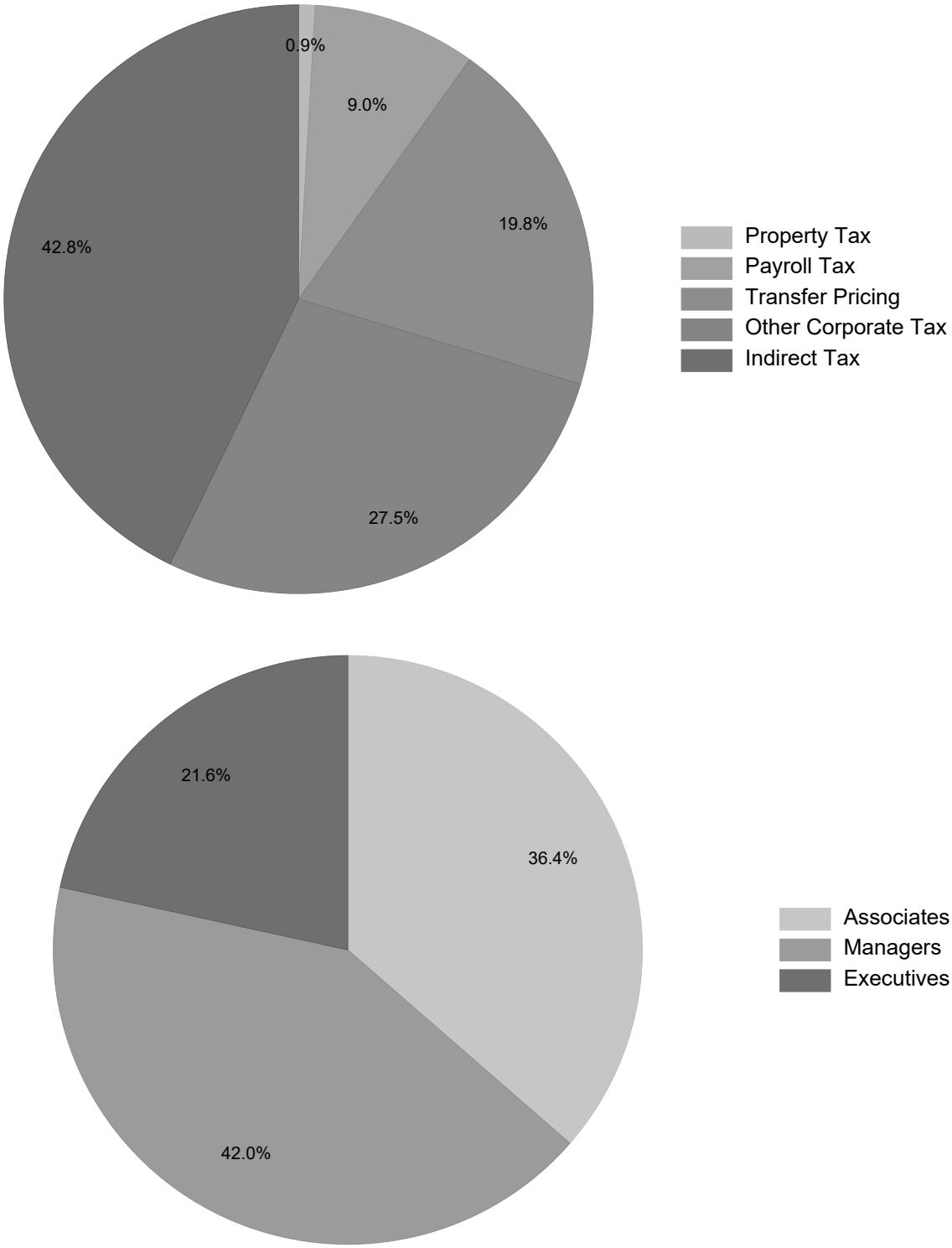
FIGURES

FIGURE 1 Distribution of tax departments by size



Notes: This figure shows the distribution of tax departments by size, measured by the number of tax employees. Tax department size varies considerably across firms, ranging from a minimum of one to a maximum of 266 tax employees, with a median of 13 and a mean of 27.5. Figure 1 comprises all 8,496 tax employees in the dataset.

FIGURE 2 Distribution of tax departments by specialization field and hierarchy level



Notes: This figure shows the distribution of tax employees across functional specializations and hierarchy levels. We include 1,773 tax employees with available information on functional specialization and 8,496 tax employees with available information on hierarchy level.

FIGURE 3 Distribution of tax departments by specialization field and hierarchy level

Notes: This figure presents the distribution of tax employees by functional specialization and hierarchy level. We compare tax employees located in the headquarters country to those based in the largest foreign tax department (i.e., the country with the highest number of tax employees outside headquarters). The analysis includes 1,773 tax employees with available data on functional specialization and 8,496 tax employees with available data on hierarchy level.

TABLES

TABLE 1 Sample selection (MNE sample)

Step	N
All firms that are part of the STOXX Europe 600	600
Less: Firms in the real estate, oil and gas, or financial sector	(173)
Less: Firms with dual listing	(1)
Less: Firms that provide tax services	(1)
Less: Firms without foreign operations	(8)
Less: Firms that are majority-owned by another STOXX Europe 600-listed firm	(3)
Less: Firms without LinkedIn-listed tax employees	(26)
Less: Firms without LinkedIn-listed corporate tax employees	(2)
Less: Firms with negative pre-tax income over five consecutive years	(12)
Less: Firms with missing data to compute regressions variables	(65)
Final MNE sample	**309**

Notes: This table outlines the sample selection process for our MNE sample. The final sample comprises 309 publicly listed European MNEs that (i) have at least one corporate tax employee with an active LinkedIn profile and (ii) provide sufficient firm-level data for our empirical analyses.

TABLE 2 Sample by size, industry, and headquarters country (MNE sample)

	(1) Min total assets (millions)	(2) Mean total assets (millions)	(3) Max total assets (millions)	(4) N
Panel A: Firm size				
Quintile 1	270.267	2,203.821	3,753.000	62
Quintile 2	3,921.221	6,057.694	7,995.035	62
Quintile 3	8,042.000	11,096.330	15,280.000	62
Quintile 4	15,612.000	29,004.400	46,100.000	62
Quintile 5	46,269.000	110,265.300	458,156.000	61
Panel B: Industry				
Industrial	270.267	27,885.140	458,156.000	263
Utility	4,634.652	58,124.130	248,592.000	37
Transportation	4,271.200	26,695.250	56,636.000	9
Panel C: Headquarters country				
Austria	3,742.910	9,504.483	15,651.600	4
Belgium	4,146.900	37,913.770	232,103.000	8
Switzerland	857.671	22,691.110	145,563.000	26
Germany	580.558	48,189.860	458,156.000	43
Denmark	270.267	42,911.560	174,575.000	15
Spain	9,526.202	38,092.870	114,047.000	10
Finland	2,092.900	8,281.611	22,409.000	9
France	1,661.581	28,342.900	153,702.000	50
Ireland	3,098.700	11,509.000	35,173.000	6
Italy	905.940	28,990.920	165,424.000	17
Netherlands	1,847.972	14,358.030	41,956.000	13
Norway	1,624.412	62,375.770	191,272.000	7
Poland	1,126.838	34,168.280	64,141.000	3
Portugal	6,659.927	20,324.630	41,626.960	3
Sweden	9,684.100	71,292.230	248,592.000	22
United Kingdom	528.000	17,641.200	146,342.000	73

Notes: This table presents descriptive statistics for our MNE sample. We report minimum, mean, and maximum values for firm size as well as the number of firms, depending on firm size quintiles in panel A, industry affiliation in panel B (General Industry Classification from Thomson Reuters), and the MNE's headquarters country in panel C.

TABLE 3 Tax department centralization measures
by size, industry, and headquarters country (MNE sample)

	(1) Mean Centralization I	(2) Mean Centralization II	(3) Mean Centralization III	(4) Mean Centralization IV
Panel A: Firm size (quintiles, in € millions)				
1 (<= 3,753.00)	0.654	0.546	0.370	-2.661
2 (<=7,995.04)	0.613	0.495	0.375	-3.217
3 (<=15,280.00)	0.563	0.362	0.320	-3.507
4 (<=46,100.00)	0.426	0.317	0.173	-4.988
5 (<=458,156.00)	0.390	0.263	0.179	-5.221
Panel B: Industry				
Industrial	0.515	0.378	0.263	-4.145
Utility	0.663	0.559	0.449	-2.137
Transportation	0.422	0.286	0.226	-4.500
Panel C: Headquarters country				
Austria	0.585	0.410	0.297	-3.308
Belgium	0.583	0.540	0.402	-3.178
Switzerland	0.449	0.323	0.217	-4.640
Germany	0.480	0.373	0.257	-4.311
Denmark	0.527	0.377	0.292	-3.833
Spain	0.575	0.425	0.368	-3.607
Finland	0.545	0.496	0.223	-3.568
France	0.430	0.275	0.165	-4.822
Ireland	0.444	0.340	0.113	-3.676
Italy	0.682	0.597	0.495	-2.660
Netherlands	0.473	0.385	0.136	-4.854
Norway	0.656	0.389	0.425	-2.749
Poland	0.833	0.667	0.667	-1.031
Portugal	0.806	0.306	0.500	-1.409
Sweden	0.490	0.297	0.197	-4.177
United Kingdom	0.598	0.477	0.364	-3.416

Notes: This table reports mean values for the tax department centralization measures *Centralization I*, *Centralization II*, *Centralization III*, and *Centralization IV* for our MNE sample. We report statistics depending on firm size (panel A), industry affiliation (panel B, General Industry Classification from Thomson Reuters), and the MNE's headquarters country (panel C). *Centralization I* represents the largest share of corporate tax employees located in a single country an MNE is active in. *Centralization II* represents the share of corporate tax employees located in an MNE's headquarter country. *Centralization III* represents the normalized Herfindahl-index for an MNE's distribution of corporate tax employees across countries. *Centralization IV* represents the average geographical distance between the locations of an MNE's corporate tax employees. We report raw values for the centralization measures (i.e., prior to standardization to a mean of zero and a standard deviation of one).

TABLE 4 Descriptive statistics (MNE sample)

Variables	(1) N	(2) Mean	(3) Std. Dev.	(4) P5	(5) P95
CETR	309	25.937	15.740	10.227	46.423
GETR	309	23.406	12.528	8.600	43.970
H&S	317	0.163	0.778	-0.546	1.180
VolCETR	307	10.771	10.378	1.690	35.525
Centralization I	309	0.530	0.272	0.181	1.000
Centralization II	309	0.397	0.325	0.000	1.000
Centralization III	309	0.284	0.355	0.000	1.000
Centralization IV	309	-3.915	2.598	-7.786	0.000
TaxEmployees	309	8.997	9.253	0.710	26.987
Size	309	9.615	1.341	7.586	11.855
RoA	309	0.062	0.052	0.004	0.158
MtB	309	3.758	3.601	0.810	10.306
Leverage	309	0.250	0.137	0.032	0.501
R&D	309	0.022	0.037	0.000	0.106
PPE	309	0.255	0.196	0.043	0.660
Intangibles	309	0.318	0.229	0.022	0.735
Inventories	309	0.102	0.110	0.000	0.293
APTS	309	0.237	0.544	0.000	1.341
BusinessComplexity	309	1.002	0.656	0.000	1.946
VolRoA	309	0.032	0.031	0.006	0.080
MNECentralization I	309	0.314	0.220	0.090	0.796
MNECentralization II	309	0.269	0.236	0.032	0.796
MNECentralization III	309	0.143	0.192	0.011	0.566
MNECentralization IV	309	-4.741	2.152	-7.449	-0.451

Notes: This table presents descriptive statistics for our MNE sample used for testing Hypotheses 1 and 2. We report raw values for the centralization measures (i.e., prior to standardization to a mean of zero and a standard deviation of one). Variable definitions and data sources are provided in the Appendix.

TABLE 5 Tax department centralization and overall tax planning (H1)
(MNE sample)

	(1)	(2)	(3)	(4)
Dependent variable	*CETR*	*CETR*	*CETR*	*CETR*
Centralization I	**0.417**			
	(0.323)			
Centralization II		**-1.409**		
		(-1.134)		
Centralization III			**0.519**	
			(0.469)	
Centralization IV				**-0.114**
				(-0.092)
TaxEmployees	-0.155**	-0.166**	-0.144*	-0.200**
	(-2.307)	(-2.642)	(-2.030)	(-2.807)
Size	-0.882	-1.466	-0.864	-1.277
	(-0.839)	(-1.342)	(-0.831)	(-1.351)
RoA	-111.708***	-111.006***	-112.216***	-110.292***
	(-3.386)	(-3.357)	(-3.419)	(-3.268)
MtB	0.193	0.212	0.207	0.141
	(0.806)	(0.780)	(0.878)	(0.555)
Leverage	12.272	11.371	11.997	12.230
	(1.001)	(0.962)	(0.970)	(1.025)
R&D	8.005	6.810	8.229	3.874
	(0.197)	(0.159)	(0.201)	(0.096)
PPE	-4.969	-2.859	-4.900	-4.697
	(-0.669)	(-0.370)	(-0.673)	(-0.683)
Intangibles	-4.050	-2.787	-3.731	-4.267
	(-0.653)	(-0.482)	(-0.622)	(-0.687)
Inventories	-12.557*	-11.027	-12.754*	-13.042*
	(-1.914)	(-1.622)	(-1.859)	(-1.936)
APTS	-0.052	-0.025	-0.045	-0.429
	(-0.026)	(-0.012)	(-0.022)	(-0.218)
BusinessComplexity	0.567	0.630	0.631	0.309
	(0.519)	(0.637)	(0.586)	(0.293)
MNECentralization	-1.520	0.938	0.592	-0.776
	(-0.321)	(0.199)	(0.130)	(-1.452)
Industry FE	YES	YES	YES	YES
MNE-Country FE	YES	YES	YES	YES
Observations	309	309	309	309
Adjusted R^2	0.133	0.139	0.134	0.142

Notes: This table presents the estimates of Equation 1 to test for the effect of tax department centralization on overall tax planning (Hypothesis 1). *CETR* is the MNE's five-year cash ETR. All regressions include industry and MNE-country fixed effects. See the Appendix for all variable definitions. *t* statistics are reported in parentheses and standard errors are heteroscedasticity-robust and clustered at the MNE-country level. ***, **, and * label statistical significance at 1%, 5%, and 10% level, respectively.

TABLE 6 Tax department centralization and overall tax risk (H2)
(MNE sample)

	(1)	(2)	(3)	(4)
Dependent variable	*VolCETR*	*VolCETR*	*VolCETR*	*VolCETR*
Centralization I	**1.096****			
	(2.447)			
Centralization II		**0.195**		
		(0.342)		
Centralization III			**0.556**	
			(1.591)	
Centralization IV				**1.554****
				(2.633)
TaxEmployees	-0.015	-0.019	-0.025	-0.013
	(-0.275)	(-0.347)	(-0.450)	(-0.237)
Size	0.891*	0.554	0.612	1.007*
	(2.031)	(1.119)	(1.247)	(1.799)
RoA	-49.743***	-47.864***	-49.334***	-48.964***
	(-4.199)	(-4.174)	(-4.174)	(-4.229)
MtB	-0.139	-0.156	-0.155	-0.164
	(-0.803)	(-0.855)	(-0.882)	(-0.903)
Leverage	-3.062	-2.900	-2.699	-3.051
	(-0.753)	(-0.680)	(-0.662)	(-0.788)
R&D	22.281	22.355	21.699	21.016
	(1.279)	(1.280)	(1.217)	(1.244)
PPE	-8.363*	-7.585*	-7.793*	-8.541*
	(-2.001)	(-1.957)	(-1.856)	(-2.123)
Intangibles	-5.309	-4.666	-4.793	-5.516
	(-1.480)	(-1.380)	(-1.363)	(-1.703)
Inventories	9.213	9.492	10.529	9.077
	(1.210)	(1.218)	(1.411)	(1.137)
APTS	0.452	0.407	0.408	0.439
	(0.276)	(0.251)	(0.252)	(0.266)
BusinessComplexity	1.517**	1.493**	1.445**	1.430**
	(2.392)	(2.374)	(2.307)	(2.402)
VolRoA	114.908***	111.845***	112.781***	112.879***
	(4.235)	(3.944)	(4.035)	(4.204)
CETR	0.256***	0.258***	0.257***	0.256***
	(10.909)	(10.778)	(11.021)	(10.580)
MNECentralization	-3.001	-0.839	-3.642	-0.500*
	(-1.228)	(-0.324)	(-1.719)	(-1.766)
Industry FE	YES	YES	YES	YES
MNE-Country FE	YES	YES	YES	YES
Observations	307	307	307	307
Adjusted R^2	0.398	0.392	0.395	0.402

Notes: This table presents the estimates of Equation 1 to test for the effect of tax department centralization on overall tax risk (Hypothesis 2). *VolCETR* is an MNE's standard deviation of annual cash ETR over five years. All regressions include industry and MNE-country fixed effects. See the Appendix for all variable definitions. *t* statistics are reported in parentheses and standard errors are heteroscedasticity-robust and clustered at the MNE-country level. ***, **, and * label statistical significance at 1%, 5%, and 10% level, respectively.

TABLE 7 Robustness tests (MNE sample)

Panel A: Tax planning regressions (H1)				
Measure	*Centralization I*	*Centralization II*	*Centralization III*	*Centralization IV*
(1) Dependent variable: CETR, 2018-2022, Propensity-Score Matched Sample				
Centralization	-3.166	-2.940	-1.087	-0.461
	(-0.848)	(-1.227)	(-0.500)	(-0.284)
Observations	106	106	106	106
Adjusted R^2	0.181	0.188	0.164	0.165
(2) Dependent variable: CETR, 2018-2022, Mahalanobis-Distance Matched Sample				
Centralization	-3.717	-2.883*	-2.231	0.536
	(-1.288)	(-2.060)	(-1.352)	(0.400)
Observations	101	101	101	101
Adjusted R^2	0.347	0.340	0.337	0.334
(3) Dependent variable: CETR, 2016-2020, Unmatched Sample				
Centralization	0.262	-0.740	0.271	0.350
	(0.397)	(-0.710)	(0.360)	(0.744)
Observations	308	308	308	308
Adjusted R^2	0.112	0.114	0.113	0.117
(4) Dependent variable: CETR, 2014-2018, Unmatched Sample				
Centralization	-0.401	0.433	0.058	0.327
	(-0.616)	(0.577)	(0.105)	(0.442)
Observations	308	308	308	308
Adjusted R^2	0.075	0.071	0.069	0.071
(5) Dependent variable: GETR, 2018-2022, Unmatched Sample				
Centralization	-0.684	-0.794	-0.446	-1.903**
	(-1.098)	(-0.875)	(-0.819)	(-2.788)
Observations	309	309	309	309
Adjusted R^2	0.158	0.158	0.162	0.168
(6) Dependent variable: H&S, 2018-2022, Unmatched Sample				
Centralization	0.001	-0.084	-0.003	-0.015
	(0.047)	(-1.540)	(-0.073)	(-1.043)
Observations	317	317	317	317
Adjusted R^2	0.268	0.276	0.268	0.268

TABLE 7 Robustness tests (MNE sample) (continued)

Panel B: Tax risk regressions (H2)				
Measure	*Centralization I*	*Centralization II*	*Centralization III*	*Centralization IV*
(1) Dependent variable: VolCETR, 2018-2022, Propensity-Score Matched Sample				
Centralization	3.287*	2.083*	1.925*	2.299*
	(1.874)	(1.977)	(1.813)	(1.893)
Observations	105	105	105	105
Adjusted R^2	0.308	0.261	0.257	0.245
(2) Dependent variable: VolCETR, 2018-2022, Mahalanobis-Distance Matched Sample				
Centralization	1.978***	0.280	1.137*	1.788***
	(2.980)	(0.324)	(1.813)	(3.130)
Observations	101	101	101	101
Adjusted R^2	0.308	0.265	0.291	0.293
(3) Dependent variable: VolCETR, 2016-2020, Unmatched Sample				
Centralization	1.552***	0.483	0.851*	1.662**
	(3.544)	(0.915)	(1.944)	(2.697)
Observations	308	308	308	308
Adjusted R^2	0.404	0.390	0.395	0.403
(4) Dependent variable: VolCETR, 2014-2018, Unmatched Sample				
Centralization	0.934*	0.362	0.596	1.013*
	(2.029)	(1.058)	(1.628)	(2.004)
Observations	307	307	307	307
Adjusted R^2	0.350	0.340	0.355	0.341

Notes: This table presents robustness tests for Hypothesis 1 (panel A) and Hypothesis 2 (panel B). We use 1:3 propensity-score matching (with replacement; 0.03 caliper) in line (1) and Mahalanobis-distance matching (with replacement) in line (2). Lines (3) and (4) of each Panel use alternative time periods to calculate the dependent variables (2016 to 2020 in line (3), 2014 to 2018 in line (4)). Lines (5) and (6) of Panel A use alternative tax planning measures (5-year GAAP ETRs (5), the Henry and Sansing measure (6)). All regressions include industry and MNE-country fixed effects. *CETR* represents an MNE's five-year cash ETR. *GETR* represents an MNE's five-year GAAP ETR. *H&S* represents an MNE's five-year Henry and Sansing measure. *VolCETR* represents an MNE's standard deviation of its annual cash ETR over five years. See the Appendix for all variable definitions. *t* statistics are reported in parentheses and standard errors are heteroscedasticity-robust and clustered at the MNE-country level. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level, respectively.

TABLE 8 Sample selection (affiliate sample)

Step	N
Affiliate-years belonging to affiliates that are majority-owned by one of the 309 MNEs in the MNE Sample over the period 2015–2021	78,969
Less: Affiliates operating in the financial sector	(1,721)
Less: Affiliate-years with total assets below €10 million	(35,184)
Panel A: Transfer pricing	
Less: Affiliate-years with lagged total assets below €10 million	(1,876)
Less: Affiliate-years with missing data to compute regression variables	(20,458)
Final transfer pricing sample	**19,730**
Panel B: Debt shifting	
Less: Affiliate-years with missing data to compute regression variables	(24,074)
Final debt shifting sample	**17,990**
Panel C: Local investment incentives	
Less: Affiliate-years with lagged total assets below €10 million	(1,876)
Less: Affiliate-years that report losses	(8,800)
Less: Affiliate-years with missing data to compute regression variables	(23,977)
Final local investment incentives sample	**7,411**

Notes: This table presents the sample selection process for our affiliate sample (period 2015–2021). We start with affiliates majority-owned by one of the 309 European firms in the MNE Sample. We exclude firms in the financial sector, as well as observations below the threshold of €10 million in total assets and with insufficient data for our regression analysis. The transfer pricing and local investment incentives samples further exclude observations below the threshold of €10 million in lagged total assets since affiliate profitability and investment is scaled by lagged total assets. The local investment incentives sample additionally excludes loss-making observations.

TABLE 9 Descriptive statistics (affiliate sample)

Variables	(1) N	(2) Mean	(3) Std. Dev.	(4) P5	(5) P95
Panel A: Transfer pricing					
AffRoA	19,730	-246.306	129.617	-475.947	-91.888
AffTaxDiff	19,730	0.143	6.156	-10.575	9.723
Centralization I	19,730	0.440	0.248	0.150	1.000
Centralization II	19,730	0.325	0.280	0.000	1.000
Centralization III	19,730	0.208	0.279	0.015	1.000
Centralization IV	19,730	-4.858	2.485	-8.005	-0.093
AffFixedAssets	19,730	2.779	2.537	-1.432	7.108
AffStaff	19,730	2.302	1.589	0.000	5.126
GDPcapita	19,730	-3.547	0.693	-4.900	-2.844
Panel B: Debt shifting					
AffLeverage	17,990	62.408	26.497	14.138	100.000
AffTaxDiff	17,990	1.012	6.010	-9.665	10.294
Centralization I	17,990	0.426	0.242	0.150	1.000
Centralization II	17,990	0.311	0.263	0.000	1.000
Centralization III	17,990	0.198	0.263	0.015	1.000
Centralization IV	17,990	-5.016	2.364	-8.104	-0.105
AffTangibility	17,990	0.347	0.300	0.005	0.928
AffSales	17,990	4.130	1.859	1.009	7.238
AffProfitability	17,990	0.110	0.200	-0.074	0.391
Growth	17,990	0.008	0.026	-0.023	0.051
Inflation	17,990	1.458	1.495	-0.323	3.840
PoliticalStability	17,990	0.464	0.458	-0.348	1.106
Panel C: Local investment incentives					
AffInvestment	7,411	14.003	22.073	0.000	50.356
EffectiveTaxGap	7,411	1.322	3.056	-4.000	7.693
Centralization I	7,411	0.439	0.248	0.156	1.000
Centralization II	7,411	0.315	0.269	0.000	1.000
Centralization III	7,411	0.209	0.278	0.015	1.000
Centralization IV	7,411	-4.919	2.421	-8.005	-0.039
AffLeverage	7,411	0.268	0.226	0.001	0.720
AffProfitability	7,411	0.142	0.158	-0.001	0.396
AffSales	7,411	4.494	1.594	2.153	7.494
AffCash	7,411	0.071	0.137	0.000	0.372
AffCapitalIntensity	7,411	0.327	0.284	0.008	0.890
StatutoryTaxRate	7,411	26.984	6.512	16.000	34.430
GDPcapita	7,411	-3.532	0.448	-4.442	-2.975
GDPgrowth	7,411	0.003	0.076	-0.146	0.118
Inflation	7,411	1.091	1.018	-0.323	2.850
Unemployment	7,411	8.406	4.410	3.163	17.224

Notes: This table presents descriptive statistics for our affiliate sample used for testing Hypotheses 3a and 3b. We report raw values for the centralization measures (i.e., prior to standardization to a mean of zero and a standard deviation of one). Variable definitions and data sources are provided in the Appendix.

TABLE 10 Tax department centralization and profit shifting (H3a)
(affiliate sample)

Panel A: Transfer pricing				
	(1)	(2)	(3)	(4)
Dependent variable	*AffRoA*	*AffRoA*	*AffRoA*	*AffRoA*
AffTaxDiff	-1.317***	-1.258***	-1.238***	-1.305***
	(-3.959)	(-3.853)	(-3.778)	(-3.794)
AffTaxDiff* × *Centralization	**-0.588****	**-0.341**	**-0.179**	**-0.548***
	(-2.037)	**(-0.978)**	**(-0.598)**	**(-1.659)**
AffFixedAssets	-12.005***	-11.953***	-11.953***	-11.977***
	(-9.318)	(-9.291)	(-9.287)	(-9.301)
AffStaff	14.323***	14.306***	14.319***	14.295***
	(8.082)	(8.064)	(8.081)	(8.074)
GDPcapita	-10.298***	-10.272***	-10.265***	-10.221***
	(-3.165)	(-3.166)	(-3.154)	(-3.141)
Industry FE	YES	YES	YES	YES
MNE FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	19,730	19,730	19,730	19,730
Adjusted R^2	0.152	0.151	0.151	0.152
Panel B: Debt shifting				
	(1)	(2)	(3)	(4)
Dependent variable	*AffLeverage*	*AffLeverage*	*AffLeverage*	*AffLeverage*
AffTaxDiff	0.589***	0.589***	0.576***	0.585***
	(5.618)	(5.690)	(5.469)	(5.715)
AffTaxDiff* × *Centralization	**0.238*****	**0.276*****	**0.209****	**0.238*****
	(2.639)	**(2.879)**	**(2.228)**	**(2.847)**
AffTangibility	-13.520***	-13.666***	-13.591***	-13.610***
	(-6.392)	(-6.533)	(-6.458)	(-6.529)
AffSales	1.901***	1.893***	1.891***	1.902***
	(3.961)	(3.969)	(3.933)	(3.985)
AffProfitability	-16.627***	-16.567***	-16.691***	-16.697***
	(-7.940)	(-7.952)	(-7.988)	(-8.014)
Growth	-24.345	-24.379	-26.111	-24.234
	(-1.375)	(-1.390)	(-1.473)	(-1.371)
Inflation	0.027	0.045	0.048	0.014
	(0.087)	(0.147)	(0.157)	(0.044)
PoliticalStability	2.899**	2.889**	2.806**	2.737**
	(2.332)	(2.330)	(2.261)	(2.187)
Industry FE	YES	YES	YES	YES
MNE FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	17,990	17,990	17,990	17,990
Adjusted R^2	0.248	0.248	0.247	0.248

Notes: This table presents the estimates of Equation 2 to test for the effect of tax department centralization on international profit shifting. The analysis in Panel A (B) focuses on the use of transfer pricing strategies (debt shifting) at the affiliate level. *AffRoA* represents the natural logarithm of affiliates' return on assets. *AffLeverage* represents affiliates' total debt. All regressions include affiliate industry, MNE, and year fixed effects. See the Appendix for all variable definitions. *t* statistics are reported in parentheses and standard errors are heteroscedasticity-robust and clustered at the MNE-level. ***, **, and * label statistical significance at 1%, 5%, and 10% level, respectively.

TABLE 11 Tax department centralization and investment response to local tax incentives (H3b) (affiliate sample)

	(1)	(2)	(3)	(4)
Dependent variable	*AffInvestment*	*AffInvestment*	*AffInvestment*	*AffInvestment*
EffectiveTaxGap	0.273*	0.257*	0.279*	0.260*
	(1.761)	(1.694)	(1.799)	(1.691)
EffectiveTaxGap* × *Centralization	**-0.090**	**-0.224****	**-0.024**	**-0.204***
	(-0.821)	**(-2.073)**	**(-0.251)**	**(-1.748)**
StatutoryTaxRate	-0.181*	-0.185**	-0.182*	-0.179*
	(-1.948)	(-1.992)	(-1.956)	(-1.925)
AffLeverage	1.145	1.187	1.177	1.157
	(0.384)	(0.398)	(0.393)	(0.388)
AffProfitability	24.036***	24.025***	24.025***	24.087***
	(5.554)	(5.563)	(5.553)	(5.561)
AffSales	-0.133	-0.140	-0.129	-0.138
	(-0.434)	(-0.456)	(-0.419)	(-0.449)
AffCash	-3.036	-3.149	-2.939	-3.104
	(-0.918)	(-0.953)	(-0.889)	(-0.938)
AffCapitalIntensity	14.199***	14.234***	14.247***	14.230***
	(3.023)	(3.026)	(3.027)	(3.028)
GDPcapita	-3.805**	-3.767**	-3.781**	-3.824**
	(-2.482)	(-2.462)	(-2.474)	(-2.497)
GDPgrowth	-25.269	-24.887	-25.281	-25.130
	(-1.454)	(-1.436)	(-1.455)	(-1.448)
Inflation	-1.167*	-1.139*	-1.167*	-1.162*
	(-1.880)	(-1.845)	(-1.877)	(-1.880)
Unemployment	-0.194*	-0.186*	-0.195*	-0.193*
	(-1.798)	(-1.734)	(-1.802)	(-1.796)
MNE FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	7,411	7,411	7,411	7,411
Adjusted R^2	0.203	0.203	0.203	0.203

Notes: This table presents the estimates of Equation 3 to test for the effect of tax department centralization on the responsiveness of affiliate level investment to local tax incentives. *AffInvestment* represents the three-year growth rate of tangible fixed assets adjusted for depreciation. All regressions include affiliate industry, MNE, and year fixed effects. See the Appendix for all variable definitions. *t* statistics are reported in parentheses and standard errors are heteroscedasticity-robust and clustered at the MNE-level. ***, **, and * label statistical significance at 1%, 5%, and 10% level, respectively.

APPENDIX

Variable Definitions

Variable	Definition	Data Source
MNE-level Variables		
$CETR_i$	Five-year cash ETR calculated as the sum of MNEs' cash taxes paid over five years divided by the sum of pre-tax income less special income over the same time period. Observations with a negative denominator are dropped from the sample. Values greater than 1 or lower than 0 are set to 1 or 0 respectively. Values are multiplied by 100.	Compustat Global
$GETR_i$	Five-year GAAP ETR calculated as the sum of MNEs' tax expense over five years divided by the sum of pre-tax income less special income over the same time period. Observations with a negative denominator are dropped from the sample. Values greater than 1 or lower than 0 are set to 1 or 0 respectively. Values are multiplied by 100.	Compustat Global
$H\&S_i$	Five-year Henry and Sansing measure calculated as the sum of MNEs' cash taxes paid less pre-tax income multiplied by the statutory corporate income tax rate over five years divided by the sum of total assets and the price of an MNE's stock multiplied by the number of shares less shareholders equity over the same time period. Values are multiplied by 100.	Compustat Global; Thomson Reuters
$VolCETR_i$	Standard deviation of MNEs' annual cash ETR over five years. The annual cash ETR is calculated as cash taxes paid divided by pre-tax income less special income. Annual cash ETRs greater than 1 or lower than 0 are set to 1 or 0 respectively. Values are multiplied by 100.	Compustat Global
Centralization I_i	Maximum number of MNEs' corporate tax employees located in a single	LinkedIn

	country, divided by the number of corporate tax employees. The variable is standardized to a mean of 0 and a standard deviation of 1 prior to estimating regressions.	
Centralization II$_i$	Number of MNEs' local corporate tax employees, divided by the sum of local and foreign corporate tax employees. The variable is standardized to a mean of 0 and a standard deviation of 1 prior to estimating regressions.	LinkedIn
Centralization III$_i$	Normalized Herfindahl-index, calculated for the distribution of MNEs' corporate tax employees across the countries they are located. The variable is standardized to a mean of 0 and a standard deviation of 1 prior to estimating regressions.	LinkedIn
Centralization IV$_i$	Average distance between the locations of an MNE's corporate tax employees in thousands of kilometers, multiplied by -1. The variable is standardized to a mean of 0 and a standard deviation of 1 prior to estimating regressions.	LinkedIn; CEPII's GeoDist
TaxEmployees$_i$	Number of MNEs' corporate tax employees, scaled by the number of employees as reported in the financial statement multiplied by 1.000.	Compustat Global
Size$_i$	Natural logarithm of MNEs' average total assets over five years.	Compustat Global
RoA$_i$	Sum of MNEs' net income over five years divided by the sum of lagged total assets over the same time period. Winsorized at the 1% and 99% levels.	Compustat Global
MtB$_i$	MNEs' average market-to-book ratio over five years. Winsorized at the 1% and 99% levels.	Thomson Reuters
Leverage$_i$	Sum of MNEs' long-term debt over five years divided by the sum of lagged total assets over the same period. Winsorized at the 1% and 99% levels.	Compustat Global
R&D$_i$	Sum of MNEs' research and development expenditures over five years divided by the sum of lagged total assets over the same period.	Compustat Global

	Winsorized at the 1% and 99% levels. Missing values of research and development expenditures are set to zero prior to variable construction.	
PPE_i	Sum of MNEs' property, plant and equipment over five years divided by the sum of lagged total assets over the same period. Winsorized at the 1% and 99% levels.	Compustat Global
$Intangibles_i$	Sum of MNEs' intangible assets over five years divided by the sum of lagged total assets over the same period. Winsorized at the 1% and 99% levels.	Compustat Global
$Inventories_i$	Sum of MNEs' inventory over five years divided by the sum of lagged total assets over the same period. Winsorized at the 1% and 99% levels.	Compustat Global
$APTS_i$	MNEs' average auditor-provided tax services over five years. Winsorized at the 1% and 99% levels.	Audit Analytics
$BusinessComplexity_i$	Natural logarithm of MNEs' business complexity measured by the number of segments.	Annual Reports
$VolRoA_i$	Average standard deviation of MNEs' net income divided by lagged total assets over five years. Winsorized at the 1% and 99% levels.	Compustat Global
$MNECentralization\ I_i$	Maximum number of MNEs' subsidiaries located in a single country, divided by the number of subsidiaries. Winsorized at the 1% and 99% levels.	Annual Reports
$MNECentralization\ II_i$	Number of MNEs' local subsidiaries, divided by the number of subsidiaries. Winsorized at the 1% and 99% levels.	Annual Reports
$MNECentralization\ III_i$	Normalized Herfindahl-index, calculated for the distribution of MNEs'subsidiaries across the countries they are located. Winsorized at the 1% and 99% levels.	Annual Reports
$MNECentralization\ IV_i$	Average distance between the locations of MNEs' subsidiaries in thousands of kilometers, multiplied by -1. Winsorized at the 1% and 99% levels.	Annual Reports
Affiliate-level Variables		

$AffRoA_{jt}$	Natural logarithm of affiliates' return on assets. Calculated as earnings before interest, taxes, depreciation and amortization in year *t* scaled by total assets in year *t-1*. Values are multiplied by 100.	Orbis
$AffLeverage_{jt}$	Affiliates' total debt in year *t* scaled by total assets in year *t*. Values are multiplied by 100.	Orbis
$AffInvestment_{jt}$	Three-year growth rate of affiliates' tangible fixed assets adjusted for depreciation. Calculated as the sum of changes in tangible fixed assets to the previous year for year *t* to *t+2* adjusted for the sum of depreciation in years *t* to *t+2* scaled by total assets in year *t-1*. Winsorized at the 1% and 99% levels. Values are multiplied by 100.	Orbis
$AffTaxDiff_{jt}$	Differential between the statutory corporate income tax rate applying to an MNE's affiliate and the MNEs' average statutory corporate income tax rate calculated as the affiliates average statutory corporate income tax rate weighted by total assets in year *t*.	Tax Foundation; Orbis
$AffProfitability_{jt}$	Affiliates' return on assets. Calculated as earnings before interest, taxes, depreciation and amortization in year *t* scaled by total assets in year *t-1*. Winsorized at the 1% and 99% levels.	Orbis
$AffFixedAssets_{jt}$	Natural logarithm of affiliates' fixed assets in year *t*.	Orbis
$AffStaff_{jt}$	Natural logarithm of affiliates' staff expenses in year *t* plus 1. Missing values of affiliates' staff expenses are set to zero prior to variable construction.	Orbis
$AffTangibility_{jt}$	Affiliates' ratio of fixed assets to total assets. Calculated as fixed assets in year *t* scaled by total assets in year *t*. Winsorized at the 1% and 99% levels.	Orbis
$AffSales_{jt}$	Natural logarithm of affiliates' turnover in year *t*.	Orbis

$AffCash_{jt}$	Affiliates' cash and cash equivalents in year *t* scaled by total assets in year *t*. Winsorized at the 1% and 99% levels.	Orbis
$AffCapitalIntensity_{jt}$	Affiliates' capital intensity. Calculated as fixed assets in year *t* scaled by total assets in year *t*. Winsorized at the 1% and 99% levels.	Orbis
Country-level Variables		
$StatutoryTaxRate_{ct}$	Statutory corporate income tax rate for country *c* in year *t*.	Tax Foundation
$EffectiveTaxGap_{ct}$	Statutory corporate income tax rate for country *c* in year *t* less effective average tax rate for country *c* in year *t*.	Tax Foundation; Spengel, Heckemeyer, Nicolay, Gaul, Gundert, Spix, Steinbrenner, Weck, Wickel (2025): Mannheim Tax Index – Update 2024
$GDPcapita_{ct}$	Natural logarithm of GDP per capita for country *c* in year *t*.	World Bank's World Development Indicators
$GDPgrowth_{ct}$	One-year GDP growth rate (in %) for country *c* in year *t*. Calculated as the change in GDP between year *t-1* and *t* scaled by GDP in year *t-1*.	World Bank's World Development Indicators
$Growth_{ct}$	Growth opportunities in affiliates' country of residence and industry. Calculated as the median change in turnover per country *c* and industry *n* between year *t-1* and *t* scaled by turnover per country *c* and industry *n* in year *t-1*.	Orbis
$Inflation_{ct}$	Inflation rate (consumer prices, in %) for country *c* in year *t*.	World Bank's World Development Indicators
$Unemployment_{ct}$	Unemployment rate (in % of total labor force) for country *c* in year *t*.	World Bank's World Development Indicators
$PoliticalStability_{ct}$	Decile rank of estimated political stability and absence of violence/terrorism for country *c* in year *t*.	Worldwide Governance Indicators (WGI)

Notes: This table presents definitions and data sources for all dependent, independent, and control variables.

ONLINE APPENDIX

Data Validation

In this Online Appendix, we test the representativeness of the LinkedIn data with regard to the overall size and any potential within and across MNE biases. To validate our hand-collected dataset regarding the overall size of the tax department, we compare it to prior surveys of corporate tax departments. A number of studies have tried to evaluate the size of tax departments, including KPMG (2016), Feller et al. (2017), Klassen et al. (2017), Barrios and Gallemore (2019), and Chen et al. (2021). These studies use different data sources, as well as tax department data from companies of different size, and hence, are a valid sample to verify our hand-collected dataset. Table A.1 shows the extrapolated values of these studies.

Klassen et al. (2017), in cooperation with the Tax Executives Institute, conducted a survey of multinational corporate tax directors to assess several issues regarding the taxation of multinationals, one of which being transfer prices. The survey contains 114 questions, one of which being a query about the size of the tax department. While Klassen et al. do not directly report a single average tax department size by firm scale, Chen et al. (2020) reconstruct the Klassen et al. data and estimate an average tax department size of 13.9 employees for the subset of public firms for which total assets information is available. To make this benchmark comparable to our sample of multinational enterprises, we linearly scale this estimate by total assets. Although Klassen et al. report a mean respondent asset level of approximately USD 39 billion, the distribution of firms is highly right-skewed, with a large share of respondents concentrated in asset ranges below USD 50 billion and a median firm size far below the mean. To reflect a representative firm within the core mass of respondents rather than the right tail, we calibrate the Klassen benchmark to an asset level of USD 20 billion. Applying linear scaling to our sample's average total assets of USD 36.9 billion yields an implied tax department size of 25.6 employees, which closely matches the average of

24.5 tax professionals observed in our data.[22] This alignment supports the representativeness of our hand-collected LinkedIn sample relative to established survey evidence on corporate tax departments.[23]

Chen et al. (2021) study in-house tax departments of S&P 1500 firms using LinkedIn data over the 2009–2014 period and report an unconditional average of 7.24 tax employees per firm, reflecting the relatively small average firm size in their sample. Indeed, the mean total assets of an S&P 1500 firm in Chen et al. (2021) amount to USD 10.7 billion, compared to approximately USD 17.6 billion (EUR 14,988 billion) in our sample. Chen et al. (2021) further document substantial heterogeneity in tax department size across firm-size quintiles. For firms in the largest asset-size quintile, with mean total assets of USD 42.5 billion, the average tax department comprises 18.7 tax professionals, placing these firms in a size regime that is most comparable to the multinational firms in our sample. While our firms are smaller in terms of total assets, the average tax department size of 24.5 employees observed in our data is reasonably close to this large-firm benchmark. Moreover, Chen et al. (2021) report that tax employees account for 0.053% of the total workforce in the largest size quintile, which closely aligns with the corresponding figure of 0.051% in our sample. Taken together, these comparisons suggest that differences in average tax department size are largely driven by firm size and the earlier sample period of Chen et al. (2021), during which LinkedIn adoption and coverage were more limited, and thus support the representativeness of our hand-collected LinkedIn data.

[22] The implied benchmark tax department size is naturally sensitive to the choice of the benchmark asset level used for calibration. Using linear scaling, benchmark asset values of USD 18 billion, USD 20 billion, and USD 27.5 billion imply expected tax department sizes of approximately 28.5, 25.6, and 18.6 employees, respectively. All estimates lie in a plausible range given the asset distribution of the Klassen et al. (2017) survey respondents and bracket the average of 24.5 tax professionals observed in our sample.

[23] Dharmapala (2014) also states that tax-planning expenditures decrease proportionally with firm size.

While the above studies do not differentiate between local (headquarter country) and foreign tax employees, a tax benchmarking study by KPMG (2016) reports on average 16 local tax managers and 27 foreign tax managers. With an average number of 5.5 local and 19.0 foreign tax employees, our sample firms have slightly smaller tax departments. While these studies mostly refer to the tax department size of U.S. corporations, Feller et al. (2017) report for 154 public listed German firms an average number of 16 tax employees. However, the average number of employees of stock market-oriented firms is higher (29). The average total number of employees for stock market-oriented firms in their sample is only 35,000, compared to 54,022 in our sample.

In general, the number of tax employees for our sample firms (24.5) tends to be only slightly below the extrapolated values of most other studies.[24] Taking economies of scale into account, it is reasonable that the size of the tax departments in our sample is smaller than the extrapolated value because our MNEs tend to be larger than the ones in the other studies.[25] Taking these findings together, the coverage seems quite plausible with potentially only a small underestimation of the real size of the tax departments of our sample MNEs.

TABLE A.1 Comparison of bandwidth of tax employees

Study	**Department Size**
This study	**24.5**
Chen et al. (2021)	18.7
Feller et al. (2017)	29
Klassen et al. (2017)	25.6

Notes: This table presents the number of tax department employees reported by previous studies.

[24] One outlier in this respect is the study by Barrios and Gallemore (2019). They report an average number of tax employees of 14 for S&P 1500 firms for the period 2011–2015. This value is almost twice the amount reported by Chen et al. (2021) for the same firms for the period 2009–2014. Furthermore, the average size of their sample firm is 1.9 billion Dollar, which is five times smaller than the average size reported by Chen et al. (2021), making their firms not a good comparison group. Compared to our size (natural logarithm of total assets) of 9.615, which translates into an approximately eight times larger average firm, this would result in a calculated department size of 112 tax employees, which seems highly unlikely.

[25] This is in line with findings by Chen et al. (2021), that the number of tax employees increases with firm size, but below linear growth, due to potential economies of scale. Dharmapala (2014) also states that tax-planning expenditures decrease proportionally with firm size.

To test the validity of our data with regard to a potential bias within an MNE, we test the location distribution of the tax employees to clarify that we do not suffer from regional coverage differences. To this end, we analyze the correlation of employee location with the MNE's continent sales of the largest 34 firms and find a statistically significant correlation of 0.68 (untabulated).

Since information presented in résumés are not subject to plausibility checks by the platform provider, skepticism regarding the accuracy might occur. Such accuracy issues could be mostly due to deceitful (job) title manipulation or overestimation of own qualifications, which should not influence our results. False statements regarding current (and past) employers seem to be unlikely, as such deception leads little benefit while detection risk is high.[26]

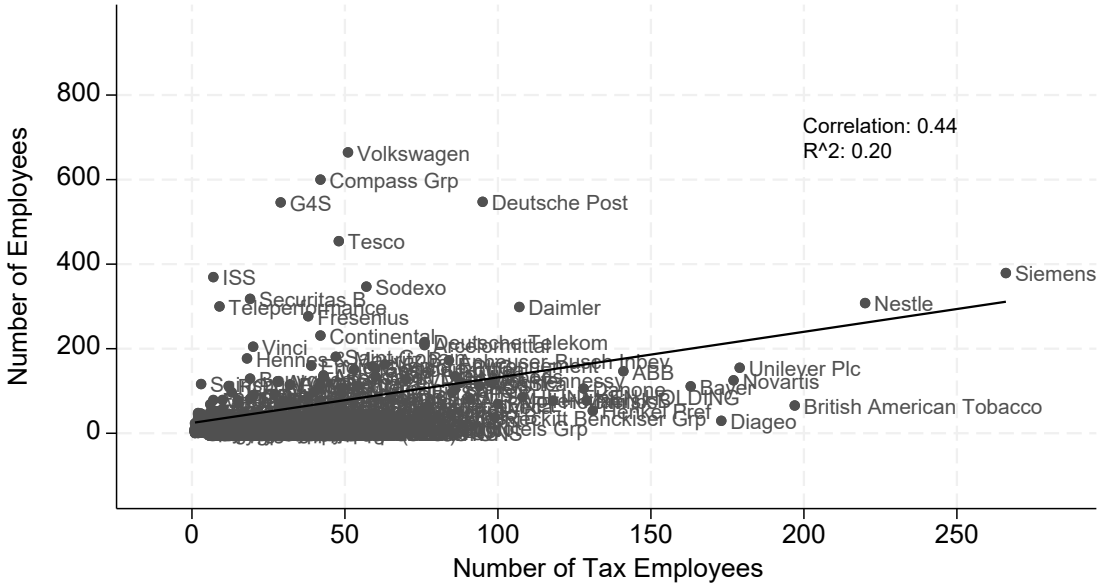
Overall, we believe that the data collection procedure, as well as the described characteristics of our data set and the comparison to previous studies, suggest that our sample is reasonably accurate in terms of capturing the size and structure of the tax departments of the non-financial, non-oil, and non-real estate STOXX Europe 600 firms.

[26] Chen et al. (2021) validate their LinkedIn dataset of tax employees through interviews with sample firms, finding that the collected data provide a slightly smaller but otherwise accurate representation, consistent with the findings presented in this section.

Supplementary Figures

Figure O.1 shows that the variation in tax department size (see Figure 1) is only partially explained by overall workforce size. The bivariate correlation between the number of tax employees and total employees is 0.44, with an R^2 of 0.20. This suggests that some firms invest more heavily in internal tax departments than others, both in absolute and relative terms.

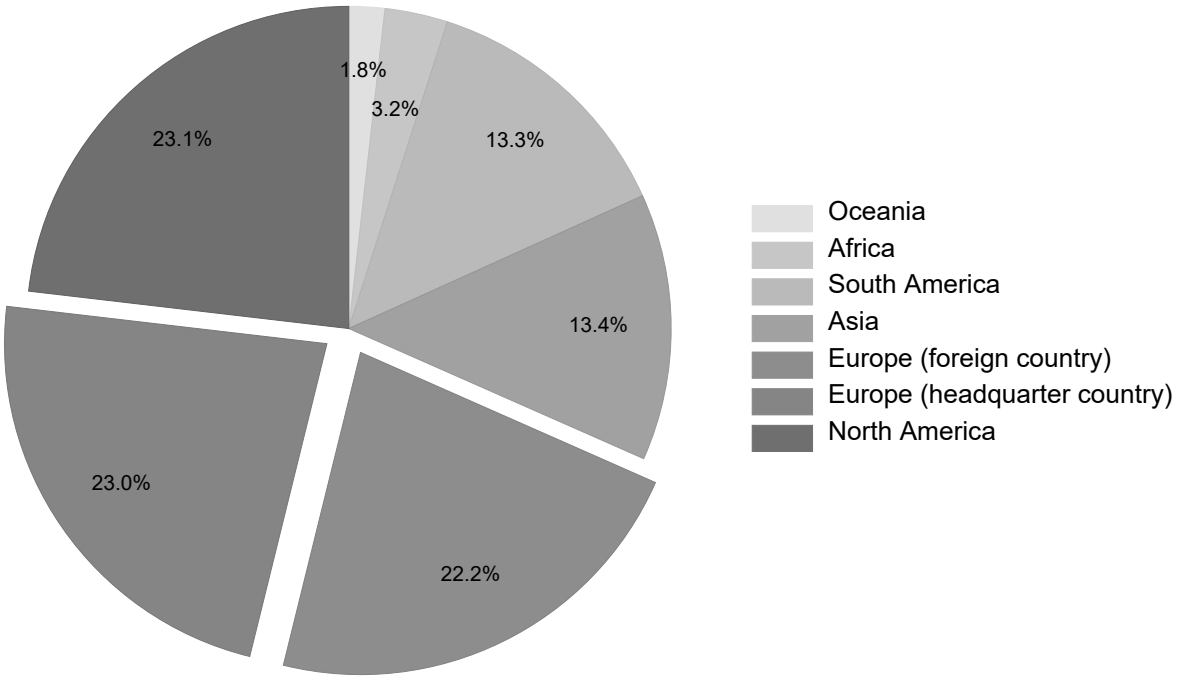
FIGURE O.1 Tax department size and firm size



Notes: This figure illustrates tax department size in relation to overall workforce. Figure O.1 comprises all 8,496 tax employees in the dataset.

We next assess tax department centralization based on the geographic distribution of tax employees. Following our focus on profit tax outcomes, we only include corporate tax employees in figures O.2 to O.6. Figure O.2 presents the location breakdown: 45.2% of corporate tax employees are based in Europe, with 23% being located in the MNE's headquarter country and 22.2% being located elsewhere in Europe. North America accounts for another 23.1%, followed by Asia (13.4%) and South America (13.3%), with smaller shares in Africa and Oceania.

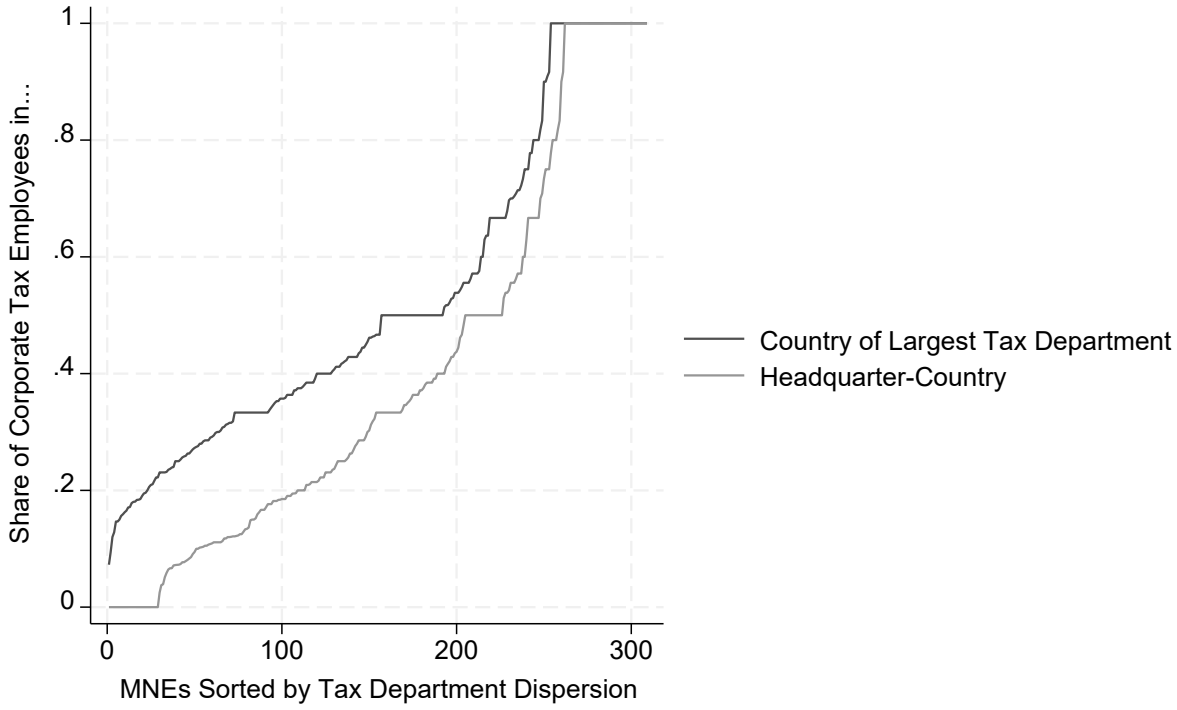
FIGURE O.2 Location of tax employees



Notes: This figure illustrates the geographic distribution of tax employees. Figure O.2 comprises 7,562 corporate tax employees in the dataset.

Figure O.3 compares the share of corporate tax employees in the headquarters country (lower line) with the share in the country housing the largest tax department (upper line). For 41.7% of MNEs, the largest tax department is located outside the headquarters country, which explains the divergence between the two lines. Nonetheless, both lines show a similar slope, underscoring the central role of headquarters in tax department design. Among the 309 MNEs, 56 locate all corporate tax employees in a single country, 48 of which do so at headquarters, while 29 have no corporate tax employees in their headquarters country.

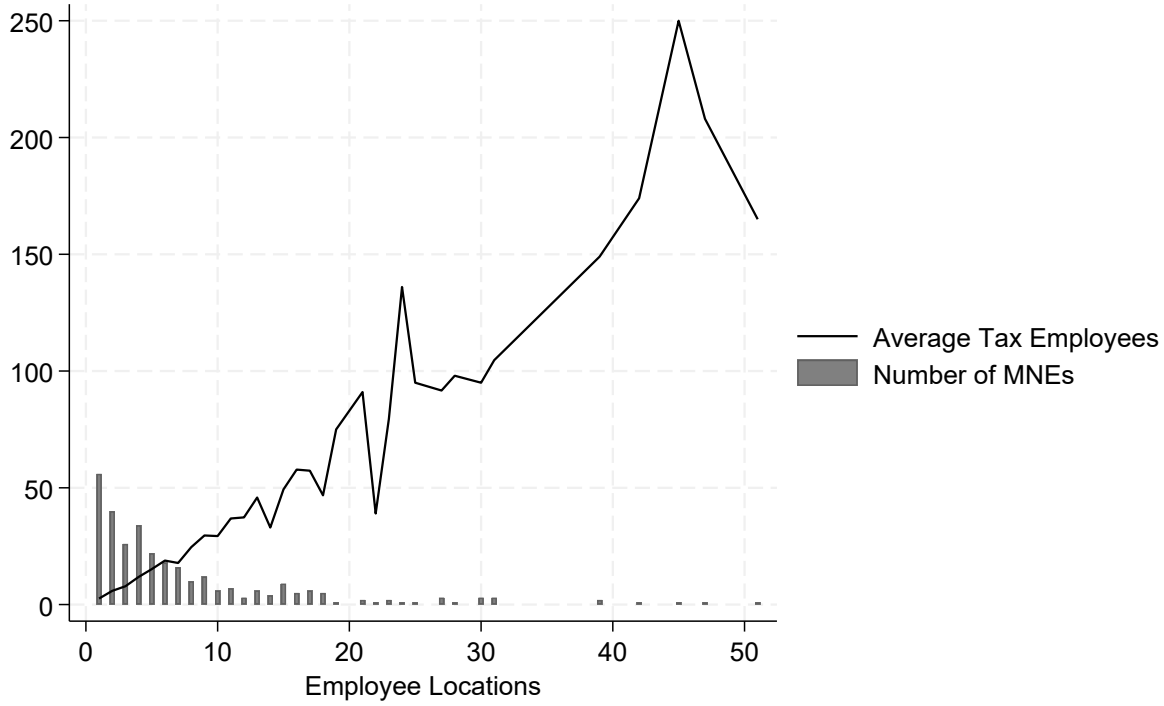
FIGURE O.3 Size of largest and headquarter tax department



Notes: This figure compares the share of corporate tax employees in the headquarters country (lower line) with the share in the country housing the largest tax department (upper line). Figure O.3 comprises 7,562 corporate tax employees in the dataset.

Figures O.4 and O.5 provide insight into geographic dispersion. Figure O.4 plots the number of corporate tax employee locations of MNEs against average tax department size of MNEs with the same number of employee locations. 77.7% of firms operate tax departments in ten or fewer locations, with a maximum of 51. Not surprisingly, the number of locations correlates strongly with (average) tax department size. This pattern reflects that geographic expansion tends to go hand-in-hand with proportionate growth in the number of tax employees.

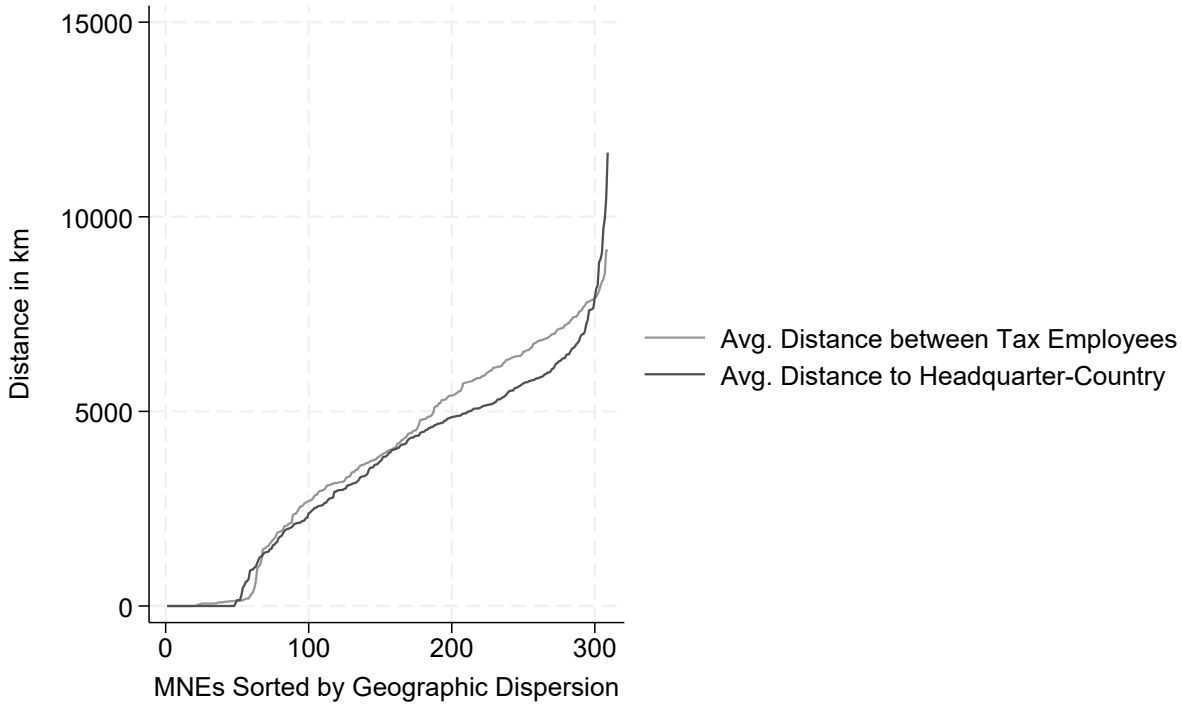
FIGURE O.4 Number of employees and number of employee locations



Notes: This figure illustrates the geographical dispersion of tax employees, especially the relationship between the number of tax employee locations and tax department size. Figure O.4 comprises 7,562 corporate tax employees in the dataset.

Figure O.5 plots average geographic distance between corporate tax employees and the average distance to headquarters. While the two measures correlate, deviations suggest that some MNEs do not rely solely on regional hubs, but rather distribute tax employees broadly across jurisdictions. The steeper slope for highly dispersed firms is driven in part by a small number of very large MNEs (see Figures 1 and O.4).

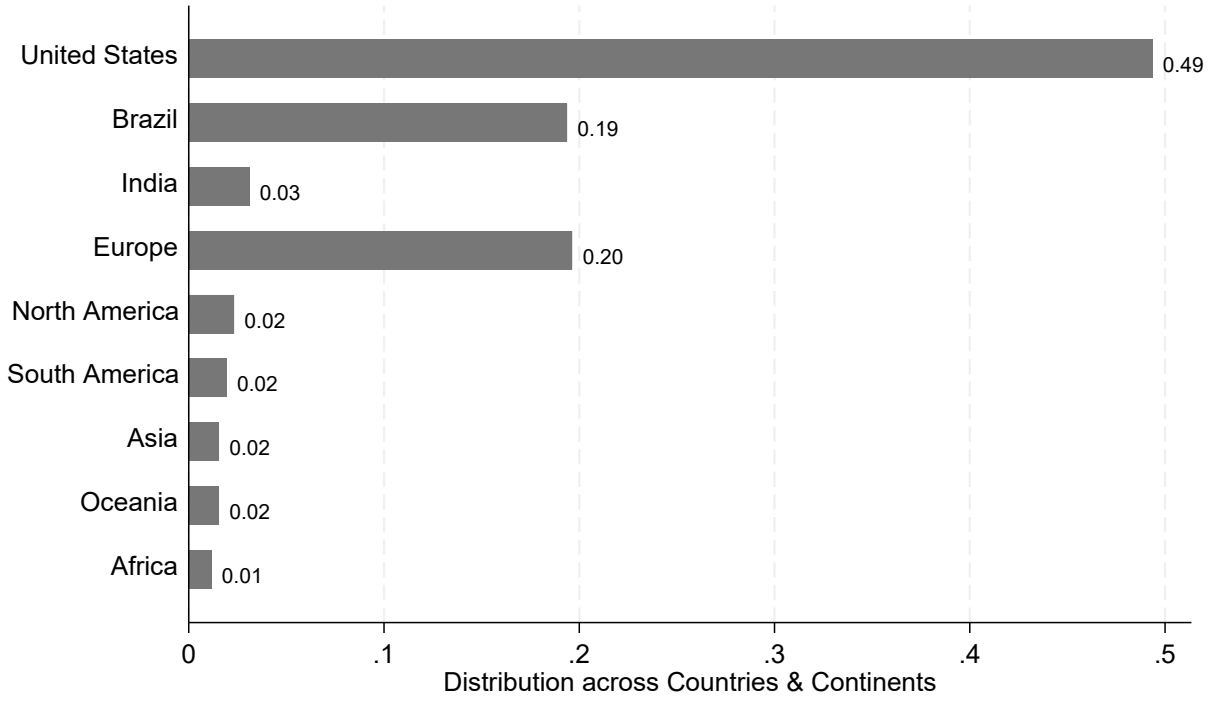
FIGURE O.5 Geographic distance of tax employees within MNEs



Notes: This figure illustrates the geographical dispersion of tax employees, especially the average geographic distance between tax employees and the distance to headquarters. Figure O.5 comprises 7,562 corporate tax employees in the dataset.

Among the 309 firms in our sample, 129 locate their largest tax department in a country other than their headquarters country. Figure O.6 shows the countries and continents where these foreign tax departments are most frequently located. As expected, the U.S. dominates. Brazil and India also appear as prominent regional tax centers, reflecting economic significance and indicating high tax complexity.

FIGURE O.6 Location of foreign largest tax departments



Notes: This figure illustrates the countries and continents where largest tax departments outside the headquarter country are frequently located. Figure O.6 comprises 7,562 corporate tax employees in the dataset.

Impressum:
Arbeitskreis Quantitative Steuerlehre, arqus, e.V.
Vorstand: Prof. Dr. Ralf Maiterth (Vorsitzender),
Prof. Dr. Kay Blaufus, Prof. Dr. Dr. Andreas Löffler
Sitz des Vereins: Berlin

Herausgeber: Kay Blaufus, Jochen Hundsdoerfer, Martin Jacob, Dirk Kiesewetter, Rolf J. König, Lutz Kruschwitz, Andreas Löffler, Ralf Maiterth, Heiko Müller, Jens Müller, Rainer Niemann, Deborah Schanz, Sebastian Schanz, Caren Sureth-Sloane, Corinna Treisch

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

ISSN 1861-8944