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Tax Structures**

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# The Spiderweb of Partnership Tax Structures

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U.S. partnerships control more than \$40 trillion in assets, vastly outnumber U.S. public firms, and contribute significantly to the U.S. tax non-compliance of pass-through entities, which is larger than the non-compliance of publicly traded corporations. However, the prior literature provides extremely little evidence explaining the pervasive use of such entities and which specific characteristics enable the lightly taxed nature of partnership business income. Using administrative U.S. tax data, we first create graphical organizational structures by tracing income through millions of partnership entities. We show that 80 percent of partnership groups are simple structures composed of one single partnership owned directly by individual taxpayers. In contrast, the most complex structures resemble “webs,” characterized by multiple tiers of ownership and clusters of overlapping partners. Second, we determine the entity attributes associated with partnerships developing into complex organizations. Third, conditional on being selected for audit, complex partnerships are four percent *less* likely to be assessed additional tax, but the amount of assessments is larger. Fourth, we show that complex partnership audits have a high return-on-investment, generating \$20 of assessments for each \$1 spent, which is a rate over eight times that for corporations. Thus, beyond adding to the nascent literature explaining the prevalent use of partnerships, we provide new insights about the under-reporting of tax on U.S. business income and quantify the potentially large increases in tax revenue collection that could be obtained from increased enforcement of complex partnership businesses.

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# 1 Introduction

Partnership businesses are an increasingly important component of the U.S. economy, reporting assets of \$43 trillion and rising from 29% of U.S. business entities in 2003 to almost 40% by 2020; see Figure 1 (IRS 2020; IRS 2021). A number of factors have contributed to this rapid rise, including favorable tax treatment, liability protection, and the flexibility partnerships offer owners in allocating business profits, expenses, and various tax attributes. At the same time, audit rates for partnerships have plummeted. These facts, in conjunction with the disproportionate use of partnerships by the highest income taxpayers, have increased concern about the role of partnerships in facilitating tax planning and, at an extreme, tax evasion (Versprille 2020; Iacurci 2021; Burns 2022). However, despite the importance of partnerships and the policy interest in understanding their role in tax non-compliance, some of even the most basic descriptive facts about partnerships remain largely unknown. In this paper, we use confidential, anonymized IRS administrative records to first provide descriptive evidence about the prevalence, activities, and structures of U.S. partnership organizations. We then study to what extent partnership complexity is associated with tax non-compliance.

Prior work examining tax avoidance focuses primarily on the corporate sector, with the literature including hundreds of studies about corporate businesses (reviewed in Hanlon and Heitzman 2010 and Wilde and Wilson 2018). In contrast, academic work studying partnership tax avoidance comprises only a small fraction of the business tax literature, even though government estimates suggest substantially larger levels of tax avoidance and non-compliance among pass-through businesses.<sup>1</sup> One explanation for the lack of evidence on partnerships relates to the lack of data:

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<sup>1</sup>The annual tax gap related to pass-through business income, which captures the non-compliance of both S corporations and partnerships, is estimated to be \$130 billion for the tax years 2014-2016; see Figure 1 of Publication 1415 (Rev. 10-2022), “Federal Tax Compliance Research: Tax Gap Estimates for Tax Years 2014-2016.” One explanation for why the estimated tax non-compliance is relatively high is that partnerships lack substantial third-party information reporting, which makes them of particular interest to regulators (IRS 2022).

most partnerships are private and thus not subject to the same disclosure requirements as publicly traded corporate entities. Furthermore, the majority do not voluntarily produce financial statements that permit measurement of firms' tax choices (Allee and Yohn 2009; Lisowsky and Minnis 2020). A second explanation for the lack of evidence relates to complexity; partnership structures can include numerous entities across multiple tiers and types of owners. Understanding how partnership businesses are organized and the role of tax planning in these businesses requires a complete picture of the chain of entities and owners.

In this paper, we use an interdisciplinary approach that combines computer science expertise with business tax knowledge to study the organizational structures of U.S. partnerships. Our sample includes the near-universe of U.S. partnership businesses between 2013 and 2015 ( $n = 7.4$  million firm-years). To identify which business entities are connected to each partnership, either directly or indirectly, we map the network of ownership relations between business entities and their individual owners, tracing income through millions of partnership entities and multiple tiers of ownership. This analysis produces a graph of each partnership organization, which we define as a business group consisting of at least one partnership and all connected owners. The analysis yields what we believe to be the first comprehensive dataset of Partnership-Related Businesses (PRBs) in the United States.

Figure 2 provides an illustrative example of the scale of the PRBs we mapped. To construct the figure, we randomly select 10,000 PRBs from the sample and then add random noise to each organization to generate an illustrative sample. Each dot represents a PRB, with larger dots representing more complex organizations. Despite the large number of entities represented, the figure presents only about 0.1 percent of the full sample, which demonstrates the magnitude of the entities and ownership links mapped. Additionally, PRBs are presented more towards the center of the figure as the number of other PRBs in which a taxpayer has ownership increases. Therefore, the

ownership connections of complex PRBs in the center of the figure are more convoluted than their individual PRBs may convey as the taxpayers have ownership in multiple PRBs.

From the data, we report several novel descriptive facts about PRBs and their organizational structures. We find that the vast majority of partnerships – approximately 80% – are directly owned by individuals; see examples in Figure 3. We call these organizations “simple” partnerships. Among simple partnerships, most (71% of simple partnerships and 62% of all partnerships) are owned by exactly two individuals.

The remaining 20 percent of partnerships employ a wide range of structures, such as the ones depicted in Figures 4 through 7. The most complicated structures resemble “spiderwebs,” with groups of related entities and clusters of overlapping partners. We refer to this group of partnerships as “complex” partnerships. Relative to simple partnerships, complex organizations are three times as large (based on total assets), and they report almost seven times the amount of investment-related income. Complex partnerships are more likely to be organized as a limited liability entity, rather than a “general partnership” in which all partners are fully liable for business activities. They are also more likely to use accrual tax accounting and engage a paid preparer for their tax filings.

We construct measures of partnership complexity, including the number of partners, the tiers of ownership, and the length of ownership chains, from each organization structure. The average complex partnership has two ownership tiers and is owned by 3.7 individuals, 1.7 partnerships, 0.2 C corporations, 0.4 S corporations, and 0.4 trusts. We distill these characteristics into one complexity measure using a principle components analysis (PCA). We then study the determinants of whether a partnership is complex by measuring the relation between the PCA measure of complexity and firm characteristics identified based on the framework of tax avoidance costs in Wilde and Wilson (2018). We find that partnerships with more assets and those using more sophisticated reporting methods (accrual tax accounting) are more likely to be part of a complex PRB, as are firms with overall higher

income levels. We find publicly traded partnerships and partnerships with non-operating losses are less likely to be complex. Additionally, we find the type of income reported by the partnerships is predictive of complexity.

Having documented the determinants of partnership complexity in the descriptive tests, we test whether and to what extent partnership complexity is associated with partnership tax non-compliance. To the extent that complex structures obfuscate transactions and the flow-of-funds, thereby permitting owners to under-report income, we expect to observe a positive association between partnership complexity and tax non-compliance. Observing such an effect would be consistent with earlier work in the corporate sector documenting that inclusion of a partnership in the corporate organizational structure is associated with lower tax burdens (Agarwal et al. 2021). Legal and policy discussions indeed point to the flexibility of structuring as a distinct feature of partnerships and a central mechanism contributing to the lightly taxed nature of these firms' income (Gergen 1990; Hasen 2012; Cauble and Polsky 2014). For example, the U.S. Government Accountability Office states that partnership complexity can complicate efforts in “determining the relationships and allocations of income and losses” reported to partners (GAO 2014). However, to the extent that these structures are primarily for non-tax reasons, such as operational issues or legal protection, we would observe little relation between complexity and tax evasion (Molk 2017).

We measure non-compliance based on whether a partnership was assessed additional tax during an IRS audit. Use of assessment data follows prior work on corporations that also uses assessments as a measure of tax planning and non-compliance (Kubick et al. 2017; Nessa et al. 2020). We observe two main results. First, complexity is associated with a *lower* likelihood of assessment; more complex partnerships are two percentage points, or four percent, *less* likely to have an assessment. Second, conditional on an assessment occurring, we observe that the assessment amounts are increasing with

complexity. A one-standard-deviation increase in complexity is associated with larger assessments ranging from \$13,200 to \$56,700 per audit.

A natural question is why the likelihood of assessments is negatively associated with complexity, whereas the total amount of assessments is positively associated. We perform several additional analyses to assess potential explanations for these observed results. First, we examine whether the results can be explained by non-random selection of partnerships into the subsample of audited returns. We find little support for this explanation because the distribution of the audited sample appears similar to the overall population. Second, we examine if the negative relation between complexity and audit assessments is due to the fact that the most sophisticated tax planners are better able to escape assessments. However, we find little evidence of this explanation based on our analysis of subsamples in which we expect the most tax planning to occur – PRBs with at least one high net worth individual owner or those using a sophisticated tax preparer.

Third, we examine if the negative relation between complexity and likelihood of assessment is related to the way that audits are conducted. Specifically, we focus on the length of complex audits and observe that the proportions of both very long and very short audits increase for complex audits as compared to simple audits. Complex cases can be more difficult to audit, in part due to requirements under U.S. tax laws.<sup>2</sup> We observe that many complex cases are more quickly closed with no tax assessed, as compared to simple partnership audits. This may be efficient to the extent that a quicker no-change audit permits examiners to shift focus to other audits where assessments may be more likely. We also observe that a higher proportion of complex audits takes longer, as compared to simple partnerships, but ultimately, these audits lead to larger assessments. Both facts observed in the data point to complex audits being conducted differently than simple audits.

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<sup>2</sup>For example, the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) and the Bipartisan Budget Act of 2015 (BBA) outline specific procedures for partnership audits that can add substantial time to audits.

These patterns may explain why complex partnerships have a lower likelihood of assessment, but conditional on an assessment occurring, the amount is larger.

Finally, we calculate an audit return-on-investment (ROI), which is defined as the amount of tax assessed on a partnership audit, divided by the direct labor and overhead costs of the audit. The ROI on complex audits is high, at about 20 times the cost of the audit. This rate is *twice* that of simple audits and *eight* times that found in prior work on corporate audits (Nessa et al. 2020). These estimates quantify the substantial increases in tax revenue collection that could be obtained from conducting additional complex audits.

Our work contributes to the literature in several ways. Despite the widespread use of partnerships and popularity among businesses and high net worth individuals, the literature includes relatively little information about these companies. In concurrent work, Love (2023) examines the flexibility of partnership allocations and estimates the associated tax benefits. Cooper et al. (2016) examine partnerships and S corporations and document that income earned through the partnership sector is relatively low-taxed, with estimated effective tax rates of 15.9 percent. Their work and other papers provide some evidence that the lightly taxed nature of partnership income is attributed to tax rate differences between the corporate and non-corporate sectors, higher levels of preferentially taxed investment income reported within partnership structures, and ownership by tax-exempt and foreign individuals (Cooper et al. 2016; Kopczuk and Zwick 2020; Smith et al. 2021). However, beyond this work, there is extremely little evidence. Thus, consistent with other studies that examine determinants and consequences in new domains (e.g., Bozanic et al. 2018; Glendening et al. 2019; Monsen 2022; Lennox et al. 2023), the first contribution of our paper is providing novel descriptive evidence about partnership businesses. Specifically, we provide evidence on the amount, type, and use of partnership structures in the United States, and our graphical depictions of partnership organizations provide visual evidence of complex structures used by these private companies.



Second, we construct measures of partnership complexity from the network structures, distill these measures into a complexity score, and demonstrate that this complexity measure helps explain the relatively low levels of taxation on income earned through this sector. Thus, we further contrast tax planning decisions of partnership businesses from the hundreds of studies on corporate avoidance, where corporate structures are often tiered and characterized by several layers under a single parent entity. In doing so, we also extend work on the corporate side that studies the use of flow through businesses in a publicly-traded corporate structure (Agarwal et al. 2021). Evidence from our work about the broader population of private partnerships is important because different tax and reporting incentives influence firms' tax planning decisions.

Finally, the paper offers policy relevant evidence regarding the distribution of non-compliance across U.S. businesses. The complexity of partnership structures makes them an apt vehicle for tax non-compliance. Thus, addressing non-compliance within this sector is critical for addressing questions of tax under-reporting; indeed, the Biden administration intends that the \$60 billion allocated to the IRS to be used for “enforcement activity aimed at high-wealth taxpayers, large corporations, and partnerships” (CBO 2021). We provide evidence useful for enhancing tax policies and IRS tax administration capabilities for these businesses.

## **2 Hypothesis and Empirical Design**

Our goal is to examine the relation between complexity and tax non-compliance. In this section, we first motivate our prediction for the relation between complexity and non-compliance, and then we outline the research design for the empirical tests.

Theory shows that evasion increases when the probability of detection is lower (Allingham and Sandmo 1972). Adapting this theory for individual taxpayers to partnership structures, the

implication is that – to the extent that a complex partnership structure impedes tax authority detection – we would observe a positive relation between complexity and non-compliance.

Due to the limited research on partnerships, we look to empirical work in the accounting and law literature to further motivate our hypothesis. Prior work shows that organizational complexity is indeed associated with reduced transparency (Bushman et al. 2004). Additional work links organizational complexity to tax planning (Lewellen and Robinson 2014; Blouin and Krull 2018). For example, tax planning increases the financial complexity of organizations, thereby also increasing information asymmetry between the firm and external stakeholders (Balakrishnan et al. 2019). Tax avoidance strategies have also been shown to disseminate through social network connections or networks of tax professionals (Brown and Drake 2014; Boning et al. 2020). More recent work quantifies the extent to which corporations use partnerships for tax planning. Agarwal et al. (2021) find that corporations with partnerships embedded in their corporate structure report lower ETRs. This finding is consistent with partnerships facilitating greater levels of tax planning and, possibly, tax non-compliance, suggesting a positive relation with complexity.

However, as previously mentioned, there are numerous non-tax reasons complex partnership structures may develop. These include legal liability protection, ownership preferences, and operational needs (Molk 2017). To the extent operational and liability concerns are primary drivers of organizational complexity, we would expect to find little association between complexity and tax non-compliance. Therefore the association between these two concepts is an empirical question, leading to the below hypothesis stated in the null:

*Hypothesis 1:* Partnership organizational complexity is not associated with tax non-compliance.

We test the relationship between firm-year partnership non-compliance and partnership complexity with the following OLS model:

$$NonCompliance_{it} = \alpha_0 + \beta_1 Complexity_{it} + \sum \gamma_k X_{it} + Industry_i + Year_t + \epsilon_{it}, \quad (1)$$

where  $NonCompliance_{it}$  for firm  $i$  in year  $t$  is measured using IRS assessments;  $Complexity$  captures the complexity of PRBs; and  $X_{it}$  includes control variables correlated with non-compliance based on the framework from Wilde and Wilson (2018). We discuss each of these measures below. We also include industry and year fixed effects to control for differences in non-compliance across industry sectors and across time.

We use three measures for  $NonCompliance_{it}$ , all of which are conditioned on the firm being subject to IRS audit.<sup>3</sup>  $Adjust[0/1]$  is an indicator equal to one if partnership  $i$  in tax year  $t$  was assessed an amount of tax due upon being audited by the IRS. The second measure,  $Adjust$ , is the dollar amount of an IRS adjustment, and the third measure,  $Adjust | Adjust > 0$ , captures the adjustment amount, conditional on an adjustment being imposed. Amounts are obtained from the IRS audit outcomes database. We use audit assessments as a measure of non-compliance for two reasons. First, it is the most direct measure of non-compliance (Mills 1998). Second, alternative measures from the corporate literature, such as effective tax rates (ETRs), are not easily transferable to partnership businesses, primarily because it is difficult to calculate the amount of tax paid *solely attributable to partnership transactions* at the partner level and also because partnerships do not consistently report a measure of economic (or “book”) income for the denominator.<sup>4</sup>

We use ten features of each PRB network to measure complexity. Six of these features include the count of partnership returns, S-corp returns, C-corp returns, estate and trust returns, individual returns, and the number of nodes missing a return type in the IRS data. We also calculate the degrees of separation ( $DoS$ ), which is the length of a partnership’s ownership chain.  $DoS$  is equal to

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<sup>3</sup>We are unable to use a measure of whether a firm is selected for audit due to IRS disclosure limitations; tabulating a model of audit selection would reveal information to taxpayers about the audit process that cannot be publicly disseminated.

<sup>4</sup>For example, to calculate the ETR numerator for a partnership with only individual owners, it would be necessary to estimate the proportion of tax due on each individual owner’s tax return attributable to partnership income, as compared to wage income, investment income, etc. This approach is particularly complicated for the most complex partnerships that include tiers of entities and owners. Similarly, many private businesses like partnerships do not separately calculate financial reporting income that could be used in the denominator; for example, within our sample, only 1.7 percent of businesses state that they report on the accrual basis of accounting. Consequently, there is not a consistent measure of economic income to be used across the sample.

the maximum number of edges (i.e., K-1s) through which income is reported before it is allocated to the final taxable entity. *Max in-degree* and *Max out-degree* include the maximum number of K-1s reported into or out of an entity in the PRB, respectively. Finally, we include an indicator if there is a circular ownership path within the entity (*Cycle [0/1]*).

Based on these features, we construct three measures for *Complexity*. *Complex [0/1]* is an indicator equal to one if the partnership is categorized as “complex,” which we define based on the PRB having non-individual owners, having multiple tiers of ownership, or both. Our second measure is a count of the PRB’s total nodes (*Tot nodes*); in other words, it is the sum of all entities (i.e., partnerships, S-corps, C-corps, individuals, etc.) within a PRB. As a third measure, we utilize a principal components analysis (PCA) to distill all ten PRB network characteristics into one measure called *Complexity*. This measure reduces multicollinearity concerns from using the ten measures simultaneously when estimating Eq. 1. Furthermore, use of a single measures helps facilitate interpretation, as opposed to examining complexity across ten different measures.

We include a broad vector of measures in the model to control for other factors correlated with complexity and non-compliance ( $X_{it}$ ). These measures reflect three broad categories as outlined in Wilde and Wilson 2018: 1) implementation costs, 2) outcome costs, and 3) agency costs. Because these costs reflect factors established by the corporate tax literature, we adapt the measures to partnership businesses when possible. All measures are calculated using data from the U.S. partnership income tax return.

**Implementation costs** reflect that owners of PRBs have incentives to implement tax-efficient transactions and structures to maximize after-tax profits, subject to the characteristics of the organization (Hanlon and Heitzman 2010). Such characteristics include firm size, profitability, income source, and industry (e.g., Zimmerman 1983; Mills et al. 1998; Edwards et al. 2016). Thus,

we include *Assets* to control for variation in partnership size. *Loss [0/1]* is an indicator equal to one for partnerships reporting a loss and controls for differences in tax planning based on tax profitability.

We also include several variables for the types of income and expenses reported by a partnership, as this controls for both the type of business as well as the environment in which the partnership operates. We include both an indicator and a continuous measure for ordinary income (*Ordinary income*), rental income (*Rental income*), and long-term capital gains and dividends (*Investment income*). We also include the income from the sale of business assets (*Sec 1231*), as these transactions have minimal third-party reporting and provide opportunities for misreporting. Compensation expense (*Salary and wage*), interest expense (*Interest exp*), and depreciation expense (*Depreciation*) control for the capital and labor intensity of the firm.

Implementation costs of partnership planning also include factors related to the firms' operating environment, such as international operations (Rego 2003; Dyreng and Lindsey 2009) and reporting standards (De Simone 2016). To control for geographic presence, we include the amount of foreign taxes reported to partners (*Foreign tax [0/1]*), as well as an indicator for partnerships that file Forms 8858 or 8865, which are required for foreign disregarded entities, branches, and partnerships (*Forms 8858 OR 8865[0/1]*). To capture the firm's reporting environment, we include an indicator if firms report on the accrual method (*Accrual [0/1]*).

The ability of a taxpayer to engage in tax planning is also subject to expected **outcome costs** related to regulation, as well as internal and external monitoring (Wilde and Wilson (2018)). Tax preparers hired by the firm influence tax avoidance by providing expert consultation to maximize the after-tax value of financial transactions (Belnap et al. 2024). Thus, we control for *Paid preparer [0/1]*, which is an indicator equal to one if the firm lists a paid preparer on its partnership tax return. The composition of owners also affects tax planning activities (Khan et al. 2017); we control for whether the partnership is publicly traded (*Publicly traded [0/1]*) to reflect firms with more disperse

ownership and higher levels of capital market scrutiny. *Agent rank* reflects external monitoring by the IRS and controls for audit experience of the IRS agent conducting the audit. Agent ranks are based on the United States General Schedule (GS), which ranks federal employees from GS-1 to GS-15.

Finally, prior work shows that corporate tax avoidance is influenced by **agency costs** stemming from misaligned incentives between business owners and managers (Hanlon and Heitzman 2010). While most partnership businesses are private, closely-held businesses – in which we expect a relatively close alignment of interests between ownership and management – the largest and most complex partnerships may suffer from agency issues. To control for this, we include an indicator if the entity is a limited partnership rather than a general partnership (*LP/LLC/LLP [0/1]*). In general partnerships, owners are fully liable (“on the hook”) for all operations of a general partnership. Not only does the measure control for potential agency issues, it also controls for legal reasons that may be correlated with the complexity of a PRB. Finally, we include guaranteed payments (*Guaranteed payments*), which are similar to salary payments given to partners, to further control for managerial compensation. We define all variables in Appendix A.

## 3 Data

### 3.1 Sample Construction

We obtain all U.S. partnerships in the IRS data for 2013 through 2015, for a starting sample of 11.6 million observations. We compare this number to the total number of partnerships reported in the IRS 2013-2015 Data Book and confirm that our initial dataset contains the near universe of firms. We obtain data about each partnership, including income and expense items reported on Form 1065, U.S. Return of Partnership Income. Also using Schedule K-1s from the partnership return,

which provide partner-level information, we obtain data on each partner’s ownership percentage, capital account balance, and distributive portion of each partnership line item. Finally, we obtain information about whether each partner is an individual, C corporation, S corporation, trust, or other partnership.

We impose sample restrictions for purposes of creating partnership organizational structures. First, we drop partnerships with multiple filings in a single year if it is not possible to identify the most recent filing (i.e., the superseded or amended return). Next, we remove partnerships where the unique tax identification number is linked to more than one type of entity to ensure we retain only partnership entities. We also drop any partnership for which the ownership percentages do not sum to 100%, with a buffer of 1% in either direction. This step ensures that we account for all owners and all income. We also drop organizations that have greater than 1 million nodes, which are large network structures that we cannot otherwise unpack without de-anonymized data. While necessary for purposes of tracing PRB ownership, they substantially reduce the sample size by approximately 2.2 million partnership firm-years and disproportionately drop some of the most complex partnerships. Finally, we retain only those partnerships that report any activity during the tax year. That is, we drop partnerships for which there are no income or loss amounts reported on the partnership tax return, as we require non-zero income to estimate ownership percentages. The resulting sample includes 7.4 million partnership firm-years. Table [1a](#) provides the sample selection.

### **3.2 Creation of Organizational Structures**

We create visualizations of partnership organizations using a Python implementation of graphical imaging (NetworkX), which permits analysis of the structure and activity of complex networks. We start by graphing one node for each partnership entity. We then graph the owners of each partnership as additional nodes and connect the nodes with lines or “edges.” If the owner nodes are tax-paying

entities (i.e., individuals or corporations), these are the boundary of the partnership organization, and we do not graph further any lines of ownership. However, if the owner nodes are flow-through entities, such as S corporations or partnerships, we append nodes for those entities to the graph. We iterate this process through the entire ownership chain until we arrive at the ultimate taxpaying entities for each partnership. This process produces a network graph for each PRB that depicts overlapping and common ownership interests.

Figure 3 provides examples of three simple partnership structures. Red triangles represent the partnership entities; purple circles indicate the individual owners, where each circle is sized proportionately to the ownership percentage of each partnership. The arrow indicates ownership and points to the partner directly owning each entity. Panel A presents the most simple organization, a partnership with two owners; Panels B and C present partnerships with four and eight owners, respectively. Table 1a shows that we classify 5.9 million, or 80 percent, of firm-year observations in our sample as simple partnerships.

Complex partnerships include all other partnership organizations. For example, we categorize any business group with multiple partnership entities as complex partnerships. Figure 4a provides an example of this type of complex organization. We also categorize business groups with one partnership entity but a mix of partner types as a complex partnership. Figure 4b provides an example of this group, with the green nodes denoting S corporations. The most complex organizational groups include both multiple partnerships and multiple partner types. Approximately 1.5 million partnerships in our data are included in over 800,000 complex partnership organizations.

We provide additional graphical evidence about partnership structures in Figure 5, which depicts three complex organizations that each contain four partnerships. Panel A shows an organization with two DoS. Each of the four partnerships is owned by a combination of individuals and another partnership in the group. Thus, the longest path to the ultimate owners for each of these partnerships



is two, given that income is reported first to another partnership and then to the individual partner. Panel B (C) presents organizations with three (four) DoS.

Figure 6 provides additional figures that permit a comparison of structures based on the number of partnerships and the DoS within these entities. The organizations in Panel A and B each contain six partnerships. Despite having the same number of partnerships, the structures have very different DoS: the structure in Panel A has two DoS, meaning that two purple nodes directly or indirectly own all nine partnerships, whereas the structure in Panel B has five DoS. The structure in Panel B includes five individual owners (purple nodes) and one entity owner that is an estate or trust (orange node). Panels C and D depict additional structures that contain nine partnerships and show increasingly complex web-like organizations characterized by a large number of partnership entities and greater DoS between the entities and the taxpayer. Figure 7 shows two of the most complex structures that include 17 partnership entities, with two (six) DoS in Panel A (B). A comparison of the simple structures in Figure 3 to the most complex structures in Figure 7 demonstrates vastly different use of the partnership entity form. We study whether and to what extent the more complex structures are associated with tax non-compliance.

Table 1b shows the count of the organizations by “Simple” and “Complex.” The vast majority of simple partnership observations in our sample have two individual partners (4.2 million firm-years), representing 70% of simple partnership observations and 62% of all partnerships. The frequency of simple partnerships declines as the number of partners increases, with approximately 600 firm-years reporting over 50 partners. We observe similar patterns among the complex partnership organizations: most complex organizations include partnerships with only two individual owners, and the count of partnerships again declines with the number of partners. Table 1c provides further details about complex partnerships. Over half of complex partnership observations contain only one partnership entity (n=549,265), meaning that these business groups are categorized as complex

due to having a mix of partner types (e.g., individuals, corporations, etc.). The remaining complex partnerships include multiple entities and a mix of partner types, with over 5,000 organization-years containing more than ten partnerships.

## 4 Descriptive Characteristics of Partnerships

### 4.1 *Industry Affiliation*

This section presents descriptive evidence about the types of businesses using partnership structures and the amount of income reported by these firms. We start by providing information about the industry affiliation of firms included in our sample in Figure 8. We present sample counts by two-digit NAICS codes, which are self-reported on the partnership tax return. The light blue (orange) shading shows the proportion of the simple (complex) organizations within each industry. Almost half the full sample (47.0 percent) is in the Real Estate industry. We do not observe similar concentrations in any other industry. The next largest counts occur in Professional Services (7.6 percent), Retail Trade (5.7 percent), Agriculture and Forestry (5.5 percent), and Construction (4.9 percent). The proportion of simple and complex partnerships are relatively comparable across industries, with the exception of the Finance and Insurance industry in which complex partnerships are almost three times more prevalent.<sup>5</sup>

### 4.2 *Financial and Network Characteristics*

Table 2 provides additional descriptive statistics based on financial measures and network characteristics distilled from the PRB organizational structures. Columns 1 and 2 present

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<sup>5</sup>The proportion of finance and insurance firms is understated given that many of the firms in the large, bundled node dropped during the sample selection include companies in these industries. This difference likely relates, in part, to the use of complex partnerships by the private equity industry (Allen et al. 2023).

information for the full sample; Columns 3-4 and 5-6 present information for subsamples of simple and complex partnerships, respectively.

Partnerships report average gross receipts (*Sales*) of \$295,381. We tabulate two measures of assets because not all partnerships are required to report assets on their tax return.<sup>6</sup> Average *Assets*, calculated by recoding missing values to zero, are \$715,981; average *Assets\_non missing* are \$984,144.

Average total compensation paid to employees and owners includes \$37,444 of *Salary and wage* and \$6,679 of *Guaranteed payments*, respectively.<sup>7</sup> The mean value of 0.01 for the indicator *Foreign tax [0/1]* means that the vast majority of partnerships do not conduct international operations. Sample firms have external debt financing based on mean *Interest exp* of \$2,427, and they own fixed assets based on average *Depreciation* of \$4,332. The average partnership reports positive *Ordinary income* of \$22,401, and average income attributable to *Rental* activities is \$12,711. Investment income earned from dividends, long-term capital gains (*Investment income*) and gains from the sale of assets used in business (*Sec 1231*) are \$6,901 and \$1,962, respectively.

We report several variables that provide detail on partnership sophistication and legal structure. Only approximately 1.7 percent of partnerships use the accrual method of tax accounting based on *Accrual [0/1]*. Despite almost all partnerships using the relatively simpler cash accounting method, 75 percent of partnerships utilize a professional to prepare the tax return (*Paid preparer [0/1]*). As expected, there are very few publicly traded partnerships, and 81 percent of partnerships have some form of a limited liability structure based on *LLP/LLC/LP[0/1]*.

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<sup>6</sup>A partnership is not required to report assets if it meets four conditions: 1) total receipts for the tax year were less than \$250,000; 2) total assets at the end of the tax year were less than \$1 million; 3) schedules K-1 are filed and furnished to the partners on or before the due date; and 4) the partnership is not required to file Schedule M-3.

<sup>7</sup>Guaranteed payments are compensatory amounts paid to partners, whereas salaries and wages include compensation paid to non-owner employees. A guaranteed payment is in addition to the proportionate share of income or loss that a partner earns each year by virtue of his/her partnership stake.

The bottom of the table provides descriptive statistics about PRB structures. The average *In deg* of 0.05 means that most partnerships do not own another partnership, consistent with most sample partnerships having a simple structure. The average *Out deg* of 2.77 means the average partnership has 2.77 direct owners. The average number of *Individuals*, *Partnerships*, *C corps*, *S corps*, and *Trusts* owners are 3.08, 1.40, 0.03, 0.08, and 0.09, respectively. The average distance between a partnership and its ultimate owner (*DoS*) is 1.22 links (again reflecting that we classify most partnerships as simple).

A comparison of the values across simple and complex organizations reveals that complex partnerships report higher mean and variance across each of the financial measures. For example, complex organizations report almost twice the amount of *Sales* at \$462,418 compared to \$253,560 for simple partnerships, and complex partnerships have almost three times the amount of assets. Consistent with the use of complex structures for investment purposes, these organizations report almost seven times the dollar value of *Investment income*. Complex partnerships are also almost twice as likely to use the accrual method but are similar in their use of a paid preparer and for organizing as a limited liability entity. By construction, *In deg*, *C corps*, *S corps*, and *Trusts* are equal to zero for simple structures, and the values for *Out deg* and *Individuals* are similar. In contrast, complex structures have 3.43 average ownership nodes (*Out deg*). The average *DoS* is 1.95 links.

### **4.3 Size Distribution**

We next report the distribution of partnerships based on size (measured with gross receipts and assets) and type of income (ordinary or Schedule K income). As brief background, partnerships report ordinary income separate from other types of income for which the tax treatment depends on the type of owner. Ordinary income from a trade or business is reported on page one of the partnership return; other types of income and expenses related to rental activities, royalties, and

asset sales are separately reported on Schedule K. Thus, the descriptive statistics permit an analysis of the types of activities reported by partnerships in the sample by analyzing these types of reported income separately.

Table 2b reports observations by gross receipts. Column 1 shows that over 4.4 million partnerships (60 percent) report no gross receipts, suggesting that a substantial portion of partnerships are not generating ordinary income but instead producing Schedule K income and loss. Even among those firms reporting positive *Sales*, 1.2 million firm years report amounts less than \$100,000. Relatively few observations (n=118,425) report sales over \$5 million. Similar patterns hold for simple and complex partnerships, although a higher proportion of complex partnerships report \$0 of gross receipts (71.9 percent in Column 6 as compared to 56.4 percent in Column 4).

Table 2c presents statistics based on total assets. The largest group of partnerships reports no assets, likely due to the fact that many partnerships fall below the asset reporting threshold. Similar to the previous table, we find complex organizations are bigger, with over 30 percent of complex partnerships reporting assets greater than \$1 million as compared to 14 percent for simple partnerships.

Table 2d and 2e presents statistics based on ordinary income and Schedule K income, where we exclude ordinary income from Schedule K income for purposes of this comparison. Across the full sample, as well as the subsample of simple and complex partnerships, we observe that approximately 30 percent of partnerships report an ordinary loss. For the full sample, about 40 percent report no ordinary income, and that percentage is notably higher (47 percent) for complex partnerships. This latter statistic is consistent with complex partnership income being concentrated in investment or Schedule K income. Table 2e shows that fewer partnerships report Schedule K losses (16 percent), and a higher percentage of complex partnerships report Schedule K income above \$100 thousand (14 percent).

In summary, while most partnerships are simple in nature and report relatively small amounts of income, we find that, even among simple partnerships, some organizations have a large number of partners and a large amount of reported operating income. The figures depicting complex partnerships suggest some extremely complicated ownership chains, possibly contributing to the differing amounts and types of income reported by those organizations.

#### 4.4 Determinants of Partnership Organization Complexity

To provide further insight on PRB structures, we study the determinants of PRB complexity. Specifically, we estimate the following OLS model:

$$Complexity_{it} = \alpha_0 + \sum \gamma_k X_{it} + Industry_i + Year_t + \epsilon_{it}, \quad (2)$$

where  $Complexity_{it}$  is one of three measures described above for partnership  $i$  in year  $t$ . We include firm-specific measures of  $X$  as described for Eq. 1, and we estimate Eq. 2 using year fixed effects.

Table 3 reports the results of the principal component analysis (PCA) to construct  $Complexity$ , one of the three measures of  $Complexity$ . The benefit of using PCA is that it identifies the underlying structural dimensions of the PRBs and determines the indicators associated with the significant factors (Larcker et al. 2007). We retain the first factor, which has an eigenvalue of greater than 2 (2.82). This results in a single factor that retains 28 percent of the total variance in the original data, with all variables loading positively. All other factors have eigenvalues less than two and negative loading factors. Following Larcker et al. (2007), we report the loadings from the principal component analysis in Column 1, with bootstrapped standard errors based on 1,000 iterations in Column 2. The component loadings generate the first principal component,  $Complexity$ , by 1) standardizing each variable, 2) multiplying each standardized variable by the loading and 3) taking the sum of the products.

#### 4.5 Results from tests of Partnership Complexity Determinants

We provide descriptive evidence about the determinants of partnership complexity in Table 4. Columns 1-3 use *Complex [0/1]* as the dependent variable; Column 4 uses *Total nodes*, and Column 5 uses *Complexity*. In Column 1, we estimate first without industry or year fixed effects. We observe that larger, profitable firms are more likely to be complex. We also find that the type and amount of income is predictive of complexity. Firms with ordinary income are less likely to be complex, but those with rental or investment income are more likely. Importantly, the likelihood of being complex increases as income increases for all three income types. This is consistent with complex partnerships deriving income from Schedule K income items as opposed to ordinary income.

Partnerships with more sophisticated operations, such as those with international operations or those using accrual accounting, are 14 percent and 11 percent more likely to be complex, respectively. Additionally, partnerships in the real estate, professional services, and finance industries are more 0.2, 2.5, and 14 percent more likely to be complex. Limited liability entities are also six percent more likely to be complex. Guaranteed payments to partners are negatively associated with complexity with a one standard deviation increase in guaranteed payments associated with a 1.9 percent decrease in the likelihood of being complex. This association indicates complex partnerships are more likely to be investment vehicles because guaranteed payments are generally provided in lieu of a salary. Finally, the use of paid preparers is associated with a 1.5 percent increased probability of the partnership being complex. However, while any of these measures are statistically significant, we note that the overall explanatory power of the model is fairly low. The R-squared is 0.055, suggesting that these characteristics explain a relatively small portion of complexity.

We add industry and year fixed effects in Columns 2 and 3, respectively. The size and significance of the coefficients are relatively unchanged. We note the R-squared appreciably increases by about 50 percent to 0.083 when including industry fixed effects, suggesting industry contributes significantly

to the organizational structure of a PRB. We do not find a similar increase in explanatory power when including year fixed effects in Column 3.

In Column 4, we present the model with *Tot nodes* as the dependent variable. We find substantially similar results across the our prediction variables. We note *Investment income [0/1]* is not significant, suggesting the pursuit of investment income does not affect the number of entities in a partnership's structure. Additionally, the R-squared decreases to 0.044, suggesting relatively lower explanatory power when explaining the count measure of complexity.

In Column 5, the dependent variable is the first factor from the PCA analysis, *Complexity*. Again, our results are largely consistent with those in Column 3, confirming that the PCA-derived factor captures similar effects of complexity and is a valid measure for our empirical tests. Thus, we focus on using this measure going forward in the remainder of our analyses.

#### **4.6 Sample and Descriptive Statistics for Audited Subsample**

To test our hypothesis, we use audit outcomes from a sub-sample of partnerships selected for IRS audit. Table 1 shows that the sample includes 16,699 observations, of which 78 percent are simple partnerships. Observing a similar ratio of simple to complex partnerships in this sample as compared to the population suggests that this sample is representative of the broader population. That said, we acknowledge that the audited subsample is slightly smaller than the full sample of audits because, as discussed above, the sample excludes audited partnerships in the dropped complex organization containing over two million interconnected nodes.

We present the corresponding descriptive statistics from the full sample for the audited sub-sample. Table 5 presents the count of audited organizations by simple and complex groups.<sup>8</sup> Consistent with patterns in the full sample, we see the majority of audits are conducted on

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<sup>8</sup>Throughout the tables, we suppress some data to conform with IRS disclosure requirements. We indicate these items with asterisks.



partnerships with fewer partners; furthermore, the number of organizations declines as the number of partners per organization increases. This pattern can be seen in samples for both simple and complex partnerships.

We present the audit selection rate relative to the population rate by industry in Figure 9. The dashed orange line represents points at which the population rate and audit rate are equal. Industries above (below) the line are over (under) audited relative to their rate in the full population. We find the Agriculture and Manufacturing industries are audited at a rate of about 150 percent higher than they exist in the general population, while the Real Estate industry is audited at a rate of 50 percent less. The size of each industry in the figure is representative of the rate at which an audit leads to a positive adjustment. The average adjustment rate across industries is about 50 percent. We find the industry with the highest (lowest) adjustment rate is the Administrative (Utility) industry at 67.2 (14.9) percent.

Table 6a provides financial and network descriptive statistics. Columns 1 and 2 present information for the full audited sample; Columns 3-4 and 5-6 present information for sub-samples of partnerships with and without positive audit adjustments, respectively.

Relative to the full population, audited partnerships report significantly higher *Sales* (\$1.02 million) and *Assets* (\$1.53 million). Expenses are also notably higher with *Salary and wage* of \$132 thousand and *Depreciation* of \$19 thousand. The average audited partnership reports an ordinary loss of \$53 thousand.<sup>9</sup> Finally, audited partnerships are generally not more complex, with average organizational structure variables comparable to the full sample.

Partnerships without positive audit adjustments tend to be larger with higher *Sales* and *Assets*. They have larger income and expense items and tend to be more sophisticated, with a higher percentage utilizing the accrual tax accounting method and a paid preparer. Additionally,

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<sup>9</sup>While it may seem unusual to audit loss firms, some losses can directly offset a partner's taxable income. Thus, an IRS audit that reduces reported losses could generate immediate tax revenue for the government.

partnerships *without* positive adjustments tend to be more complex, with organization structure variables that are all larger or equal to the sample with positive adjustments.

The descriptive statistics reported in the remaining panels of Table 6 follow a similar pattern to the full sample. We find the number of partnerships in our sample decreases as size and income increases. Table 6b shows that about 30 percent of the audit sample reports \$0 sales, and only eight percent report sales over \$ 5 million. A similar pattern holds for assets reported in Table 6c.

## 5 Results of Complexity Tests

### 5.1 Results from tests of Partnership Complexity Outcomes

Table 7 presents the results from estimating Eq. (1). The dependent variable in Columns 1 through 3 is *Adjust* [0/1], *Adjust* in Column 4, and *Adjust* | *Adjust* > 0 in Column 5. The independent variable of interest is *Complexity*. The statistically significant coefficient of -0.0205 on *Complexity* in Column 1 ( $p < 0.05$ ) indicates an organization with a one standard deviation increase in *Complexity* is 2.0 percentage points *less* likely to face a positive IRS audit adjustment. Given that the overall likelihood of assessment, conditional on audit, is approximately 50 percent, this is an decrease of approximately four percent. For the most complex organizations, this effect is approximately 7.7 percentage points, or a decrease of approximately 15 percent.

We find similar inferences in Columns 2 and 3 after including both industry and year fixed effects. Control variables exhibit the expected signs: *Agent rank* is positively correlated with the likelihood of adjustment, whereas having a foreign presence, reporting on the accrual method, having limited liability, and having a paid preparer are negatively associated with the likelihood of assessment.

Column 4 presents the model using the total dollar value of the audit adjustment (*Adjust*). Under this model specification, we find *Complexity* is positively associated with this outcome ( $p < 0.05$ ).

The results indicate that, for a one standard deviation increase in *Complexity*, the dollar value of the adjustment increases by \$13 thousand, which represents 13 percent of the mean adjustment. For the most complex organizations, this indicates an adjustment that is approximately \$49 thousand, which represents a nearly 50 percent increase relative to the mean adjustment. The change in coefficient sign suggests that, while complex partnerships are less likely to face an audit adjustment, the amount of the assessment is *increasing* in partnership complexity.

To confirm that the results are not driven by the no-adjustment partnerships, we re-estimate the model, conditional on IRS assessment. We present the results in Column 5. Consistent with adjustments increasing with partnership complexity, we continue to find a positive and statistically significant coefficient on *Complexity* ( $p < 0.1$ ). Among the population of firms with a positive adjustment, a one standard deviation increase in *Complexity* increases the dollar value of the adjustment by \$56.7 thousand.

## **5.2 Explaining the negative relation between complexity and assessment likelihood**

A natural question is why the likelihood of assessments is negatively associated with complexity, whereas the total amount of assessments exhibits a positive relation. To better understand the negative relationship between complexity and partnership tax compliance, we explore three possible explanations: 1) audit selection, 2) taxpayer planning, and 3) audit time-to-assessment.

### **5.2.1 Audit Selection**

First, complexity could be positively associated with audit selection, but then – conditional on being selected – complexity may have little relation, or even a negative relation, as observed in Table 7. Thus, we first evaluate the degree to which the audited sample is representative of the full partnership population by examining the proportion of the full and audited samples within seven

*Complexity* bins. We present the results in Figure 10. We observe that the audited sample appears similar to the full population across all seven bins. While the distributions are different in a statistical sense (Kolmogorov-Smirnov test p-value < 0.001), the fact that the audited sample covers a similar range as the full population suggests that audit selection is unlikely to explain the strong negative association we observe.

### 5.2.2 Taxpayer Planning

A second possible explanation is taxpayer planning, which we define as the ability of taxpayers to sufficiently arrange financial activities to avoid tax authority detection or adjustment. This type of planning could include contracting with tax and legal professionals to establish complex structures, implementing specific tax planning strategies via these structures, and ultimately successfully defending these strategies upon audit. To the extent better tax planners are able to stay “one step ahead” of enforcement, then this could explain the negative relation between complexity and likelihood of assessment. We test this explanation by examining whether there is variation in the relation between complexity and likelihood of assessment using two measures of tax planning.

Our first measure is whether the partnership organization has a high net worth (“HNW”) partner. HNW partners are arguably more financially sophisticated, have greater incentives to engage in tax planning, and have more resources to do so. We define HNW partnerships as those in which at least one individual partner has total taxable income in excess of \$1 million based on U.S. income tax returns (Schedule 1040) filed by any individual taxpayer-partner. We separately estimate Eq. 1 for partnerships with and without a high-net-worth partner and report the results in Table 8a. We do not find evidence consistent with the negative relation driven by taxpayer planning, based on statistically insignificant coefficients in Columns 1, 3, and 5. Instead, we continue to find negative

and statistically significant coefficients in the sample of partnerships that are not connected to HNW individuals.

Our second measure of taxpayer planning is whether a partnership utilizes a sophisticated tax preparer, defined as a tax preparer firm that signs more than four thousand partnership tax returns per year in the full sample of partnerships. We then partition the audited sample based on the use of sophisticated preparers and present our results in Table 8b. We also do not find support for this explanation. Specifically, the coefficient on *Complexity* is insignificant in the sample of partnerships with sophisticated preparers in Columns 1, 3, and 5. We caveat that, while our methodology for sophisticated preparers follows other papers in the literature (i.e., Zwick and Mahon 2017; Dobridge et al. 2024), the sample size is quite small relative to non-sophisticated preparers, thereby decreasing the statistical power. Nonetheless, across both panels, we find little support for sophisticated taxpayer planning as a primary explanation for the negative association between complexity and tax noncompliance.

### 5.2.3 Audit Time and Outcomes

Our third possible explanation relates to the time spent on audits and how that is correlated with audit outcomes. Complex cases may be much more difficult to review and to identify possible tax adjustments. This is in part because tax laws such as Tax Equity and Fiscal Responsibility Act (TEFRA) and Bipartisan Budget Act (BBA) require a number of steps that increase the amount of time examiners must spend on any partnership. To understand this, we study the distribution of exam time for complex partnerships as compared to simple partnerships. Figure 11a shows the distribution of exam time for simple partnerships largely follows a normal distribution (in blue), but the distribution of exam time for complex partnerships (in orange) differs in two ways. First, the complex distribution is bi-modal: there is one peak early within the exam timeframe at four

hours and a second peak at 33 hours that mirrors the simple partnership distribution. Second, the distribution for complex audits appears to have a slightly fatter right tail, implying that these audits take longer.

We further investigate differences across these distributions by plotting the outcomes of the audits by time. Specifically, Figure 11b plots the distribution of exam time separately for simple and complex audits, with the colors reflecting those audits with positive assessments (in green), negative assessments (in pink), and no changes (in blue).

We first focus on the bimodal nature of the complex partnership distribution as compared to the simple partnership distribution and, in particular, the audits that are closed within a relatively short timeframe. For complex audits, we observe a large number of decisions are reached very quickly based on the tall peak in the first histogram bar. A substantial proportion of these audits are closed with no change (based on the blue shading). This differs from the normal distribution for simple partnerships; there is no peak in this distribution, and we observe relatively fewer no-change audits among the audits that first close. This may be efficient to the extent that a quicker no-change audit permits examiners to shift focus to other audits where assessments may be more likely. Observing the relatively high “no change rate” for complex audits as compared to simple audits offers one explanation for the negative relation between complexity and likelihood of assessment.

Second, we observe different patterns in the right tail. For simple partnerships, the time committed generally follows a normal distribution with a small right tail. In contrast, for complex audits, we observe that a higher proportion of complex audits takes longer than 200 hours (K-S test for difference in distributions yields  $p\text{-value} < 2.2e\text{-}16$ ). Furthermore, these longer audits have a higher probability of yielding a positive and large assessment; see Figure 11c.

While not causal, both observations are consistent with, and help explain, why complexity exhibits a negative relation with the likelihood of assessment but a positive relation with the amount of assessment.

#### 5.2.4 Audit ROI

Finally, we quantify the IRS's return on time spent on partnership audits. Specifically, we examine whether auditors should persist with more complex audits (which may maximize the dollar value of assessments) or if auditors should switch to simpler audits (which may maximize the quantity of audits with assessments, but not necessarily the dollar amount). To evaluate this, we calculate an aggregate measure of return-on-investment (ROI) for partnership audits. The numerator is equal to the total tax that would be collected on the proposed assessments across all audits. The denominator is the total cost to the IRS of audits, which is calculated by multiplying the number of agent audit hours by the applicable hourly cost of an agent based on their GS ranking. We then add in additional agency overhead costs by multiplying this amount by 1.68, where the overhead rate of 0.68 is based on the IRS Chief Financial Officer Corporate Budget Cost and User Fees. Finally, we sum these costs across all audits. We divide the total tax estimate by this total cost to calculate an aggregate ROI.

We present our findings on ROI by agent rank in Figure 12. For simple partnerships, we find an ROI of approximately \$10 for every \$1 invested. This indicates auditors deliver proposed audit assessments that are 10 times the cost of the audit, which is substantially higher than the 2.5 ROI for corporate returns as estimated in Nessa et al. (2020).<sup>10</sup> For complex partnerships, we find a significantly higher ROI of 20. This suggests an effect that is roughly double the ROI of simple partnerships, with a bootstrapped 95% confidence interval for the difference between complex and

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<sup>10</sup>Nessa et al. (2020) quantify that, for a \$13.7 billion reduction in the IRS corporate enforcement budget during their sample period, the lost collections were equal to \$34.3 billion, or an ROI of 2.5.

simple of (7.4, 11.6). The graphical evidence suggests there could be substantial increases in tax revenue collection by conducting more complex audits.

## **6 Conclusion**

Our work provides new evidence about U.S. partnership entities. To do so, we obtain access to the population of U.S. partnerships for three tax years and graph their network structures. The most prevalent partnership entities include simple partnerships, which are characterized by a single partnership entity and individual partners. Simple partnerships represent approximately 80 percent of all partnerships in our sample. However, on average, they are much smaller in size, reporting sales, ordinary income, and assets less than half that of the average amount reported by complex partnerships. Complex partnerships exhibit web-like structures characterized by the use of multiple partnership entities and a long path between an entity and its owner. The visual depictions and descriptive statistics about U.S. partnerships adds to the very limited evidence about this large and growing group of contemporary U.S. businesses.

We construct a measure of complexity, study determinants of complexity, and examine the degree to which organizational complexity is associated with tax noncompliance of partnerships. We use a sample of audited partnerships to directly measure noncompliance through audit adjustments. We find complex partnerships are less likely to receive an audit adjustment but face larger adjustments when they are imposed. This seems related to the time spent on audited partnerships, reflecting either the long duration to arrive at large assessments or the relatively quick conclusion of audits with no changes. We quantify relatively high ROIs on audits, suggesting potentially large revenue gains from investing additional time in these complex cases.

The evidence from this study contributes to the literature by providing information about a large sector of U.S. firms that are relatively understudied in the academic literature. As the number of



partnership businesses continue to grow, and the extent of U.S. private funds increasingly flow through these structures, additional evidence is needed to understand their role and how the structures may facilitate non-compliance. We look forward to future work that examines these questions, as such evidence may be useful to tax authorities in advancing their capabilities for administering and enforcing U.S. tax law.

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## Appendix A

### Variable Definitions

<b>Dependent Variables</b>	
<i>Complex [0/1]</i>	Indicator equal to zero if a partnership is wholly owned by individuals and does not own any other entities; equal to one otherwise.
<i>Tot nodes</i>	Count of a the total number of nodes of the PRB in which a partnership is an entity.
<i>Complexity</i>	The principle components from the dimensional reduction of the PRB's organization complexity features.
<i>Adjust [0/1]</i>	Indicator equal to one if the IRS imposed a positive adjustment as a result of audit and zero otherwise.
<i>Adjust</i>	The standardized dollar value of audit adjustment.
<i>Adjust   Adjust &gt; 0</i>	The standardized dollar value of audit adjustment conditional on the value being positive.
<b>Implementation costs</b>	
<i>Assets</i>	Total assets reported on Form 1065, schedule L, line 14.
<i>Loss [0/1]</i>	Indicator equal to one if the partnership reports negative Schedule K income and zero otherwise. Reported on Form 1065, Schedule K, lines 1-11.
<i>Ordinary income</i>	Ordinary business income reported on Form 1065, line 23.
<i>Ordinary income [0/1]</i>	Indicator equal to one if the partnership reports any ordinary business income (loss) and zero otherwise. Reported on Form 1065, line 23.
<i>Rental income</i>	Net rental real estate income (loss) reported on Schedule K, line 2.
<i>Rental income [0/1]</i>	Indicator equal to one if the partnership reports any net rental real estate income (loss). Reported on Schedule K, line 2.
<i>Investment income</i>	Ordinary dividends plus net long-term capital gains reported on Schedule K, lines 6a and 9a.
<i>Investment income [0/1]</i>	Indicator equal to one if the partnership reports any ordinary dividends or net long-term capital gains. Reported on Schedule K, lines 6a and 9a.
<i>Forms 8858 OR 8865 [0/1]</i>	Indicator equal to one if the partnership reports foreign disregarded entities, foreign branches, or foreign partnerships and zero otherwise. Reported on Schedule K, lines 13 and 15.
<i>Foreign tax [0/1]</i>	Total foreign taxes paid reported on Form 1065, Schedule K, line 21.
<i>Accrual [0/1]</i>	Indicator equal to one if the partnership uses the accrual accounting method and zero otherwise. Reported on Form 1065, line H.
<i>Interest exp</i>	Interest expense reported on Form 1065, line 15.
<i>Salary and wage</i>	Salaries and wage expense reported on Form 1065, line 9.
<i>Sec 1231</i>	Net Section 1231 gains reported on Schedule K, line 10.
<i>Depreciation</i>	Depreciation expense reported on Form 1065, line 16a.

**Agency costs**

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<i>Guaranteed payments</i> <i>LP/LLC/LLP [0/1]</i>	Guaranteed payments to partners reported on Form 1065, line 10. Indicator equal to one if partnership is a limited partnership or company and zero otherwise. Reported on Form 1065, Schedule B, line 1.
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**Outcome costs**

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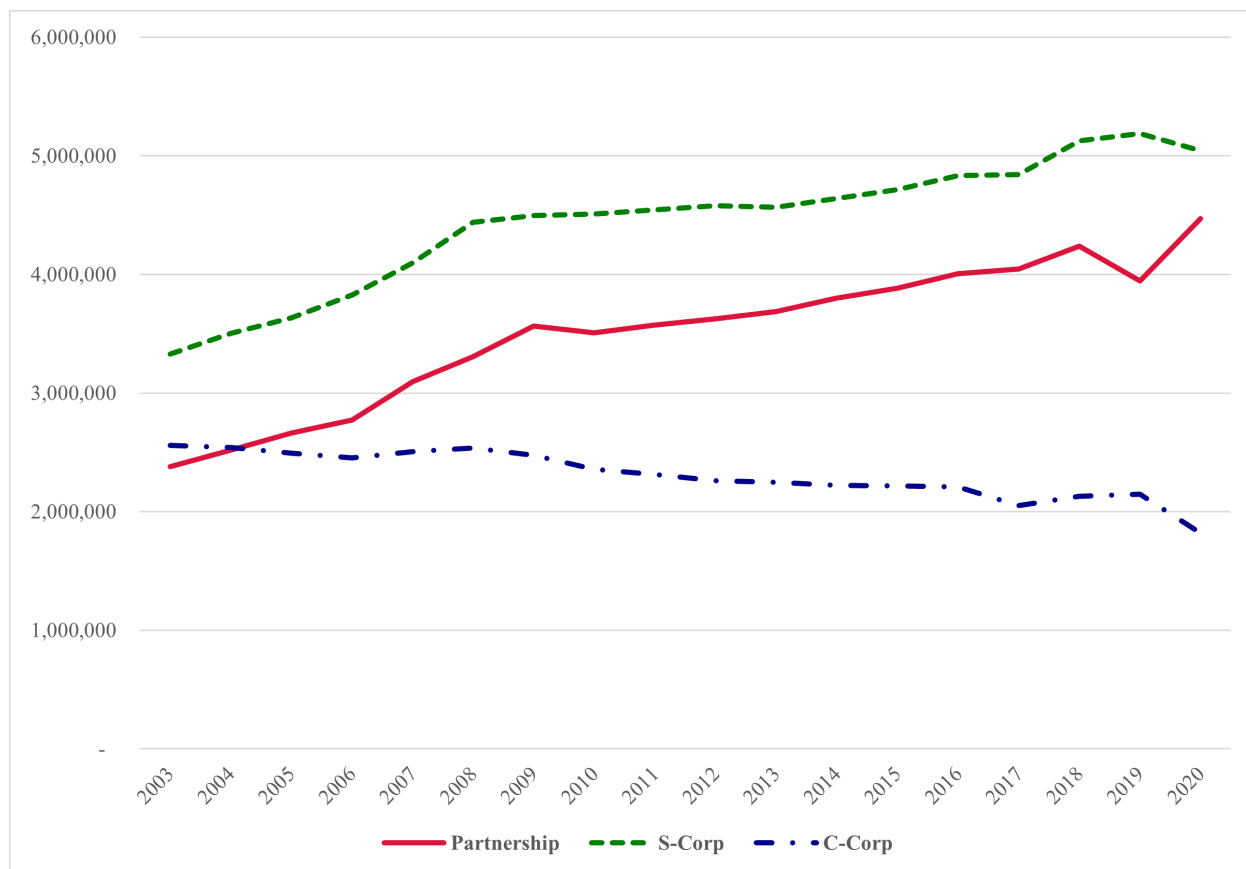
<i>Paid preparer [0/1]</i>	Indicator equal to one if the partnership has a paid preparer complete the tax return and zero otherwise.
<i>Publicly traded [0/1]</i>	Indicator equal to one if the partnership is publicly traded and zero otherwise. Reported on Form 1065, Schedule B, line 5.
<i>Agent rank</i>	The General Schedule classification of the revenue agent conducting the audit. General Schedule classification ranges from GS-1 to GS-15.

**Organization complexity features**

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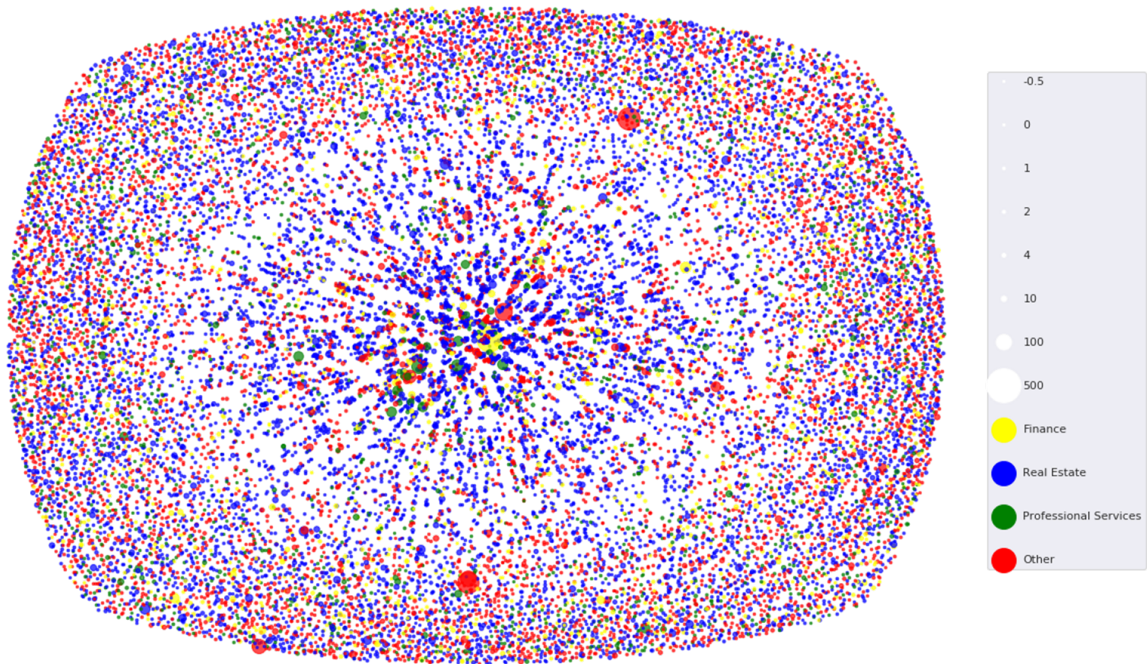
<i>DoS</i>	The maximum number of entities through which income flows before it is reported to a taxable partner.
<i>In deg</i>	Number of K-1s received by a partnership entity.
<i>Out deg</i>	Number of K-1s issued by a partnership entity.
<i>Partnerships</i>	Number of partnership entities within an organization.
<i>Individuals</i>	Number of individuals within an organization.
<i>S corps</i>	Number of S corporations within an organization.
<i>C corps</i>	Number of C corporations within an organization.
<i>Tot nodes</i>	Total number of nodes within an organization.
<i>Trusts</i>	Number of trusts within an organization.

Figure 1: Growth of Business Structures



Notes: This figure illustrates the number of business returns filed between 2003 and 2020. Partnerships do not include disregarded entities that are not required to file a form 1065 with the IRS. Over this time period, partnership filings increased the most, both in terms of the number of returns and the rate of increase: partnership (S-corp) returns filed increased by 87.7% (51.5%) at an average annual rate of 3.9% (2.5%). C-corp returns filed decreased by 28.9% at an average annual rate of -1.9%.

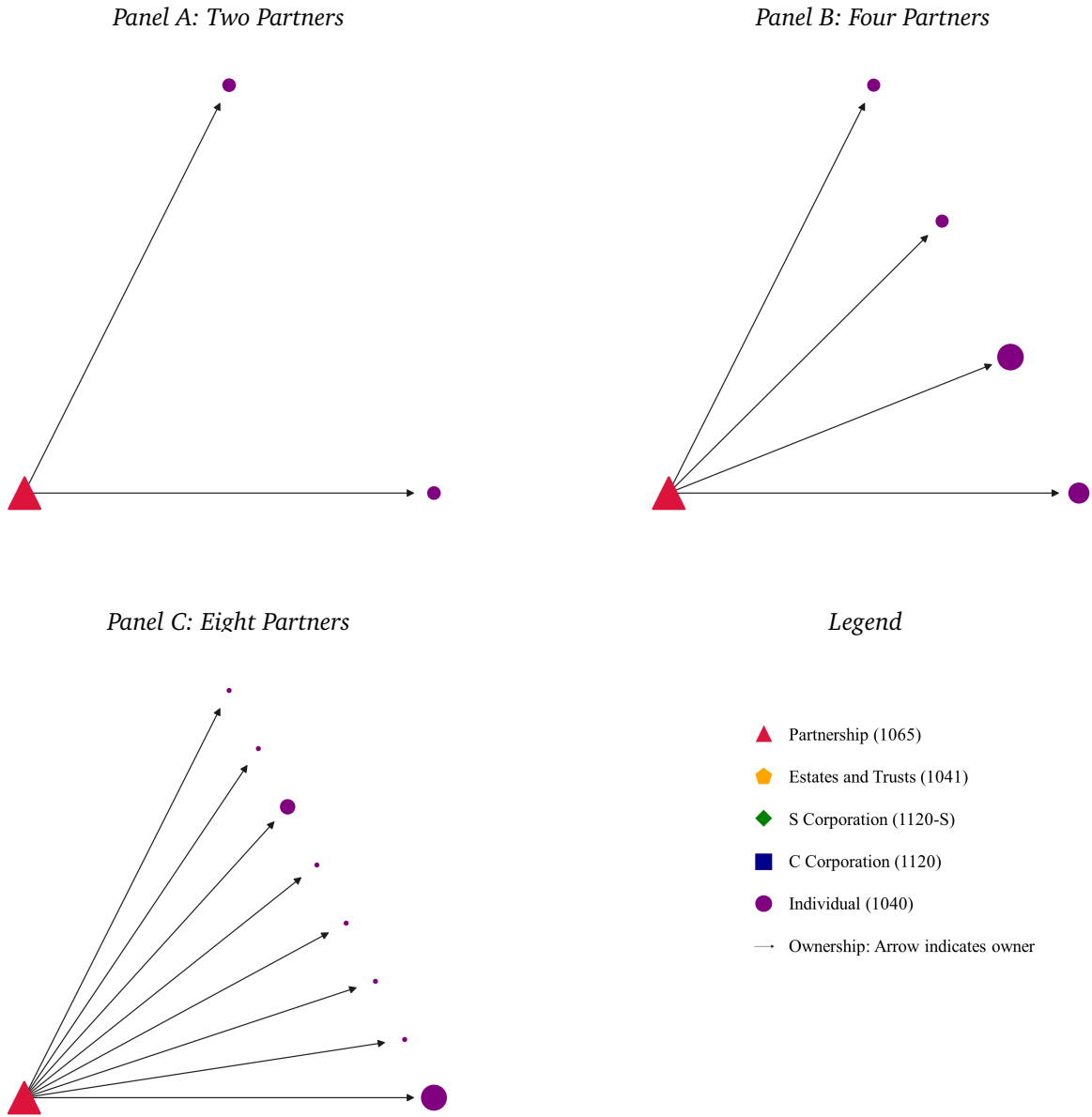
Figure 2: Illustrative Example of Partnership-Related Businesses



Notes: This figure presents a random, synthetic population of ten thousand Partnership Related Businesses (PRB). Each dot represents a PRB, and the size indicates *Complexity*; however, to conform with IRS disclosure requirements, we add random noise to *Complexity* independently for each PRB presented in this figure. Larger (smaller) dots indicate more (less) complex PRBs. The industry of each PRB is represented through color: finance is yellow, real estate is blue, professional services is green, and all others are red. PRBs are presented more towards the center of the figure as the number of other PRBs in which a taxpayer has ownership increases.



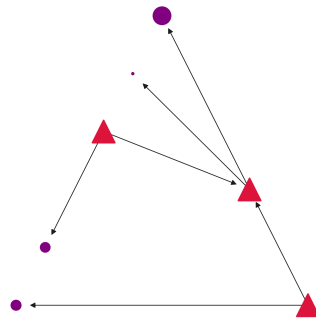
Figure 3: Examples of Simple Partnership Structures



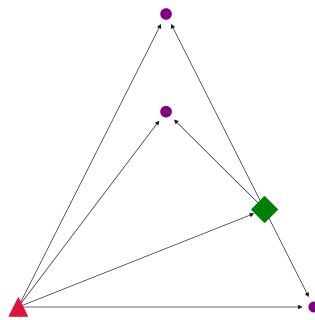
Notes: This figure illustrates partnership organization structures and depicts the relationship between the partnership and its partners. All panels show a simple partnership organization, which is a group composed of one partnership entity owned directly by individuals. Panel A presents a simple partnership organization with two owners; Panel B (C) present an organization with four (eight) partners. Red triangles denote the partnership entity; purple circles denote individual partners; the arrow indicates ownership and points to the direct partner owner. The purple nodes are sized based on the proportion of the organization's total income reported to each partner.

Figure 4: Examples of Complex Partnership Structures

Panel A: Multiple Partnerships



Panel B: Multiple Entity Types

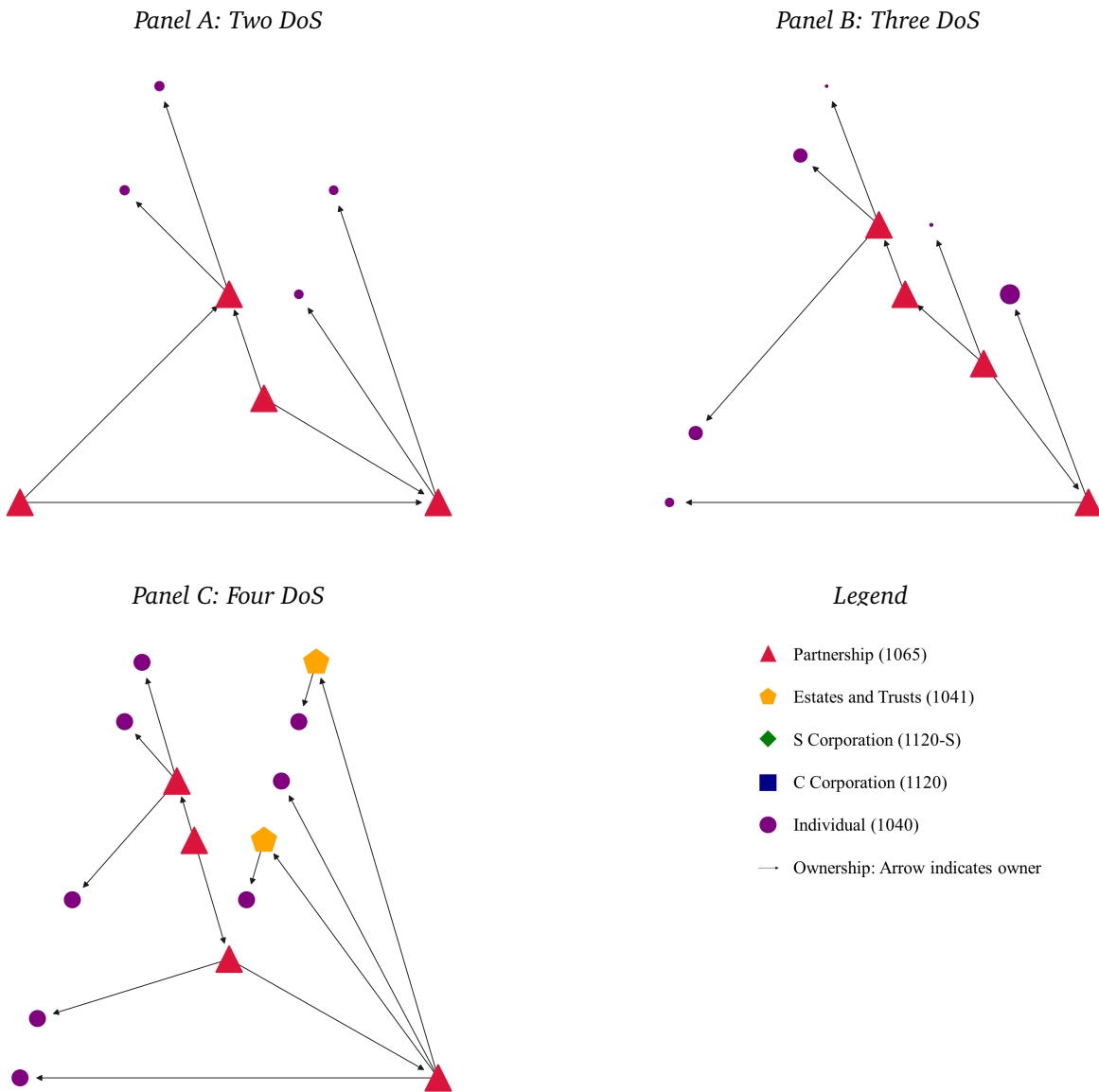


Legend

- ▲ Partnership (1065)
- ◆ Estates and Trusts (1041)
- ◆ S Corporation (1120-S)
- C Corporation (1120)
- Individual (1040)
- Ownership: Arrow indicates owner

Notes: This figure illustrates partnership organization structures and depicts the relationship between the partnership and its partners. Both panels show a complex partnership organization, which is an organization (i) composed of multiple partnerships and/or (ii) directly owned by partners who are not individuals. Panel A presents a complex partnership organization composed of multiple partnerships with four distinct individual owners; Panel B presents an organization with one partnership organization directly owned by three individual owners and one S corporation. Red triangles denote the partnership entity; orange pentagons indicate estates and trusts; green diamonds indicate S corporations; blue squares indicate C corporations; and purple circles denote individual partners. The arrow indicates ownership and points to the direct partner owner. The purple nodes are sized based on the proportion of the organization's total income reported to each partner.

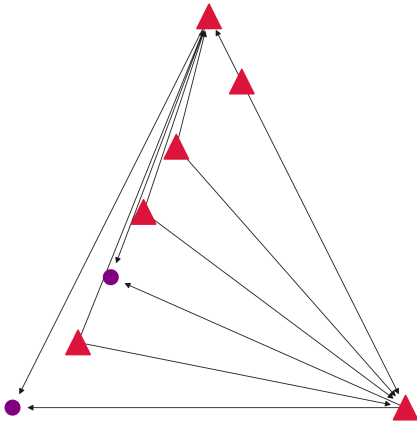
Figure 5: Complex Partnership Structures with Contrasting Degrees of Separation



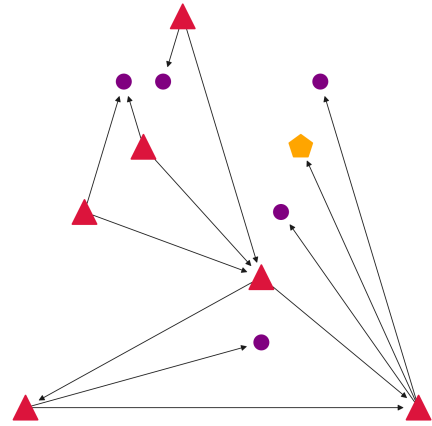
Notes: This figure illustrates partnership organization structures and depicts the relationship between the partnership and its partners, comparing organizations with differing Degrees of Separation. The panels show complex partnership organizations, which are groups (i) composed of multiple partnerships and/or (ii) directly owned by partners who are not individuals. Panel A presents a complex partnership organization with two degrees of separation; Panel B (C) denotes three (four) degrees of separation. Red triangles denote the partnership entity; orange pentagons indicate estates and trusts; green diamonds indicate S corporations; blue squares indicate C corporations; and purple circles denote individual partners. The arrow indicates ownership and points to the direct partner owner. The purple nodes are sized based on the proportion of the organization’s total income reported to each partner.

Figure 6: Complex Partnership Structures Comparing Degrees of Separation

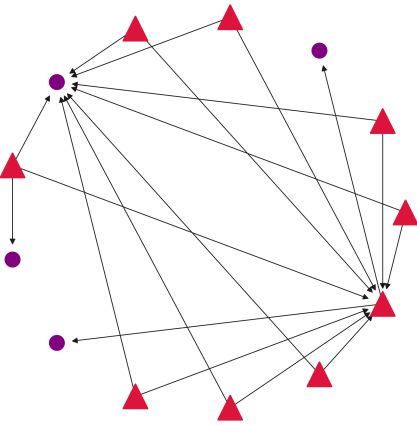
Panel A: Two DoS



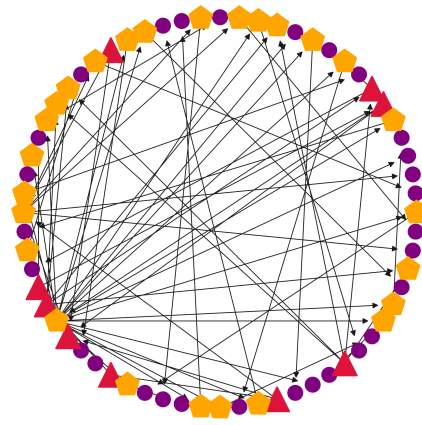
Panel B: Five DoS



Panel C: Two DoS



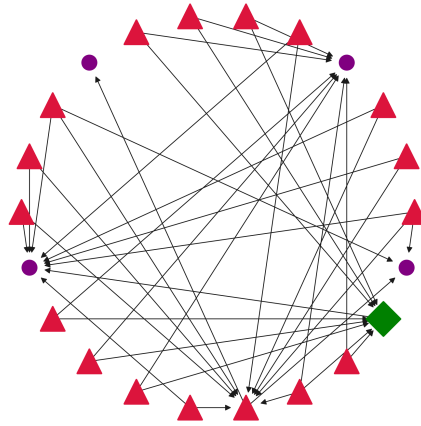
Panel D: Five DoS



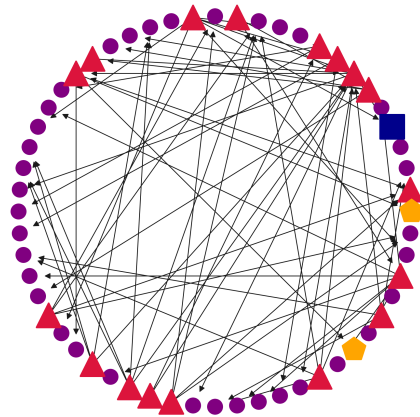
Notes: This figure illustrates partnership organization structures, comparing organizations with differing numbers of partnerships and degrees of separation. The panels show complex partnership organizations, which are groups (i) composed of multiple partnerships and/or (ii) directly owned by partners who are not individuals. Panels A and B present organizations with six partnerships; Panels C and D present organizations with nine partnerships. Panels A and C (B and D) show organizations with two (five) degrees of separation. Red triangles denote the partnership entity; orange pentagons indicate estates and trusts; green diamonds indicate S corporations; blue squares indicate C corporations; and purple circles denote individual partners. The arrow indicates ownership and points to the direct partner owner. The purple nodes are sized based on the proportion of the organization's total income reported to each partner.

Figure 7: Examples of Complex Partnership Structures with 17 Partnerships

*Panel A: Two DoS*

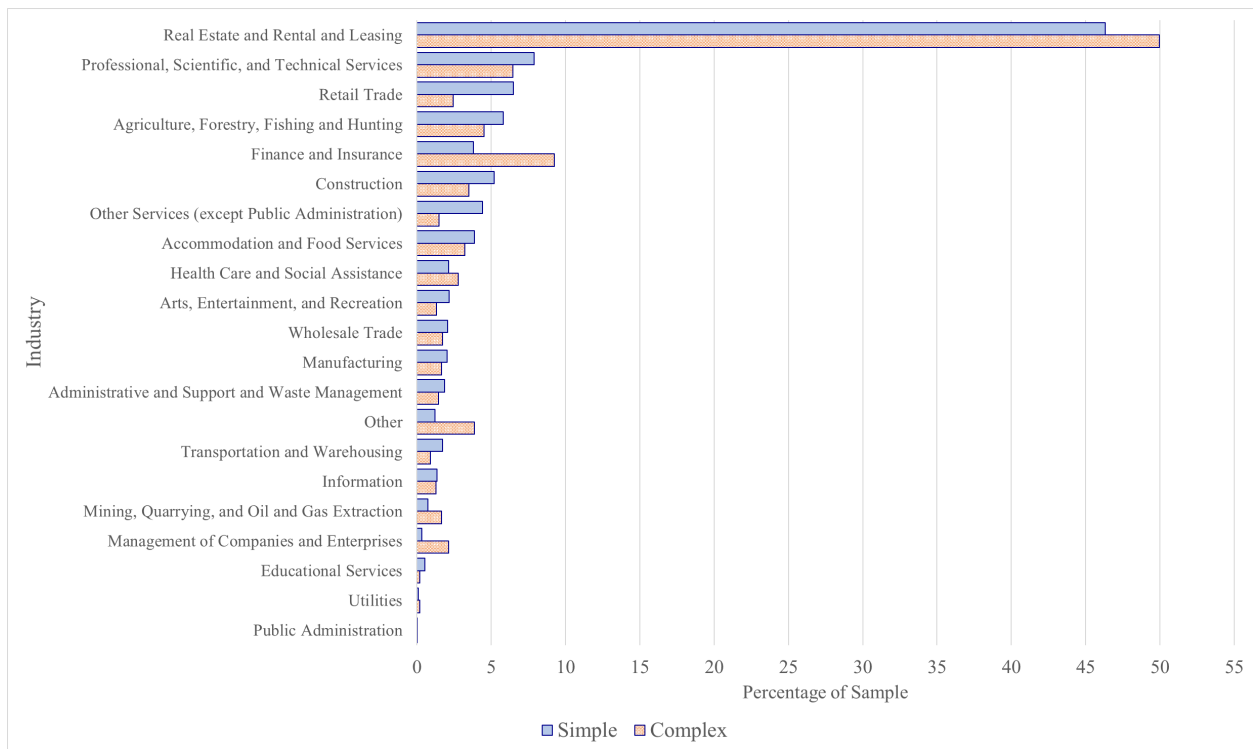


*Panel B: Six DoS*



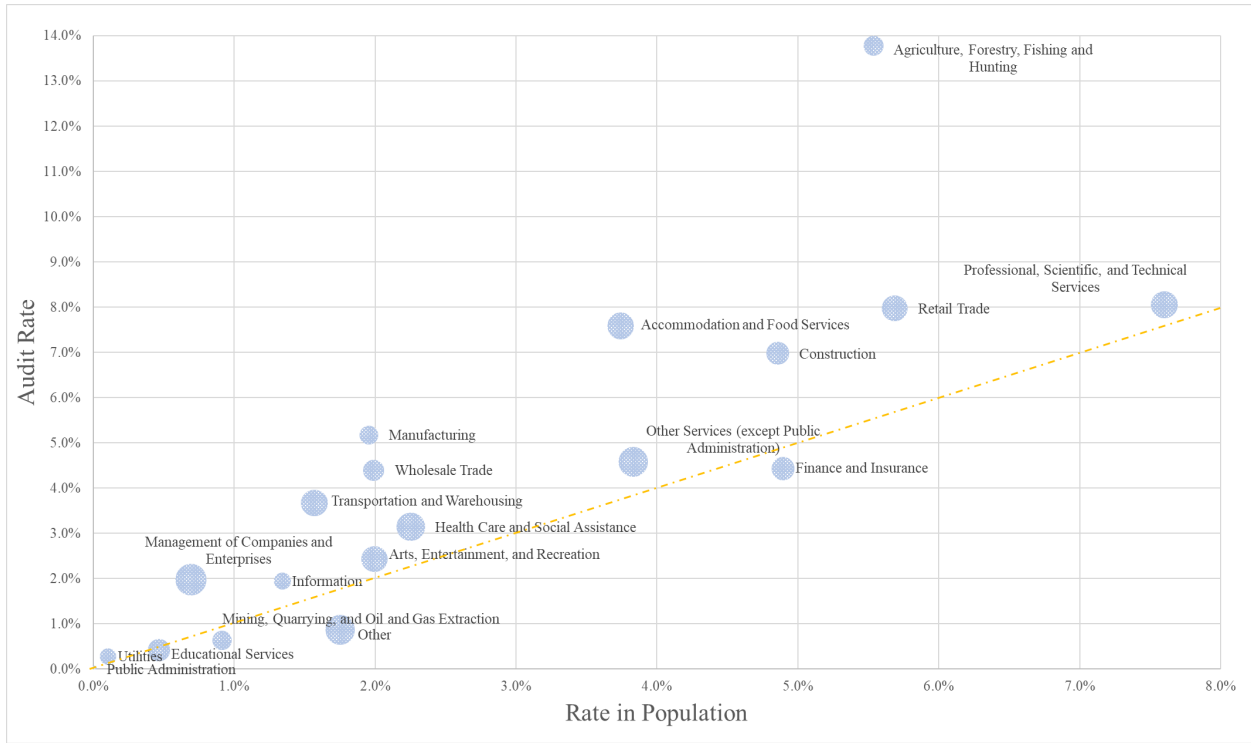
Notes: This figure illustrates partnership organization structures and depicts the relationship between the partnership and its partners. Both panels show a complex partnership organization, which is an organization (i) composed of multiple partnerships and/or (ii) directly owned by partners who are not individuals. Panel A presents a complex partnership organization composed of 17 partnerships with two Degrees of Separation ("DoS"); Panel B presents an organization composed of 17 partnerships with six Degrees of Separation ("DoS"). Red triangles denote the partnership entity; orange pentagons indicate estates and trusts; green diamonds indicate S corporations; blue squares indicate C corporations; and purple circles denote individual partners. The arrow indicates ownership and points to the direct partner owner. The purple nodes are sized based on the proportion of the organization's total income reported to each partner.

Figure 8: Industry Composition: Full Population



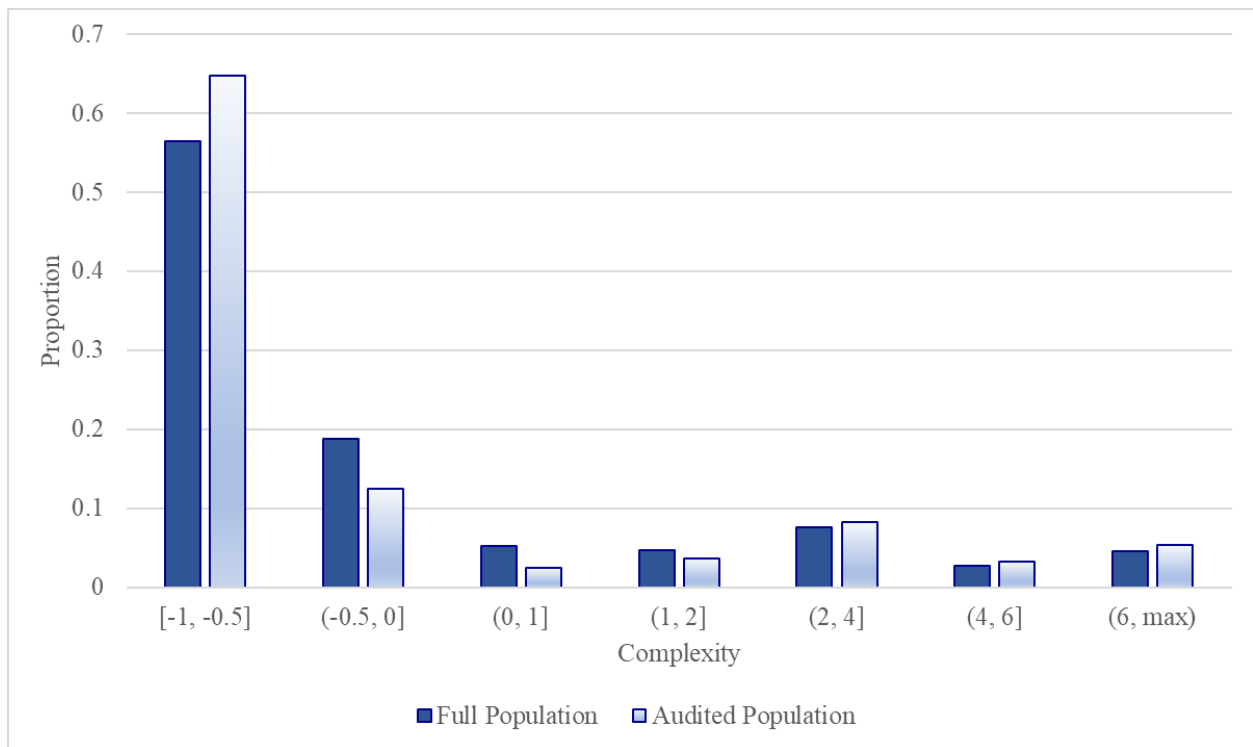
Notes: This figure presents the industry composition for the full sample of partnership organizations from 2013-2015 with sufficient data from the IRS for estimation. Industry is defined by two-digit NAICS codes. The 'other' category includes partnerships whose NAICS codes were listed as zero. We separately identify our sample by simple and complex partnerships. Simple partnerships (solid blue) are single partnerships wholly owned by individuals; complex partnerships (hatched orange) include all other structures.

Figure 9: Industry Composition: Audited Population



Notes: This figure presents the industry composition for the audited sample of partnership organizations from 2013-2015 with sufficient data from the IRS for estimation. Industry is defined by two-digit NAICS codes. The 'other' category includes partnerships whose NAICS codes were listed as zero. The figure graphs industry rate in the population and industry audit rate. Industries are represented by hatched blue circles, and the size is representative of the audit success rate. The average success rate across industries is 50 percent. A larger point indicates a higher percentage of audits led to a positive audit adjustment. The dashed orange line represents points at which the population rate and audit rate are equal. Industries above (below) the line are over (under) audited relative to their rate in the full population. For ease of scalability, the real estate industry is not included in the figure. Real estate industry rate in the population is 47 percent, the audit rate is 19 percent, and the success rate is approximately average at 50 percent.

Figure 10: Audit Selection Across Complexity

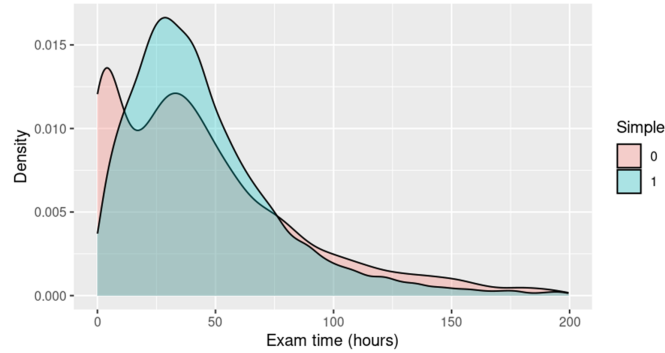


Notes: This figure present the proportion of partnerships within seven *Complexity* bins. We separately identify the full sample (solid blue) and the audited sub-sample (gradient blue).

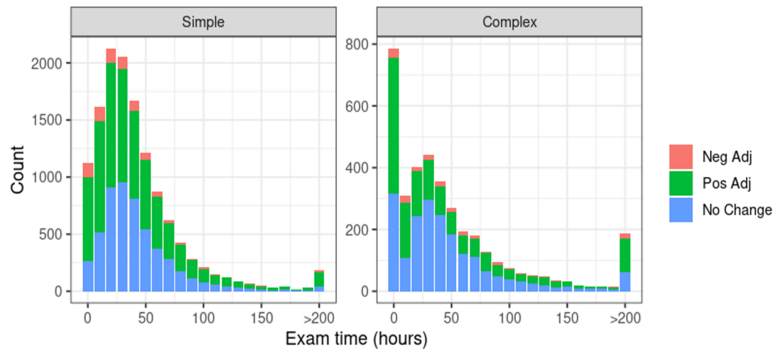


Figure 11: Time commitment to audit decision

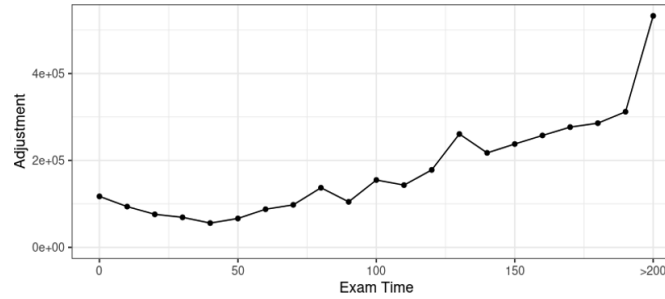
Panel A: Density of time to audit decision



Panel B: Stacked histogram of time to audit decision broken out by outcome

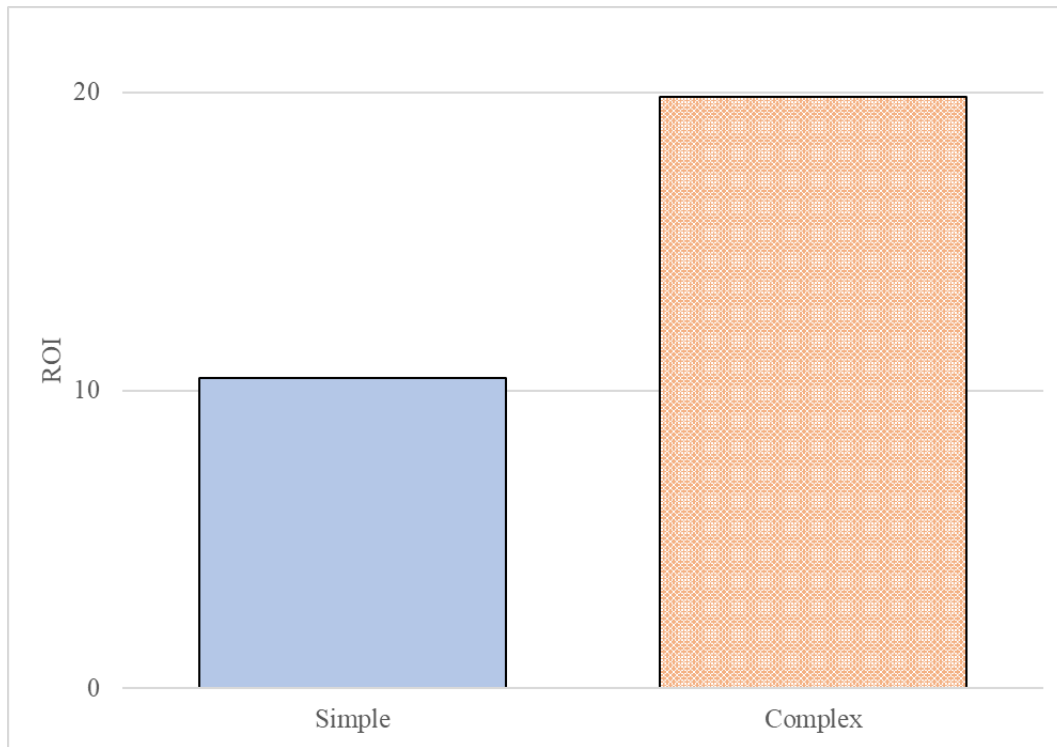


Panel C: Average adjustment by time to audit decision



Notes: This figure presents the time it takes to complete a partnership audit (in hours). Panel A presents the distribution for simple partnerships (blue) overlaid with the distribution for complex partnerships (pink). Panel B presents separately the distributions for simple and complex and displays the portion of audits that result in no change (blue), a positive change (green), and a negative change (red). Panel C presents the average adjustment by audit time.

Figure 12: Return on Investment



Notes: This figure presents the return on investment for audits of simple (solid blue) and complex partnerships (hatched orange). The return on investment incorporates the time an auditor spends directly on an audit, the auditors GS rank, and overhead costs based on the IRS Chief Financial Officer Corporate Budget Cost and User Fees.

Table 1: Sample Composition

(a) 2013-2015 Sample Construction

Population from IRS partnership database	11,586,994	
Drop:		
Partnerships with multiple filings in a year	274,104	
Partnerships with identifiers linked to more than one type of entity	6,129	
Partnerships with insufficient ownership data	445,474	
Partnerships from organizations with > 1 million nodes	2,232,583	
Partnerships with no income activity	1,204,598	
All partnerships	7,424,106	
	Full Sample	Audited Sample
Partnerships in simple organizations	5,937,523	12,988
Partnerships in complex organizations	1,486,583	3,711
All partnerships	7,424,106	16,699

Sample consists of 7,424,106 partnership organization observations from 2013-2015 with sufficient data from the IRS for estimation. We separately identify our sample by simple and complex partnership organizations. Simple partnership organizations are single partnerships wholly owned by individuals; complex partnership organizations include all other structures.

(b) Partnership Organizations

Simple Partnership Organizations		Complex Partnership Organizations		
Number of Partners	Number of Organizations	Number of Partners	Number of Organizations	Average Number of Partnerships
2	4,192,833	2	393,861	1.35
3	895,111	3	148,679	1.54
4	456,939	4	102,079	1.75
5	168,152	5	64,192	1.89
6	84,206	6	40,986	2.06
7	41,637	7	26,519	2.20
8	27,757	8	18,793	2.34
9	16,995	9	14,022	2.55
10	12,742	10	10,557	2.58
11-20	34,774	11-20	38,228	3.01
21-30	4,383	21-30	7,814	3.99
31-40	970	31-40	2,573	4.54
41-50	391	41-50	1,084	5.36
51+	633	51+	1,969	5.80

Sample of simple partnership organizations consists of 5,937,523 partnerships from 2013-2015 with sufficient data from the IRS for estimation. Sample of complex partnership organizations consists of 1,486,583 partnerships in 871,356 partnership organizations from 2013-2015 with sufficient data from the IRS for estimation.

Table 1: continued

(c) *Complex Partnership Organizations by Number of Partnerships*

Complex Partnership Organizations	
Number of Partnerships in Organization	Number of Organizations
1	549,265
2	215,196
3	53,365
4	21,663
5	10,946
6	6,247
7	3,890
8	2,487
9	1,845
10	1,382
11-20	4,047
21-30	659
31-40	180
41-50	83
51+	103

Sample of complex partnership organizations consists of 871,358 partnership organizations from 2013-2015 with sufficient data from the IRS for estimation.

Table 2: Descriptive Statistics: Full Population

## (a) Descriptive Statistics

	All Partnerships (n=7,424,106)		Simple Partnerships (n=5,937,523)		Complex Partnerships (n=1,486,583)	
	Mean (1)	SD (2)	Mean (3)	SD (4)	Mean (5)	SD (6)
<b>Tax Return Variables</b>						
<i>Sales</i>	295,381.03	1,043,575.00	253,559.83	900,126.60	462,418.00	1,472,342.00
<i>Assets</i>	715,980.68	1,701,006.00	530,283.89	1,301,426.00	1,457,667.00	2,645,248.00
<i>Assets_non missing</i>	984,144.77	1,926,970.26	750,074.87	1,493,604.72	1,800,572.24	2,833,015.36
<i>Salary and wage</i>	37,443.66	155,902.80	31,723.14	136,631.60	60,291.87	214,871.10
<i>Guaranteed payments</i>	6,679.32	32,214.44	6,717.95	31,619.21	6,525.02	34,489.12
<i>Foreign tax [0/1]</i>	0.01	0.11	0.01	0.09	0.03	0.17
<i>Interest exp</i>	2,427.48	11,268.13	2,099.36	9,985.05	3,738.01	15,288.56
<i>Depreciation</i>	4,331.68	18,017.67	3,917.82	16,246.90	5,984.67	23,739.39
<i>Ordinary income</i>	22,401.34	132,097.30	19,544.27	114,939.80	33,812.69	184,975.60
<i>Rental income</i>	12,711.32	55,949.06	10,099.97	47,206.44	23,141.23	81,217.82
<i>Investment income</i>	6,901.26	586,746.19	3,163.83	274,796.51	21,828.84	1,190,559.43
<i>Sec 1231</i>	1,962.10	14,770.08	1,757.69	13,803.56	2,778.54	18,100.46
<i>Accrual [0/1]</i>	0.17	0.38	0.15	0.36	0.27	0.44
<i>Paid preparer [0/1]</i>	0.75	0.43	0.75	0.44	0.79	0.41
<i>Publicly traded [0/1]</i>	0.00	0.03	0.00	0.03	0.00	0.02
<i>LLP/LLC/LP [0/1]</i>	0.81	0.39	0.79	0.41	0.88	0.32
<b>Organization Structure Variables</b>						
<i>In deg</i>	0.05	0.21	0.00	0.00	0.23	0.42
<i>Out deg</i>	2.77	1.54	2.61	1.32	3.43	2.09
<i>Individuals</i>	3.08	2.63	2.63	1.52	3.74	3.58
<i>Partnerships</i>	1.40	1.53	1.00	0.00	1.67	1.38
<i>C corps</i>	0.03	0.17	0.00	0.00	0.18	0.38
<i>S corps</i>	0.08	0.33	0.00	0.00	0.37	0.61
<i>Trusts</i>	0.09	0.43	0.00	0.00	0.39	0.79
<i>DoS</i>	1.22	0.49	1.00	0.00	1.95	0.46

This table presents descriptive statistics for the sample of partnerships from 2013-2015 with sufficient data. Variable definitions are included in Appendix A. Amounts shown are averages for all partnerships and based on the number of taxable partners in the organization.

Table 2: continued

(b) *Partnerships by gross receipts (Form 1065, Page 1)*

	All Partnerships		Simple Partnerships		Complex Partnerships	
	# Observations (1)	Percent of total (2)	# Observations (3)	Percent of total (4)	# Observations (5)	Percent of total (6)
\$0	4,417,445	59.50%	3,348,202	56.39%	1,069,243	71.93%
\$1-\$99,999	1,266,545	17.06%	1,155,361	19.46%	111,184	7.48%
\$100,000-\$499,999	909,402	12.25%	811,447	13.67%	97,955	6.59%
\$500,000-\$999,999	312,666	4.21%	260,405	4.39%	52,261	3.52%
\$1,000,000-\$4,999,999	399,623	5.38%	295,881	4.98%	103,742	6.98%
\$5,000,000-\$49,999,999	118,425	1.60%	66,227	1.12%	52,198	3.51%
>=\$50,000,000	0	0.00%	0	0.00%	0	0.00%

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This table presents the number of partnerships in our sample by total gross receipts. We separately show partnerships in simple and complex organizations.

(c) *Partnerships by total assets (Form 1065, Page 1)*

	All Partnerships		Simple Partnerships		Complex Partnerships	
	# Observations (1)	Percent of total (2)	# Observations (3)	Percent of total (4)	# Observations (5)	Percent of total (6)
\$0	2,025,483	27.28%	1,741,858	29.34%	283,625	19.08%
\$1-\$99,999	1,683,931	22.68%	1,413,495	23.81%	270,436	18.19%
\$100,000-\$499,999	1,643,637	22.14%	1,359,387	22.89%	284,250	19.12%
\$500,000-\$999,999	764,553	10.30%	593,600	10.00%	170,953	11.50%
\$1,000,000-\$4,999,999	1,071,539	14.43%	724,838	12.21%	346,701	23.32%
\$5,000,000-\$49,999,999	234,963	3.16%	104,345	1.76%	130,618	8.79%
>=\$50,000,000	0	0.00%	0	0.00%	0	0.00%

This table presents the number of partnerships in our sample by total assets. We separately show partnerships in simple and complex organizations.

Table 2: continued

*(d) Partnerships by ordinary income (Form 1065, Page 1)*

	All Partnerships		Simple Partnerships		Complex Partnerships	
	# Observations (1)	Percent of total (2)	# Observations (3)	Percent of total (4)	# Observations (5)	Percent of total (6)
<\$0	2,242,423	30.20%	1,815,625	30.58%	426,798	28.71%
\$0	3,031,807	40.84%	2,320,479	39.08%	711,328	47.85%
\$1-\$99,999	1,594,825	21.48%	1,400,383	23.59%	194,442	13.08%
\$100,000-\$499,999	411,488	5.54%	316,476	5.33%	95,012	6.39%
>=\$500,000	143,563	1.93%	84,560	1.42%	59,003	3.97%

This table presents the number of partnerships in our sample by total ordinary income. We separately show partnerships in simple and complex organizations.

*(e) Partnerships by Schedule K income (Form 1065, Page 3)*

	All Partnerships		Simple Partnerships		Complex Partnerships	
	# Observations (1)	Percent of total (2)	# Observations (3)	Percent of total (4)	# Observations (5)	Percent of total (6)
<\$0	1,155,713	15.57%	937,719	15.79%	217,994	14.66%
\$0	2,810,837	37.86%	2,309,783	38.90%	501,054	33.71%
\$1-\$99,999	2,839,112	38.24%	2,273,775	38.30%	565,337	38.03%
\$100,000-\$499,999	617,212	8.31%	415,824	7.00%	201,388	13.55%
>=\$500,000	1,232	0.02%	422	0.01%	810	0.05%

This table presents the number of partnerships in our sample by total Schedule K items included in our analyses. We separately show partnerships in simple and complex organizations.

Table 3: Complexity Principal Component Analysis

Factor	Component Loading	Standard Error
<i>Partnerships</i>	0.4246	0.00032
<i>S corps</i>	0.2445	0.00034
<i>C corps</i>	0.1529	0.00030
<i>Trusts</i>	0.2730	0.00155
<i>Individuals</i>	0.3619	0.00051
<i>Unlabeled EIN</i>	0.2604	0.00061
<i>DoS</i>	0.4374	0.00038
<i>Max in-degree</i>	0.3876	0.00063
<i>Max out-degree</i>	0.3362	0.00069
<i>Cycle [0/1]</i>	0.0933	0.00018

This table presents the loadings for the first principal component and bootstrapped standard errors. Factors are 1) standardized, 2) multiplied by the loading and 3) summed together to get the first principal component. Standard errors are calculated via bootstrap using 1,000 samples. The first principal component has an eigenvalue greater than 2 (2.82) and explains 28 percent of the total variance in the original data. Note that all of the loadings for the first principal component are positive.



Table 4: Determinants of Partnership Complexity

	(1)	(2)	(3)	(4)	(5)
	COMPLEX [0/1] <sub>t</sub>	COMPLEX [0/1] <sub>t</sub>	COMPLEX [0/1] <sub>t</sub>	TOT NODES <sub>t</sub>	COMPLEXITY <sub>t</sub>
<b>IMPLEMENTATION COSTS</b>					
<i>Assets</i>	0.045*** (201.143)	0.0469*** (211.26)	0.0468*** (211.138)	0.2022*** (162.723)	0.2723*** (183.026)
<i>Loss[0/1]</i>	-0.0843*** (-26.742)	-0.0601*** (-19.26)	-0.0601*** (-19.248)	-0.1148*** (-6.504)	-0.2224*** (-9.993)
<i>Ordinary income [0/1]</i>	-0.0311*** (-63.221)	-0.0266*** (-54.307)	-0.0266*** (-54.277)	-0.0669*** (-24.44)	-0.146*** (-43.31)
<i>Rental income [0/1]</i>	0.0051*** (7.848)	0.0055*** (8.54)	0.0056*** (8.657)	-0.0376*** (-9.519)	-0.009* (-1.939)
<i>Investment income [0/1]</i>	0.025*** (10.936)	0.0216*** (9.503)	0.0215*** (9.469)	0.0165 (1.215)	0.1401*** (8.625)
<i>Ordinary income</i>	0.0223*** (8.552)	0.0089*** (21.381)	0.0089*** (21.392)	0.0846*** (32.679)	0.1245*** (40.003)
<i>Rental income</i>	0.0708*** (22.45)	-0.0061*** (-12.383)	-0.0061*** (-12.424)	0.0814*** (25.76)	0.0845*** (22.664)
<i>Investment income</i>	0.1031*** (32.567)	0.0232*** (45.41)	0.0232*** (45.447)	0.0962*** (30.483)	0.1383*** (36.812)
<i>Forms 8858 OR 8865[0/1]</i>	0.1357*** (15.803)	0.1059*** (12.202)	0.1059*** (12.212)	0.4313*** (7.673)	0.767*** (10.488)
<i>Accrual [0/1]</i>	0.1137*** (165.206)	0.123*** (178.984)	0.123*** (178.93)	0.6453*** (140.759)	0.8144*** (153.04)
<i>NAICS code 53 (real estate)</i>	0.0024* (3.04)				
<i>NAICS code 54 (prof. services)</i>	0.0249*** (29.917)				
<i>NAICS code 52 (finance)</i>	0.1438*** (105.588)				
<b>AGENCY COSTS</b>					
<i>LP/LLC/LLP[0/1]</i>	0.0622*** (121.409)	0.0625*** (122.872)	0.0626*** (122.98)	0.2303*** (85.428)	0.3173*** (97.63)
<i>Guaranteed payments</i>	-0.0188*** (-87.56)	-0.0169*** (-79.136)	-0.0169*** (-79.185)	-0.0856*** (-80.324)	-0.0876*** (-64.069)
<b>OUTCOME COSTS</b>					
<i>Paid preparer [0/1]</i>	0.0153** (32.107)	0.0229*** (48.475)	0.0232*** (48.987)	0.0786*** (28.382)	0.1061*** (32.424)
<i>Publicly traded [0/1]</i>	-0.06*** (-10.124)	-0.05*** (-8.502)	-0.0499*** (-8.472)	-0.2075*** (-6.689)	-0.2805*** (-7.164)
Observations	7,424,106	7,424,106	7,424,106	7,424,106	7,424,106
Industry FE	No	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes
Adjusted R2	0.055	0.083	0.083	0.044	0.060

This table presents the determinants models for partnership complexity using an OLS model. T-statistics are reported below each coefficient in parentheses. All continuous variables are standardized for interpretability. All variables are defined in Appendix A. The estimated models were developed based on relevant tax planning research, independent from models employed by the IRS.

Table 5: Audited Partnerships

(a) Partnership Organizations: Audited Sample

Simple Partnership Organizations		Complex Partnership Organizations		
Number of Partners	Number of Organizations	Number of Partners	Number of Organizations	Average Number of Partnerships
2	10,820	2	1,251	1.69
3	1,380	3	492	2.17
4	474	4	351	2.78
5	162	5	232	3.32
6	53	6	144	3.01
7	25	7	111	4.39
8	27	8	76	3.88
9	*	9	62	3.79
10	*	10	45	3.98
11-20	33	11-20	187	6.36
21-30	*	21-30	50	8.32
31-40	*	31-40	21	9.57
41-50	*	41-50	10	16.10
51+	*	51+	18	16.44

Sample of simple partnership organizations consists of 13,649 audited partnerships from 2013-2015 with sufficient data from the IRS for estimation. Sample of complex partnership organizations consists of 3,050 audited partnerships in partnership organizations from 2013-2015 with sufficient data from the IRS for estimation. An \* indicates the information is suppressed to conform with IRS disclosure requirements.

Table 5: continued

(b) *Complex Partnership Organizations by Number of Partnerships: Audited Sample*

Complex Partnership Organizations	
Number of Partnerships in Organization	Number of Organizations
1	1,150
2	950
3	379
4	165
5	107
6	64
7	41
8	32
9	28
10	23
11-20	86
21-30	13
31-40	*
41-50	*
51+	*

Sample of complex partnership organizations consists of 3,711 partnership organizations from 2013-2015 with sufficient data from the IRS for estimation. An \* indicates the information is suppressed to conform with IRS disclosure requirements.

Table 6: Descriptive Statistics: Audited Population

(a) Descriptive Statistics

	Audited Partnerships (n=16,699)		Positive Adjustment (n=8,475)		No Positive Adjustment (n=8,224)	
	Mean (1)	SD (2)	Mean (3)	SD (4)	Mean (5)	SD (6)
<b>Tax Return Variables</b>						
<i>Sales</i>	1,019,737.00	2,086,630.00	828,493.00	1,834,106.00	1,216,818.00	2,301,807.00
<i>Assets</i>	1,527,497.00	2,705,611.00	1,202,636.00	2,501,594.00	1,862,274.00	2,862,717.00
<i>Assets non missing</i>	2,006,109.16	2,941,647.81	1,694,768.59	2,825,546.78	2,285,530.47	3,014,821.92
<i>Salary and wage</i>	131,917.90	295,039.80	103,123.40	260,004.30	161,591.20	324,597.90
<i>Guaranteed payments</i>	11,338.55	43,188.47	8,769.73	37,160.35	13,985.77	48,485.02
<i>Foreign tax [0/1]</i>	0.01	0.09	0.01	0.07	0.01	0.10
<i>Interest exp</i>	10,388.29	24,465.85	8,368.55	21,935.82	12,469.67	26,666.35
<i>Depreciation</i>	18,781.18	39,701.60	16,039.03	35,962.12	21,607.02	43,037.80
<i>Ordinary income</i>	(53,246.22)	253,792.00	(20,088.14)	237,263.20	(87,416.30)	265,483.80
<i>Rental income</i>	3,633.34	51,378.19	3,389.55	48,969.74	3,884.58	53,749.20
<i>Investment income</i>	55,426.17	3,837,312.64	28,951.46	4,021,639.51	82,708.90	3,637,399.25
<i>Sec 1231</i>	4,208.25	22,572.45	2,968.24	19,027.64	5,486.11	25,657.85
<i>Accrual [0/1]</i>	0.29	0.45	0.22	0.41	0.36	0.48
<i>Paid preparer [0/1]</i>	0.78	0.41	0.76	0.43	0.81	0.39
<i>Publicly traded [0/1]</i>	0.00	0.03	0.00	0.03	0.00	0.02
<i>LLP/LLC/LP [0/1]</i>	0.77	0.42	0.73	0.45	0.82	0.39
<i>Agent rank</i>	12.12	1.00	12.17	0.94	12.07	1.06
<b>Organization Structure Variables</b>						
<i>In deg</i>	0.09	0.29	0.09	0.29	0.09	0.29
<i>Out deg</i>	2.43	1.16	2.36	1.02	2.49	1.29
<i>Individuals</i>	2.66	2.19	2.51	1.81	2.87	2.61
<i>Partnerships</i>	1.31	1.25	1.23	1.04	1.44	1.49
<i>C corps</i>	0.05	0.21	0.03	0.18	0.06	0.24
<i>S corps</i>	0.08	0.32	0.05	0.27	0.11	0.38
<i>Trusts</i>	0.04	0.28	0.02	0.23	0.06	0.34
<i>DoS</i>	1.20	0.48	1.15	0.41	1.26	0.55

This table presents descriptive statistics for the sample of audited partnerships from 2013-2015 with sufficient data. Variable definitions are included in Appendix A. Amounts shown are averages for all partnerships and based on the number of taxable partners in the organization.

Table 6: continued

(b) *Partnerships by Total Sales*

	All Partnerships		Positive Adjustment		No Positive Adjustment	
	# Observations (1)	Percent of total (2)	# Observations (3)	Percent of total (4)	# Observations (5)	Percent of total (6)
\$0	6,626	39.68%	3,121	36.83%	3,505	42.62%
\$1-\$99,999	2,483	14.87%	1,449	17.10%	1,034	12.57%
\$100,000-\$499,999	2,700	16.17%	1,699	20.05%	1,001	12.17%
\$500,000-\$999,999	1,253	7.50%	678	8.00%	575	6.99%
\$1,000,000-\$4,999,999	2,284	13.68%	1,026	12.11%	1,258	15.30%
\$5,000,000-\$49,999,999	1,353	8.10%	502	5.92%	851	10.35%
>=\$50,000,000	0	0.00%	0	0.00%	0	0.00%

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This table presents the number of partnerships in our sample by total sales. We separately show partnerships in simple and complex organizations.

(c) *Partnerships by Total Assets*

	All Partnerships		Positive Adjustment		No Positive Adjustment	
	# Observations (1)	Percent of total (2)	# Observations (3)	Percent of total (4)	# Observations (5)	Percent of total (6)
\$0	3,989	23.89%	2,465	29.09%	1,524	18.53%
\$1-\$99,999	2,743	16.43%	1,677	19.79%	1,066	12.96%
\$100,000-\$499,999	3,035	18.17%	1,547	18.25%	1,488	18.09%
\$500,000-\$999,999	1,515	9.07%	653	7.71%	862	10.48%
\$1,000,000-\$4,999,999	3,737	22.38%	1,486	17.53%	2,251	27.37%
\$5,000,000-\$49,999,999	1,680	10.06%	647	7.63%	1,033	12.56%
>=\$50,000,000	0	0.00%	0	0.00%	0	0.00%

This table presents the number of partnerships in our sample by total assets. We separately show partnerships in simple and complex organizations.

Table 6: continued

(d) *Partnerships by Ordinary Income*

	All Partnerships		Positive Adjustment		No Positive Adjustment	
	# Observations (1)	Percent of total (2)	# Observations (3)	Percent of total (4)	# Observations (5)	Percent of total (6)
<\$0	10,453	62.60%	4,911	57.95%	5,542	67.39%
\$0	1,544	9.25%	705	8.32%	839	10.20%
\$1-\$99,999	2,842	17.02%	1,864	21.99%	978	11.89%
\$100,000-\$499,999	1,104	6.61%	613	7.23%	491	5.97%
>=\$500,000	756	4.53%	382	4.51%	374	4.55%

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This table presents the number of partnerships in our sample by total ordinary income. We separately show partnerships in simple and complex organizations.

(e) *Partnerships by Schedule K income (excluding ordinary income)*

	All Partnerships		Positive Adjustment		No Positive Adjustment	
	# Observations (1)	Percent of total (2)	# Observations (3)	Percent of total (4)	# Observations (5)	Percent of total (6)
<\$0	1,692	10.13%	837	9.88%	855	10.40%
\$0	9,126	54.65%	5,089	60.05%	4,037	49.09%
\$1-\$99,999	4,326	25.91%	1,927	22.74%	2,399	29.17%
\$100,000-\$499,999	1,535	9.19%	618	7.29%	917	11.15%
>=\$500,000	*	*	*	*	*	*

This table presents the number of partnerships in our sample by total Schedule K items included in our analyses. We separately show partnerships in simple and complex organizations.

Table 7: Consequences of Partnership Complexity

	(1) ADJUST [0/1] <sub>t</sub>	(2) ADJUST [0/1] <sub>t</sub>	(3) ADJUST [0/1] <sub>t</sub>	(4) ADJUST <sub>t</sub>	(5) ADJUST   ADJUST > 0 <sub>t</sub>
<b>COMPLEXITY</b>					
<i>Complexity</i>	-0.0205** (-2.202)	-0.0255*** (-3.683)	-0.0254*** (-3.677)	0.0362** (2.168)	0.081* (2.041)
<b>IMPLEMENTATION COSTS</b>					
<i>Assets</i>	-0.0075 (-1.422)	0.0007 (0.107)	0.0012 (0.167)	0.1385*** (6.929)	0.2999*** (5.287)
<i>Loss[0/1]</i>	-0.0116 (-0.552)	-0.0065 (-0.299)	-0.0083 (-0.383)	0.0188 (0.495)	0.0110 (0.303)
<i>Ordinary income</i>	0.0543*** (9.661)	0.0459*** (10.394)	0.0461*** (10.29)	-0.0571* (-1.888)	-0.22*** (-5.571)
<i>Rental income</i>	0.0103*** (3.48)	0.0109*** (4.085)	0.0109*** (4.039)	-0.0246** (-2.817)	-0.0648*** (-5.433)
<i>Investment income</i>	-0.0042 (-0.9)	-0.0041 (-0.895)	-0.0043 (-0.932)	-0.0167 (-1.186)	-0.0177 (-0.653)
<i>Sec 1231</i>	-0.0165*** (-7.922)	-0.0102*** (-3.206)	-0.0103*** (-3.313)	0.0016 (0.213)	0.0171 (0.561)
<i>Salary and wage</i>	-0.0169*** (-2.853)	-0.0217*** (-3.919)	-0.0215*** (-3.893)	0.0068 (0.322)	0.0491 (1.238)
<i>Interest exp</i>	0.0040 (0.533)	0.0021 (0.267)	0.0023 (0.303)	0.0324 (1.189)	0.0584 (1.478)
<i>Depreciation</i>	0.0012 (0.218)	0.0006 (0.108)	0.0006 (0.105)	0.0034 (0.189)	-0.0126 (-0.395)
<i>Foreign tax [0/1]</i>	-0.0581** (-2.483)	-0.0728*** (-3.281)	-0.0718*** (-3.274)	-0.2563* (-1.903)	0.0229 (0.07)
<i>Accrual [0/1]</i>	-0.121*** (-4.573)	-0.1254*** (-7.368)	-0.124*** (-7.344)	-0.0427 (-1.215)	0.0541 (1.191)
<b>AGENCY COSTS</b>					
<i>LP/LLC/LLP[0/1]</i>	-0.0718*** (-3.572)	-0.0708*** (-3.887)	-0.0692*** (-3.834)	0.0647** (2.556)	0.0875*** (2.831)
<i>Guaranteed payments</i>	-0.0015 (-1.036)	-0.0024 (-1.614)	-0.0025 (-1.694)	-0.0292*** (-7.054)	-0.0454 (-0.911)
<b>OUTCOME COSTS</b>					
<i>Paid preparer [0/1]</i>	-0.0684*** (-4.844)	-0.0656*** (-5.191)	-0.0679*** (-5.311)	-0.039* (-1.75)	-0.0402 (-1.145)
<i>Publicly traded [0/1]</i>	0.1080 (0.979)	0.1091 (0.982)	0.1036 (0.952)	-0.0044 (-0.042)	-0.0529 (-0.745)
<i>Agent rank</i>	0.0217** (2.672)	0.0221** (2.721)	0.021** (2.709)	0.0665*** (3.155)	0.0804*** (3.835)
Observations	16,699	16,699	16,699	16,699	8,475
Industry FE	No	Yes	Yes	Yes	Yes
Year FE	No	No	Yes	Yes	Yes
Adjusted R2	0.051	0.069	0.069	0.068	0.205

This table presents the models for an audit adjustment using an OLS model. T-statistics are reported below each coefficient in parentheses. All continuous variables are standardized for interpretability. All variables are defined in Appendix A. The estimated models were developed based on relevant tax planning research, independent from models employed by the IRS.

Table 8: Taxpayer Planning Regressions

(a) High Net Worth Individuals

	(1) HNW	(2) Non HNW	(3) HNW	(4) Non HNW	(5) HNW	(6) Non HNW
	ADJUST [0/1] <sub>t</sub>	ADJUST [0/1] <sub>t</sub>	ADJUST <sub>t</sub>	ADJUST <sub>t</sub>	ADJUST   ADJUST > 0 <sub>t</sub>	ADJUST   ADJUST > 0 <sub>t</sub>
<b>COMPLEXITY</b>						
<i>Complexity</i>	-0.0062 (-0.499)	-0.0314*** (-4.816)	0.0269 (0.752)	0.0381** (2.351)	0.0217 (0.239)	0.117*** (5.197)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,885	13,814	2,885	13,814	1,203	7,272
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.053	0.069	0.060	0.060	0.123	0.213

This table presents the complex score coefficients for regressions on the HNW and Non HNW subpopulations of the audited subsample. HNW is defined as a partnership that has at least one high net worth partner. T-statistics are reported below each coefficient.

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(b) Sophisticated Paid Preparers

	(1) Soph. Prep.	(2) Non-Soph. Prep.	(3) Soph. Prep.	(4) Non-Soph. Prep.	(5) Soph. Prep.	(6) Non-Soph. Prep.
	ADJUST [0/1] <sub>t</sub>	ADJUST [0/1] <sub>t</sub>	ADJUST <sub>t</sub>	ADJUST <sub>t</sub>	ADJUST   ADJUST > 0 <sub>t</sub>	ADJUST   ADJUST > 0 <sub>t</sub>
<b>COMPLEXITY</b>						
<i>Complexity</i>	0.0144 (0.253)	-0.026*** (-3.366)	0.1018 (1.61)	0.0355* (2.049)	0.0861 (1.112)	0.0788* (1.948)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Observations	263	16,436	263	16,436	123	8,352
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R2	0.089	0.068	0.374	0.067	0.761	0.195

This table presents the complex score coefficients for regressions on the sophisticated preparers and non-sophisticated preparers (or no paid preparer) of the audited subsample. A sophisticated preparer is defined as a preparer firm EIN that files more than 4,000 partnership returns per year in our dataset. T-statistics are reported below each coefficient.