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The Effects of Tax Reform on Labor Demand within Tax Departments

ABSTRACT

This study examines the effect of major tax reform on firms' demand for internal tax department employees. Specifically, we analyze the effects of the Tax Cuts and Jobs Act (TCJA) on the number of job postings and skill profiles for tax department positions in large U.S. firms. Understanding how tax reform affects the demand for tax employees is important for quantifying potential compliance costs and assessing how firms adjust their tax planning capacity in response to new regulations. Additionally, our findings provide insights into the evolving skill sets required in the context of technological change and intensifying competition for talent. To address our research question, we employ textual analyses and machine learning techniques to identify and classify approximately 30,000 tax-related job postings from 1,620 firms over the period of 2015-2020. Using a difference-in-differences research design, we find a 26.7% increase in the number of tax-related job postings in the three years following the TCJA enactment. This translates into approximately 1.5 new tax department employees, which, based on prior literature estimates of tax department size, implies a 21% increase in the size of the average tax department. Focusing on the dynamics, we find that this effect is concentrated in the second year after the reform. Consistent with increased compliance costs and new tax planning opportunities, we also find that firms seek tax department employees for both compliance and planning roles, with some evidence of greater demand for employees focused on tax compliance.

Keywords: tax department structure; tax reform; TCJA; tax risk; tax complexity, tax employees

JEL Classifications: H25, H26, M12

I. INTRODUCTION

This study investigates the effect of major tax reform on firms' demand for internal tax employees. Specifically, we investigate the demand for internal tax department employees and their qualifications over time and in response to the Tax Cuts and Jobs Act of 2017 (TCJA). Tax reforms increase tax complexity (Hoppe et al., 2018), reflected in the increase in perceived U.S. tax complexity after the TCJA[1] and the corresponding increase in corporate tax uncertainty

[1] See the Tax Complexity Index, www.taxcomplexity.org.

(Gallemore et al., 2024). Tax reforms increase the administrative burden for firms (Mills, 1996), and the time and resources spent to be tax compliant (Marcuss et al., 2013). For example, the White House Office of Information and Regulatory Affairs estimates that U.S. businesses spend more than 1.1 billion hours to comply with Internal Revenue Service (IRS) tax filing and reporting requirements (Hodge, 2023). Tax reforms can also create new tax planning opportunities by either creating new tax incentives or creating complexity that firms can exploit (Slemrod 2018; Wilde & Wilson, 2018). In this study, we examine how firms respond from an internal labor demand perspective to major tax reform. We do this by examining the number of external job postings for internal tax department employees and whether these postings list skills and knowledge related to tax planning or tax compliance positions following the TCJA. Our findings quantify incremental compliance costs and examine the demand for specific skill sets following the enactment of major tax reform.

Many recent tax reforms focus on a complex set of objectives that aim to create incentives for domestic investment, curb specific types of tax avoidance, improve overall tax compliance (Kirchler et al., 2008; Batrancea et al., 2019; Amberger et al., 2024), and increase tax revenues (OECD, 2023). These reforms often introduce extensive anti-tax avoidance measures, such as limits on expense deductions and new reporting requirements. However, their complexity and the inherent regulatory uncertainty create significant challenges for firms, making it difficult to navigate. It is often unclear how the new regulations will be applied, how they will interact, and how both the regulations and the additional mandated information provided to the tax authorities by tax disclosures will affect audits and post-audit tax payments. While tax reform may allow for greater tax planning, it also increases the risks associated with tax compliance and tax planning. However, there is limited evidence on the compliance costs associated with tax reform, especially on how firms adjust their compliance and tax planning capacity internally in response to tax reform (Hanlon & Heitzman, 2010; Wilde & Wilson, 2018; Lester & Olbert, 2024). In this study, we leverage a unique dataset of job postings to

investigate one crucial aspect of tax compliance costs and the tax planning response resulting from a major tax reform. Importantly, the granularity of our data allows us to analyze whether firms are seeking compliance-oriented skills or are focusing on tax planning skill sets.

Our findings are important for understanding the skills tax departments need to navigate an environment characterized by major tax reform, inherent tax risks, and emerging tax planning opportunities, all within the context of increasing reliance on technological tools and support structures (Krüger, 1996; van Reenen, 1997; Kroeger, 2024; Thomson Reuters Institute, 2023; Krupa & Mullaney, 2024). Furthermore, our results provide valuable insights for educators and practitioners, as they highlight the specific skill sets in demand. This is especially important given the alarming shortage of qualified talent in taxation and related fields of accounting in firms and tax authorities alike (Nessa et al., 2020).

The TCJA provides an excellent setting to examine our research question. As a major tax reform and a significant exogenous shock, it allows us to employ a quasi-experimental design. The TCJA is the most significant U.S. tax reform since 1986, with multiple domestic and international tax changes, such as decreased corporate tax rates, immediate expensing of specific assets, and the change from a worldwide tax system to a quasi-territorial tax system (Slemrod, 2018; Beyer et al., 2023). In addition to these changes to existing tax rules, the TCJA includes many novel and complex foreign tax provisions such as the Global Intangible Low-Taxed Income (GILTI), Base Erosion Anti-Abuse Tax (BEAT), and Foreign-Derived Intangible Income (FDII). The regulations interact with each other and create complex and potentially circular calculations (Donohoe et al., 2022). These changes suggest that the TCJA represents a significant shock to the tax environment of a firm with increases in tax complexity, tax compliance, and tax planning costs. The TCJA was also introduced and passed quickly, with its ultimate passage being uncertain until late 2017 (Wagner et al., 2018). This makes it unlikely that firms will change internal hiring practices in anticipation of the tax reform, which allows us to identify a treatment and control period clearly. We use UK firms as well as

Canadian firms as our control groups. Since the TCJA affected certain U.S. firms more than others, we also examine U.S. firms' cross-sectional variation in exposure to the TCJA's international tax provisions as in additional specifications.

To answer our research questions, we utilize textual analysis and machine learning techniques to identify and classify approximately 30,000 tax-related job postings from the LinkUp database spanning the years 2015 and 2020.[2] The identification of tax department job postings involves a two-step process. First, we identify a set of tax-related job postings through keyword search[3] within job titles and job descriptions. Second, we refine and expand this sample using a bag-of-words (BoW) machine learning approach to identify all relevant postings within the database. We train a BoW model using two samples: job postings identified as tax-related through the keyword search and postings containing the term "tax" but unrelated to tax jobs (e.g., referencing "tax-free income"). This model classifies postings with an overall accuracy rate of 93%, within 5% to 95% confidence intervals. For approximately 70,000 postings outside this interval, we manually review and correct misclassifications to ensure the reliability of our dataset.

Using a difference-in-differences research design, we investigate the effects of the TCJA on the job postings of a sample of 1,246 U.S. non-financial S&P 1,500 firms. Including firm-level controls as well as firm and year fixed effects to control for time-invariant firm characteristics and time-varying factors, e.g., economic shocks, we find an increase in tax-related job postings following the TCJA. This result is robust using several different treatment-control group designs. In our main analysis, we compare job postings of U.S. firms (treatment)

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[2] We use job postings instead of, e.g., hand-collected LinkedIn data (Giese et al., 2024; Barrios & Gallemore, 2024) or surveys (e.g., Klassen et al., 2017) as it enables us to examine the demand for tax employees instead of matched demand and supply outcomes. Furthermore, the LinkUp database offers daily information on 275 million job postings scraped directly from the firm's website, which helps avoid duplicate observations for databases that use both job search website and firm website data.

[3] We searched for "tax" in job titles and job descriptions. If the word is included in the title and description, we classify the job posting as *tax*.

to those of United Kingdom (UK) firms (control). In robustness tests, we use Canadian firms as well as within U.S. designs, such as multinational firms (treatment) versus domestic firms (control).[4] Across all specifications, we document an increase in the number of job postings in the three-year period after the TCJA. The documented increase in job postings of approximately 26.7% corresponds to an increase in demand of approximately 1.5 tax department employees over the three years. This is equivalent to an increase of approximately 21%, considering an average tax department size of 7.24 employees (Chen et al., 2010). Using an estimate for the salary of tax managers in the U.S. of $114,933 (X. Chen et al., 2021), this translates into an average annual total additional cost of $172,399. Investigating the time dynamic trends, we find that the effect is concentrated in the second year after the tax reform.

We next examine the specific skill sets of tax employee job postings. It is unclear how tax reform affects the specific types of positions and required skills of tax department employees. Consistent with evidence on tax complexity imposing compliance costs on firms (Laplante et al., 2021; Zwick, 2021; Euler et al., 2024), we expect that the new regulations, new reporting requirements, and uncertainty about how tax authorities use these new regulations and disclosures to target specific tax positions, will make firms to focus on hiring tax employees for compliance. However, it is also possible that firms will leverage the increase in complexity and uncertainty around new tax laws to invest in tax planning positions. We use the JobSpanBERT model (M. Zhang et al., 2022), a pre-trained specialized machine learning model designed to extract sought skills and knowledge from job postings. This model is trained on text of English job postings, focusing on identifying and interpreting continuous word sequences (text spans) to accurately capture and identify skills and knowledge sought in job postings. The model divides the requirements into two categories: 1) skills comprising attitude

[4] We provide evidence consistent with a parallel trend in the number of job postings for treatment versus control firms for all specifications, see Figure 10 (Roberts & Whited, 2011).

(i.e., soft skills); and 2) knowledge comprising fact-based knowledge (i.e., hard skills) (M. Zhang et al., 2022). Building on topic modeling, we then use this skill and knowledge level data to classify jobs according to whether they mainly refer to tax compliance or tax planning skills. We find that firms seek tax department employees for both tax compliance, to ensure that they comply with new tax regulations, and tax planning, to take advantage of new tax planning opportunities. However, the demand is greater for tax compliance skills. Overall, the results suggest the tax employee demand of firms in response to the TCJA relates to compliance costs and investments in tax planning opportunities.[5]

Our study makes several contributions to research and practice. First, we add to research on compliance costs of tax regulation by examining firms' internal labor demand costs. The literature that examines aggregate on-average effects finds that the complexity of a tax system leads to additional tax compliance costs (Slemrod, 1989; Mills, 1996; Giese et al., 2024). Additionally, compliance costs increase during tax audits (Mills, 1996), are higher for firms with greater international operations (Blumenthal & Slemrod, 1995) but decrease relative to firm size (Slemrod & Venkatesh, 2002; Eichfelder & Hechtner, 2018). Other literature provides mixed evidence on the effects of tax complexity and compliance costs on overall investment. For example, Gao et al. (2009) show that firms reduce their overall investment to avoid higher tax complexity and compliance costs. In contrast, Amberger et al. (2024) and Euler et al. (2024) find that multinational firms increase their investment in countries with high tax complexity. Moreover, Zwick (2021) and Euler et al. (2024) demonstrate that firms' responses to tax complexity vary depending on specific firm characteristics or the type of tax complexity faced. This mixed evidence indicates that firms differ in their response to new tax regulations, with some firms focusing more on compliance and others exploiting new tax planning opportunities.

[5] We note that an alternative way to comply with new tax rules is to purchase tax services from external sources. In additional analyses, we examine the effect of the TCJA on the demand for auditor-provided tax services (APTS) and find that treatment firms in our sample *decrease* APTS in the 2-3 year period following the TCJA.

Our study contributes to this literature by providing evidence on firms adjusting their internal hiring strategies after tax reform, particularly in terms of the specific qualifications and skill sets they seek in new tax employees.

Second, we extend the literature on the effects of the TCJA by examining the costs of this major tax reform. The literature suggests that the TCJA significantly reduced firms' explicit tax burdens (Wagner et al., 2020; Dyreng et al., 2023). However, to our knowledge, no research provides internal compliance cost estimates for the TCJA. Although our estimates capture only a portion of the potential compliance costs, they provide a more holistic picture of the economic implications of the TCJA. Furthermore, there is extensive literature on how firms change their investment and tax planning in response to the TCJA (Amberger & Robinson, 2023; Kelley et al., 2024; Samuel, 2023; Lester & Olbert, 2024; Pflitsch, 2024). However, we know relatively little about the internal response to the TCJA. This study fills this void in the literature and examines how firms effectively engage in tax planning in the post-TCJA environment, specifically by increasing the hiring of tax department employees with specialized skill sets.

Third, we more broadly contribute to the literature on the costs of regulatory changes beyond changes in tax regulation. New regulation can cause efficiency losses and create political, litigation, adoption, or planning costs (Watts & Zimmerman, 1978; Marneffe & Vereeck, 2011). IFRS adoptions are associated with higher audit fees due to increased audit complexity and higher direct implementation costs (Kim et al., 2012; De George et al., 2023). From a labor demand perspective, Enache et al. (2022) find an increase in the number of accounting job postings after the enactment of lease accounting and revenue recognition standards in the U.S., suggesting an increase in labor costs. We believe these IFRS-related results reflect a lower bound of the effect of complexity on hiring practices. Specifically, due to the substantial heterogeneity of tax laws across different countries, we argue that tax reform introduces considerably more complexity than accounting rule changes. Thus, we expect a larger increase in job postings compared to the findings of Enache et al. (2022). We also extend

this literature by investigating shifts in qualification requirements in job postings. Building on Enache et al. (2022), we are the first to document an economically significant change in the demand for tax department employees following tax reform that is larger than what has been observed in the financial accounting literature.

Our findings are of interest to decision-makers in firms, policymakers, and the educational community. From a business perspective, we inform decision-makers in charge of hiring tax department employees with specific skill sets to both comply with and tax plan in response to significant tax reform. For policymakers, we quantify internal tax compliance-related labor costs, which should inform the debate on the costs and benefits of future tax reform. Finally, for educators and students, we provide large sample evidence on the skills tax department employees need to be successful in our current global environment of significant tax reforms and technological change.

II. HYPOTHESES DEVELOPMENT

Tax reforms significantly increase firms' tax compliance costs, such as tax calculations, return preparation, or documentation (Slemrod & Blumenthal, 1996; Slemrod & Venkatesh, 2002; Eichfelder & Vaillancourt, 2014). Prior studies primarily focus on aggregate compliance costs, capturing expenditures on both external advisors and internal employees. Beyond compliance, research shows increased tax complexity resulting from reforms leads firms to engage more in tax planning (Boynton et al., 1992; Guenther, 1994; Dyreng et al., 2019; Kelley et al., 2024). We extend these streams of literature by examining how firms change their external hiring practices of internal tax department employees in response to tax reform, focusing on changes in the number and skill sets of employees.

We use one of the largest tax reforms in U.S. history, the TCJA, to study these effects. The reform introduced substantial changes to the U.S. corporate tax system. Key provisions include reducing the corporate tax rate from 35% to 21%, immediately expensing certain assets, and imposing new restrictions on interest deductions. The TCJA also repealed several existing

tax provisions, such as the performance-based exception for the deductibility of executive compensation, the corporate alternative minimum tax, and the domestic producers' activity deduction. Additionally, the reform transitioned the taxation of foreign-sourced income from a worldwide system to a quasi-territorial system (Donohoe et al., 2022), introducing a one-time repatriation tax on previously untaxed foreign earnings and creating mechanisms to limit income-shifting (Markle, 2009), such as the Global Intangible Low-Taxed Income (GILTI) tax and the Base Erosion and Anti-Abuse Tax (BEAT). The TCJA also introduced the Foreign-Derived Intangible Income (FDII) provision to incentivize domestic operations, offering preferential tax rates on U.S.-based intangible income.

The TCJA's breadth and complexity significantly shocked corporate tax systems. Firms were required to account for its effects in their 2017 financial statements despite limited guidance and interaction complexities between provisions, resulting in widespread reliance on provisional estimates under SAB 118. Research has shown that these estimates often contain substantial errors, even for basic provisions (S. Chen et al., 2023; Dyreng et al., 2023).

Given the TCJA's complexity, firms likely made significant investments to address the increased demands of tax compliance and tax planning. One potential response is hiring additional internal tax department employees. Prior research demonstrates that firms adjust staffing levels in response to accounting regulatory changes (Enache et al., 2022). Thus, we propose the following hypothesis.

H1: The number of tax-related job postings increases after tax reform.

However, firms may choose alternatives to hiring new employees to manage increased tax complexity. They might rely on external advisors for temporary compliance needs to avoid the long-term costs of expanding internal staff (Lankford & Parsa, 1999). Alternatively, firms could invest in technology and provide existing employees with the necessary training to adapt. Finally, given labor market constraints and a shortage of qualified tax professionals (Nessa et

al., 2020), firms may need to rely on technology or upskill existing staff even though they prefer to hire.

In addition to increasing the demand for internal tax employees, the TCJA likely influenced the specific qualifications sought in tax department hires. Compliance with complex provisions, such as GILTI, BEAT, and FDII, requires specialized skills in international tax law, data analysis, and technology implementation (Thomson Reuters Institute, 2023). Moreover, research indicates that firms prioritize hiring employees with advanced qualifications to reduce implementation errors when adapting to new regulations (Loyeung et al., 2016), and larger tax departments are associated with more effective tax compliance and planning (H. Chen et al., 2020). The reduction in the corporate tax rate and increased profit-shifting costs may have reduced incentives for certain types of tax planning, shifting firms' focus to compliance and adapting to newly available planning opportunities. Based on these considerations, we propose the following hypothesis.

> *H2: The demand for tax compliance and tax planning employees increases after the reform.*

III. RESEARCH DESIGN

To investigate whether the TCJA increased the demand for tax department employees (H1), we apply a difference-in-differences research design (Roberts & Whited, 2013) and compare job postings by U.S. S&P 1500 firms (treatment) to job postings of UK FTSE All-Share Index firms (control). We use Canadian S&P/TSX Composite Index firms as the control group in additional analyses. For the within U.S. settings, we use more- (i.e., multinational firms) and less-TCJA-affected firms (i.e., domestic firms) as control groups. Formally, we estimate the following regression model:

$$JobPostings_{it} = \beta_0 + \beta_1\, post_t + \beta_2\, treated_i + \beta_3\, post_t * treated_i + \beta_x * x_{it} + \delta\, firm_i + \gamma\, year_t + \varepsilon_{it} \quad (1)$$

The dependent variable $JobPostings_{it}$ is the number of newly posted job postings by

firm *i* in year *t*. $treated_i$ is an indicator variable equal to one for U.S. firms and zero for UK firms. The post indicator takes the value of one for years after the enactment of the TCJA (2018) and zero otherwise.[6] Following (Enache et al., 2022) we control for firm-specific properties using the vector x_{it}. More specifically, we control for firm size using the natural logarithm of total assets (*SIZE*), market-to-book ratio (*MTB*), whether the firm made a loss in a given year (*LOSS*), return on assets (*ROA*), and leverage (*LEV*). Additionally, we control for firm characteristics that are related to tax management. We include firm's intangible intensity (*INT*) measured by intangibles scaled by total assets, investment in production, plant, and equipment (*PPE*), research and development expenses (*RD*), and the fees paid for tax services by the auditor scaled by total assets (*APTS*) as further company controls. We provide definitions for all variables in Table 1. Descriptive statistics for all variables included in Equation 1 are reported in Table 4.

We also control for time-invariant firm-specific properties using firm fixed effects and include year fixed effects to control for macroeconomic shocks. We use heteroskedasticity-robust standard errors clustered at the firm level in all regressions (Abadie et al., 2022). The explanatory variable of central interest is the interaction term $post_t$*$treated_i$. Hypothesis 1 predicts that the TCJA increases the demand for tax department employees and, hence, a positive coefficient estimate for β_3.

Our second hypothesis examines the skill sets sought in tax department hires. To test this, we apply the following difference-in-differences regression design.

$$Qualification_{it} = \beta_0 + \beta_1\, post_t + \beta_2\, treated_i + \beta_3\, post_t * treated_i + \beta_x * x_{it} + \delta\, firm_i + \gamma\, year_t + \varepsilon_{it} \quad (2)$$

$Qualification_{it}$ is the firm-year aggregate value of attributes estimated through a machine learning-based analysis of job postings. Required skills in the job postings are identified using

[6] Note that the *treated* indicator variable as well as the post variable drops out of the model as they are perfectly collinear with our fixed effects structure.

natural language processing (NLP). Specifically, we utilize a pre-trained Bidirectional Encoder Representations from Transformers (BERT) language model, JobSpanBERT (M. Zhang et al., 2022)[7], to analyze job descriptions. This model classifies sections of the job descriptions into sought-after attributes, distinguishing between soft skills (*skill*) and fact-based or technical competencies (*knowledge*). The identified attributes are then clustered into topics using the BERTopic clustering algorithm (see Section below for more details).

We further examine whether firms prioritize hiring tax department employees focusing on tax planning or tax compliance following the TCJA. This analysis is conducted using Equation (3).

$$Compliance_{it}/Planning_{it} = \beta_0 + \beta_1\, post_t + \beta_2\, treated_i + \beta_3\, post_t * treated_i + \beta_x * x_{it} + \delta\, firm_i + \gamma\, year_t + \varepsilon_{it} \quad (3)$$

The dependent variable $Compliance_{it}$ ($Planning_{it}$) represents the number of job postings by firm *i* in time *t* classified as tax compliance (planning) roles.[8] These classifications are based on the skills and knowledge identified and grouped by the two BERT models. The literature highlights the influence of tax employee characteristics on tax planning. For instance, Dyreng et al. (2010) show that executive managers significantly impact firms' effective tax rates. Similarly, Feller & Schanz (2017) emphasize that successful modifications to a firm's tax planning strategy depend on the strategy's feasibility and on the tax manager's abilities and skills to implement changes. They categorize tax manager power into four dimensions—internal formal power, internal informal power, external reach, and capabilities—with

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7 The respective model is publicly available at the following address: https://huggingface.co/jjzha/jobspanbert-base-cased.

8 To account for the possibility that an increase in tax compliance- or tax planning-related job postings per firm may simply reflect an overall rise in job postings (H1), representing a mechanical relationship, we scale the number of compliance- or planning-related job postings by the total number of tax-related job postings for the firm in a given year. Additionally, we construct a continuous measure to capture the balance between compliance and planning roles within each job posting. Specifically, we count the references to compliance- and planning-related topics within each posting, subtract the number of compliance-related references from the number of planning-related references, and scale the result by the total number of qualifications referenced. This process produces a value ranging from -1 (indicating pure compliance-related qualifications) to 1 (indicating pure planning-related qualifications) for each job posting. These values are then aggregated at the firm-year level.

'capabilities' (personal qualifications) being the most relevant for our study. Drawing from their findings, we define *expert functional knowledge* (e.g., higher education, prior work experience, and firm-specific expertise) and *social skills* (e.g., communication, negotiation, and proactivity) as proxies for the skills and knowledge required for tax planning roles (Feller & Schanz, 2017).

Sample Selection

We use a sample of firms in the S&P 1500 as of January 1, 2018. We exclude highly regulated firms in the financial- and insurance industry (SIC 60 to SIC 64) as well as foreign firms without U.S. headquarters from our sample.[9] This sample selection procedure results in 1,246 unique U.S. firms and 7,186 firm-year observations, which provides a representative sample of large U.S. corporations. The control group consists of 374 unique FTSE All Shares UK firms (2,060 firm-year observations).

Identifying tax jobs

To estimate firms' demand for tax department employees, we use data from LinkUp, a database containing daily information on 275 million job postings since 2007. LinkUp scrapes job postings directly from firms' websites, avoiding duplicate observations often found in data that include job market platforms (Gutierrez et al., 2020; Hann et al., 2023). To identify relevant tax job postings, we first perform a keyword search with tax-related keywords across all job descriptions in the LinkUp database. We exclude postings that mention the word *tax* only once or refer solely to tax-related employee benefits[10]. Next, we apply a BoW approach to classify the remaining postings as tax-related or non-tax-related.

BoW is a widely used method for text categorization. It identifies and quantifies keywords within text that are most relevant for classification and represents their importance

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[9] We also exclude firms that provide individual tax preparation services. These firms post large numbers of tax-related positions and are excluded from the sample to avoid these firms influencing results.

[10] The keyword list includes the words: "pre-tax flexible spending, pre-tax health savings, post-tax dollars, tax withholding, tax-free, tax free, tax benefit, pre-tax employee contribution, pre-tax".

using a histogram (Y. Zhang et al., 2010). Before applying the model, it must be trained on a labeled dataset. This involves splitting the labeled data into 80% for training and 20% for testing (Mahesh, 2020). The BoW model is first trained to predict categories using the training data, after which its precision is evaluated on the test dataset. Once validated, the model can be applied to unclassified data.

In our study, we use the BoW approach to classify job postings into two categories: tax and non-tax. To construct our BoW model, we first identify potential tax-related postings through a keyword search and manually curate a subsample of tax and non-tax jobs for training and testing. The tax category includes job postings containing the term *tax* in the job description and title, while the non-tax category includes postings that mention *tax* only once or in the context of tax-related employee benefits (see Footnote 10). We split this curated dataset into 80% training and 20% testing subsets, following standard practices in machine learning (Mahesh, 2020) and accounting research (Guenther et al., 2023).

The model learns patterns within the training data to distinguish between tax and non-tax job postings. It then applies these patterns to classify the test data, verifying its accuracy. This process is iteratively refined using different subsets to enhance the model's performance. The final model achieves a training accuracy of 96.52% and a test accuracy of 96.31%, indicating high reliability (see Table 3).[11] Additional metrics, including the receiver operating characteristic (ROC) curve (Figure 1) and the confusion matrix (Figure 2), further demonstrate the model's precision. The ROC curve shows a high classification certainty of 99%, plotting the true positive rate against the false positive rate. The confusion matrix confirms that

[11] The low difference of 0.21 percentage points (0.22%) between the training and test accuracies indicates a well-fitted model that suitably can classify the remaining job postings as tax or non-tax jobs. Therefore, we used five subsets of test and training data and repeated training and validation of the model to estimate the models' performance. We received five almost similar cross-validation accuracy scores (0.95987165, 0.95980879, 0.95976293, 0.95970857, 0.96015533), suggesting a consistent and accurate model performance. The mean cross-validation accuracy is 95.99%. This score is close to the training and test accuracy, further validating the model's precision and allowing us to rule out overfitting concerns.

misclassifications are rare.

To ensure robustness, we manually review approximately 70,000 job postings that the model classifies with certainty levels between 5% and 95%. The macro-average F1-score of 93% (see Table 3) reflects the precision of the model, accounting for the imbalance between tax and non-tax job postings.

The classification model identifies two distinct groups of word tokens critical for distinguishing tax and non-tax jobs.[12] Tokens most frequently associated with tax postings are displayed in Figure 3. While non-tax tokens generally lack specificity, tax-related tokens have clear connections to tax and accounting functions. Common tokens in tax postings include terms like *tax*, *tax returns*, *tax services*, *tax preparation*, and *IRS*, indicating that tax department employees often require skills to communicate with the U.S. tax authority. The frequent appearance of *compliance* underscores its importance as a core responsibility for tax employees. Additionally, references to *support during audits* highlight the close integration between firms' tax and accounting departments. Overall, these descriptive statistics suggest that firms seek employees capable of managing diverse responsibilities, such as tax return preparation, compliance, and audit support, reflecting the intertwined nature of tax and accounting functions.

In addition to the BoW classification, we use LinkUp's O-Net taxonomy to identify tax job postings. We incorporate all tax-related postings identified through this taxonomy to capture those missed by the BoW approach and remove duplicates. These steps combined yielded approximately 975,000 U.S. tax job postings from 2007 to 2024. For our sample of S&P 1500 non-financial firms, we identify 35,880 tax-related postings (see Table 2). We merge the job posting data with firm-specific data from EIKON, Compustat, and Audit Analytics for our empirical analysis.

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[12] The bag items are termed tokens because, in addition to individual words, the model can also recognize word sequences that are relevant for classifying the job postings. These relevant words and word sequences represent the tokens, which are each assigned to a relevance for the classification as a tax or non-tax job.

Skill and knowledge requirements

After identifying the tax-related job postings, we analyze the specific skills and knowledge requirements using the JobSpanBERT model. This model categorizes job posting requirements into two main groups: *skills*, which refer to soft skills and attitudes, and *knowledge*, which encompasses fact-based or technical expertise (M. Zhang et al., 2022). To gain deeper insights into these requirements, we cluster the JobSpanBERT results using the BERTopic model, identifying key skill and knowledge topics relevant to tax employees over time.

The BERTopic model identifies 14 skill topics (Figure 4). Four topics emphasize traditional tax compliance tasks, such as preparing and reviewing tax returns (Topic 0: *Prepare and Review Tax Returns*), tax collection (Topic 2: *Tax Collection*), responding to tax authority requests (Topic 6: *Answer and Prepare Tax Requests*), and tax compliance itself (*Topic 5: Tax Compliance*). Additionally, skills in transfer pricing (*Topic 10: Transfer Pricing and Accounting*), data-related tasks (*Topic 7: Data Collection and Analysis*), and tax technology (*Topic 1: Develop and Implement Tax Technology*) are crucial.

Soft skills are prominently featured, including leadership and team management (*Topic 4: Leadership and Team Management*), communication (*Topic 8: Communication and Organization*; *Topic 11: Intercompany Communication*), and coordination (*Topic 9: Internal and External Coordination*). Attributes like self-motivation and efficiency (*Topic 3: Self Motivation and Efficiency*) as well as analytical thinking and problem-solving (*Topic 12: Problem Solving*), also appear frequently. These findings suggest firms seek employees for higher-level tax positions involving management responsibilities, complex task coordination, and team leadership.

The BERTopic model also identifies nine knowledge topics (Figure 5). These include tax compliance expertise (*Topic 0: Tax Compliance*) and knowledge in finance and accounting

(*Topic 2: Accounting*), reflecting a close connection between tax and accounting functions. Basic software proficiency (*Topic 1: Software*) and education are also highlighted. Educational requirements are categorized into general education (*Topic 3: Education*), tax-specific and advanced education (*Topic 4: Tax Specific Knowledge*), and familiarity with tax and accounting regulations (*Topic 7: Tax and Accounting Regulations*), indicating the importance of qualifications aligned with tax planning or auditing roles. Other notable knowledge areas include data analytics (*Topic 5: Data Collection and Analytics*) and international work experience (*Topic 8: International Work Experience*), further suggesting a demand for highly skilled, planning-focused employees.

Figure 8 and Figure 9 provide detailed insights into the trends in skill and knowledge requirements for tax department employees from 2015 to 2020, illustrating how these demands evolved over time and in response to the Tax Cuts and Jobs Act (TCJA). Among the skill topics in Figure 8, several exhibit consistently high levels of demand throughout the sample period, such as *Prepare and Review Tax Returns (Topic 0)* and *Communication and Organization (Topic 8)*, with job postings for these skills peaking near 800 postings per year. Other skills, such as *Tax Compliance (Topic 5)*, *Answer and Prepare Tax Requests (Topic 6)*, and *Intercompany Communication (Topic 11)*, demonstrate more modest initial levels of demand, with annual postings starting below 400 but showing significant growth over time. In contrast, topics like *Efficient Work (Topic 3)* and *Customer Service (Topic 9)* remain relatively low in magnitude across the period, with job postings rarely exceeding 200 per year. These variations suggest that while certain skills are consistently core to tax department functions, others have become increasingly important over time, reflecting changing demands for specific competencies.

Similarly, knowledge topics in Figure 9 vary in magnitude and trends over time. *Tax Compliance (Topic 0)* and *Accounting (Topic 2)* are consistently the most sought-after knowledge areas, with job postings exceeding 1,000 per year at their peaks. In contrast, topics

like *Software (Topic 1)* and *Tax-Specific Knowledge (Topic 4)* remain stable but with much lower magnitude, with fewer than 400 postings annually. Notably, *General Education (Topic 3)* experienced a downward trend after 2017, while *Data Collection and Analytics (Topic 5)* and *Tax and Accounting Regulations (Topic 7)* show clear growth, suggesting a shift toward more technical and specialized knowledge requirements. These differences in demand magnitude indicate that certain foundational knowledge areas remain critical to tax employees, while others, particularly those tied to data and regulatory expertise, have become increasingly prominent.

When considering the TCJA as a pivotal event, the trends in both skill and knowledge topics highlight its impact on firms' hiring practices. In Figure 8, several skill topics see notable increases in demand immediately following the TCJA, including *Tax Compliance (Topic 5)*, *Answer and Prepare Tax Requests (Topic 6)*, and *Problem Solving (Topic 12)*. These trends suggest that firms increasingly required employees capable of handling the heightened regulatory complexity introduced during this period. Similarly, knowledge topics in Figure 9, such as *Tax Compliance (Topic 0)*, *Data Collection and Analytics (Topic 5)*, and *Tax and Accounting Regulations (Topic 7)*, exhibit sharp increases after the TCJA, underscoring the demand for technical expertise and familiarity with the new regulatory landscape.

The decline in *General Education (Topic 3)* and the slight rise in *Tax-Specific Knowledge (Topic 4)* further reflect firms' preference for more specialized qualifications. This is consistent with prior research suggesting that firms prioritize advanced skills and knowledge when responding to regulatory shocks (Feller & Schanz, 2017).

To evaluate the impact of the TCJA on skill and knowledge requirements, we categorize the topics into tax compliance and tax planning groups (Figure 6 and Figure 7). Following Feller & Schanz (2017), we allocate social skills such as communication, negotiation, problem-solving, and team leadership to the tax planning category. In contrast, technical tasks like tax return preparation and responding to tax authority requests are assigned to tax compliance.

Certain skills, such as data analysis, intercompany communication, and coordination, are relevant for both categories. Comparing these allocations, we observe that skills associated with higher-level roles are more prevalent in tax planning jobs.

A similar categorization is applied to knowledge topics. Tax-specific expertise, accounting knowledge, and data analytics are grouped under tax planning, while general education and administrative responsibilities are linked to tax compliance. This framework provides a descriptive foundation for testing Hypothesis 2, which examines changes in the demand for tax compliance versus tax planning employees following the TCJA.

IV. RESULTS

Demand for tax employees (H1)

Applying a difference-in-differences research design relies on the assumption that parallel trends in the treatment and control groups would have continued absent the reform. Since we cannot test this directly, we investigate whether the treatment and control groups trended similarly before the TCJA using an event study design (Roberts & Whited, 2011). Specifically, we replace the post indicator of Equation (2) with a series of year (month) indicators. Figure 10 displays the results with the bars depicting 90% confidence intervals and the estimated coefficients providing estimates of the differential change in the number of job postings in the U.S. firms relative to UK firms. The coefficient estimates are indistinguishable from zero for all years (almost all months) before the reform, supporting the parallel trend assumption. After the reform, we find a statistically significant increase in the demand for tax employees providing initial support for H1.

We empirically test H1 using a difference-in-differences design. The corresponding results are reported in Table 5. Column (1) presents a reduced model without controls or fixed effects, whereas column (2) introduces fixed effects and standard errors clustered at the firm level. Column (3) adds company level controls, and column (4) further clusters standard errors

at the firm- and year-level. Across all specifications, the coefficient estimates are statistically significant, indicating robust results. The coefficient estimate in column (3) of 0.4968 suggests an increased demand for tax employees of 26.7%, equating to 1.5 additional tax employees over a three year period.

Figure 10 displays the time dynamics. Using an event study aggregated at the firm-year level, we observe increased demand for tax employees during the first year following the reform. However, this increase is not statistically significant at conventional levels. By the second year, the increase becomes larger in magnitude and statistically significant. However, the effect vanishes by the third year after the reform. To further examine the timing of these effects, we analyze job postings at the firm-month level. The corresponding results are presented in Figure 10. The coefficient estimates indicate a consistently statistically significant increase starting nine months after the reform. This delay could reflect the time required for firms to interpret the implications of the reform, access their internal resources, and adjust their hiring strategies. These findings underscore the temporary nature of firms' adjustments to tax reforms, as the increased demand for tax employees is satisfied within the first two years, leading to no significant demand thereafter.

Table 6 examines cross-sectional differences in the demand for tax employees. Using a quartile split on firm size for a U.S. only sample, we find that larger firms exhibit a significantly higher demand for tax employees, even after controlling for total assets. In contrast, there are no significant differences between multinational and domestic firms, firms that relied on auditor-provided tax services prior to the reform, firms with higher pre-reform levels of intangible assets, or firms with varying pre-reform tax department performance, as measured by cash ETR and cash ETR adjusted for tax risk (Jacob & Schütt, 2020).

We present the robustness of our findings for the U.S.-UK sample in Table 10. Since our dependent variable (the number of job postings per firm per year) is a count variable and

consists of many zeros, we report a zero-inflated[13] Poisson regression model in column (1) and the natural logarithm of job postings[14] plus one in column (2). The literature has raised the issue of serial correlation in difference-in-differences designs with several pre- and post-periods (Bertrand et al., 2004). To circumvent this issue, we follow the suggestion of Bertrand et al. (2004) and collapse all pre-reform years into one pre-period and all post-reform years into one post-period (column (3)). In column 4, we report the results in accordance with Figure 10 (left part) using firm-month observations instead of firm-years and find consistent results. Finally, in untabluated results, we replace the UK firms with Canadian firms and find similar results.

Demand for tax planning and compliance skills and knowledge (H2)

To test our second hypothesis, we analyze changes in the skills and knowledge required for internal tax department employees. Specifically, we utilize the skill and knowledge topics classifications generated by the JobSpanBERT model and examine these changes using a difference-in-differences design. In this analysis, we replace the dependent variable in Equation (2) with the variables *Compliance* and *Planning*. These variables represent the number of skill or knowledge topics classified as mainly compliance- or planning-related. The results using UK firms as control firms are depicted in Figure 11 and Figure 12.

For knowledge topics, *Data Analytics* shows a significant increase following the TCJA, highlighting the growing importance of analytical capabilities in response to the reform. Additionally, *Tax Compliance*, *Software*, and *Administrative Responsibility* topics exhibit marginally significant increases in the treatment group. For skill topics, we observe significant post-TCJA increases in *Tax Technology*, *Self-Motivation and Efficiency*, *Team Leadership*, and *Coordination*. There are also marginally significant increases in topics related to *Prepare and Review Tax Returns*, *Transfer Pricing and Accounting*, *Problem Solving*, and *Customer Service*.

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[13] The inflation parameter is estimated using prior years job postings of the respective firm, firm age, and an indicator variable for the U.S.

[14] We increase $JobPostings_{it}$ by one before taking the logarithm to avoid losing meaningful zero values.

These findings suggest that firms increasingly sought employees with both technical tax skills and broader managerial and organizational capabilities during this period.

Next, we assign the skill and knowledge topics to tax planning- and compliance-oriented job postings, as shown in Figure 6 and Figure 7. Using this classification, we estimate regressions based on Equation (3), with the results reported in Table 7. This analysis employs UK firms as the control group. We find statistically significant coefficient estimates for both tax planning- and compliance-oriented job postings, indicating an increased demand for employees across both categories. While part of this increase may reflect a mechanical relationship between the number of qualifications listed and the overall growth in tax-related job postings (Table 5), we address this concern by scaling the dependent variables in columns (3) and (4) by the number of tax-related job postings for each firm in the respective year. This adjustment reveals a relatively greater increase in demand for tax compliance employees compared to tax planning employees.

To further validate this finding, we perform an F-test to compare the coefficients across the specifications, which confirms a statistically significant difference (p-value < 0.10). These results emphasize that, while the TCJA drove growth in both tax compliance- and planning-oriented roles, the demand for compliance-related skills and knowledge increased more substantially. This aligns with the increased regulatory complexity introduced by the reform, requiring firms to prioritize compliance capabilities within their tax departments.

Alternative channel: auditor-provided tax services

Since investing in tax department employees (H1) is only one way firms can address the complexity introduced by the TCJA, we examine the use of auditor-provided tax services (APTS) as an alternative channel. Using data from Audit Analytics, we analyze total APTS and APTS explicitly related to tax compliance and tax planning, each scaled by total assets. The results, reported in Table 9, show that overall tax fees paid to auditors significantly decreased

after the reform (column (1)).

We find contrasting trends when APTS is split into fees for tax compliance and tax planning. Fees paid to auditors for tax planning increase significantly, while fees for tax compliance are insignificant and smaller in magnitude. These findings suggest that the increased tax complexity following the TCJA did not increase firms' reliance on external advisors overall. Instead, the results may reflect a strategic shift. Firms appear to prioritize hiring internal employees to develop long-term, firm-specific tax expertise, particularly for compliance, while using external advisors more selectively for planning-related tasks. This preference for internal capacity-building likely underscores the need for sustainable, in-house solutions to navigate the complexities of the new tax landscape.

V. CONCLUSION

This study examines how firms adjust their internal tax labor demand in response to major tax reform, focusing on the enactment of the TCJA. Using a unique dataset of approximately 30,000 tax-related job postings and a difference-in-differences design, we document a significant increase in firms' demand for tax department employees following the TCJA. Specifically, we find a 26.7% rise in tax-related job postings, equating to an average of 1.5 additional tax department employees per firm over three years. This effect is concentrated in the second year after the reform, suggesting that firms required time to interpret and respond to the regulatory complexity introduced by the TCJA.

In addition to quantifying the increase in employee demand, we analyze the qualifications sought in tax department job postings. Our findings reveal that firms prioritize tax compliance skills over tax planning skills, with significant increases in postings emphasizing compliance-related attributes such as tax technology, problem-solving, and coordination. While demand for tax planning skills also grows, it is comparatively smaller, reflecting the TCJA's focus on compliance-oriented provisions and the heightened risks associated with tax non-compliance. These results highlight how regulatory complexity

influences firms' internal capacity-building decisions, particularly in their investment in compliance expertise.

This study contributes to the literature in several ways. First, we add to research on tax compliance costs by providing evidence on the internal labor demand costs associated with tax reforms. While prior studies document aggregate compliance costs, our analysis offers a granular view of firms' hiring practices and skill requirements. Second, we extend research on the TCJA by shedding light on its internal labor implications, complementing existing studies on the reform's effects on tax burdens and corporate investment. Third, our study contributes to the broader literature on the costs of regulatory change by showing that due to their complexity, tax reforms can drive substantial adjustments in firms' labor demand, surpassing those observed for accounting regulation changes.

Our findings have important implications for practitioners, policymakers, and educators. For firms, the results underscore the need to invest in specific skill sets to navigate complex tax environments effectively. For policymakers, our study quantifies the labor costs associated with tax reforms, which can inform cost-benefit analyses of future reforms. Finally, the results highlight the increasing demand for technical and managerial tax skills for educators and students, emphasizing the need to align educational programs with evolving market demands. Overall, this study provides a comprehensive view of how firms adapt their internal labor strategies in response to tax reform. It offers insights into the intersection of regulatory complexity, tax compliance, and labor market dynamics.

References

Abadie, A., Athey, S., Imbens, G. W., & Wooldridge, J. M. (2022). When Should You Adjust Standard Errors for Clustering? *The Quarterly Journal of Economics*, *138*(1), 1–35. https://doi.org/10.1093/qje/qjac038

Amberger, H., Gallemore, J., & Wilde, J. (2024). Corporate Tax System Complexity and Investment. *WU International Taxation Research Paper Series No. 2023-11*. https://dx.doi.org/10.2139/ssrn.4607146

Amberger, H., & Robinson, L. (2023). The initial effect of U.S. tax reform on foreign acquisitions. *Review of Accounting Studies*, *forthcoming*. https://doi.org/10.1007/s11142-023-09760-1

Barrios, J. M., & Gallemore, J. (2024). Tax Planning Knowledge Diffusion via the Labor Market. *Management Science*, *70*(2), 1194–1215. https://doi.org/10.1287/mnsc.2023.4741

Batrancea, L., Nichita, A., Olsen, J., Kogler, C., Kirchler, E., Hoelzl, E., Weiss, A., Torgler, B., Fooken, J., Fuller, J., Schaffner, M., Banuri, S., Hassanein, M., Alarcón-García, G., Aldemir, C., Apostol, O., Bank Weinberg, D., Batrancea, I., Belianin, A., … Zukauskas, S. (2019). Trust and power as determinants of tax compliance across 44 nations. *Journal of Economic Psychology*, *74*(Issue C). https://doi.org/10.1016/j.joep.2019.102191

Bertrand, M., Duflo, E., & Mullainathan, S. (2004). How Much Should We Trust Differences-In-Differences Estimates? *The Quarterly Journal of Economics*, *119*(1), 249–275. https://doi.org/10.1162/003355304772839588

Beyer, B. D., Downes, J. F., Mathis, M. E., & Rapley, E. T. (2023). U.S. Multinational Companies' Payout and Investment Decisions in Response to International Tax Provisions of the Tax Cuts and Jobs Act of 2017. *Journal of the American Taxation Association*, *45*(1), 35–61. https://doi.org/10.2308/JATA-2020-037

Blumenthal, M., & Slemrod, J. B. (1995). The compliance cost of taxing foreign-source income: Its magnitude, determinants, and policy implications. *International Tax and Public Finance*, *2*(1), 37–53. https://doi.org/10.1007/BF00873106

Boynton, C. E., Dobbins, P. S., & Plesko, G. A. (1992). Earnings Management and the Corporate Alternative Minimum Tax. *Journal of Accounting Research*, *30*, 131–153.

Chen, H., Yang, D., Zhang, X., & Zhou, N. (2020). The Moderating Role of Internal Control in Tax Avoidance: Evidence from a COSO-Based Internal Control Index in China. *Journal of the American Taxation Association*, *42*(1), 23–55. https://doi.org/10.2308/atax-52408

Chen, S., Erickson, M., Harding, M., Stomberg, B., & Xia, J. (2023). Companies' Initial Estimates of the One-Time Transition Tax Imposed by the Tax Cuts and Jobs Act. *The Journal of the American Taxation Association*, *45*(2), 57–81. https://doi.org/10.2308/JATA-2021-021

Chen, X., Cheng, Q., Chow, T., & Liu, Y. (2021). Corporate In-house Tax Departments. *Contemporary Accounting Research*, *38*(1), 443–482. https://doi.org/10.1111/1911-3846.12637

Donohoe, M. P., Jang, H., & Lisowsky, P. (2022). Competitive Externalities of Tax Cuts. *Journal of Accounting Research*, *60*(1), 201–259. https://doi.org/10.1111/1475-679X.12403

Dyreng, S. D., Gaertner, F. B., Hoopes, J. L., & Vernon, M. E. (2023). The effect of US tax reform on the taxation of US firms' domestic and foreign earnings. *Contemporary Accounting Research*, *forthcoming*. https://doi.org/10.1111/1911-3846.12853

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2010). The Effects of Executives on Corporate Tax Avoidance. *The Accounting Review*, *85*(4), 1163–1189. https://doi.org/10.2308/accr.2010.85.4.1163

Dyreng, S. D., Hanlon, M., & Maydew, E. L. (2019). When Does Tax Avoidance Result in Tax Uncertainty? *The Accounting Review*, *94*(2), 179–203. https://doi.org/10.2308/accr-52198

Eichfelder, S., & Hechtner, F. (2018). Tax Compliance Costs: Cost Burden and Cost Reliability. *Public Finance Review*, *46*(5), 764–792. https://doi.org/10.1177/1091142117691603

Eichfelder, S., & Vaillancourt, F. (2014). Tax Compliance Costs: A Review of Cost Burdens and Cost Structures. *Arqus Discussion Paper*, *No. 178*. http://www.arqus.info/mobile/paper/arqus_178.pdf

Enache, L., Huang, Z., Moldovan, R., & Srivastava, A. (2022). *Labor Costs of Implementing New Accounting Standards*. https://doi.org/10.2139/ssrn.4110558

Euler, S., Harst, S., Schanz, D., Sureth-Sloane, C., & Voget, J. (2024). Tax Complexity and Foreign Direct Investment: Evidence Across Countries and Time. *TRR 266 Accounting for Transparency Working Paper Series No. 160*. http://dx.doi.org/10.2139/ssrn.4990616

Feller, A., & Schanz, D. (2017). The Three Hurdles of Tax Planning: How Business Context, Aims of Tax Planning, and Tax Manager Power Affect Tax Expense. *Contemporary Accounting Research*, *34*(1), 494–524. https://doi.org/10.1111/1911-3846.12278

Gallemore, J., Hollander, S., Jacob, M., & Zheng, X. (2024). *Tax Policy Expectations and Investment*. https://doi.org/10.2139/ssrn.3775710

Gao, F., Wu, J. S., & Zimmerman, J. (2009). Unintended Consequences of Granting Small Firms Exemptions from Securities Regulation: Evidence from the Sarbanes-Oxley Act. *Journal of Accounting Research*, *47*(2), 459–506. https://doi.org/10.1111/j.l475-679X.2009.00319.x

Giese, H., Koch, R., & Sureth-Sloane, C. (2024). Tax Complexity, Tax Department Structure, and Tax Risk. *TRR 266 Accounting for Transparency Working Paper Series No. 149*.

Guenther, D. A. (1994). The relation between tax rates and pre-tax returns direct evidence from the 1981 and 1986 tax rate reductions. *Journal of Accounting and Economics*, *18*(3), 379–393. https://doi.org/10.1016/0165-4101(94)90027-2

Guenther, D. A., Peterson, K., Searcy, J., & Williams, B. M. (2023). How Useful Are Tax Disclosures in Predicting Effective Tax Rates? A Machine Learning Approach. *The Accounting Review*, 1–26. https://doi.org/10.2308/TAR-2021-0398

Gutierrez, E. F., Lourie, B., Nekrasov, A., & Shevlin, T. J. (2020). Hiring Disclosure and Shareholder Value: Evidence from Job Postings. *Management Science*, *66*(7), 2801–3294. https://doi.org/10.1287/mnsc.2019.3450

Hanlon, M., & Heitzman, S. (2010). A review of tax research. *Journal of Accounting and Economics*, *50*(2–3), 127–178. https://doi.org/10.1016/j.jacceco.2010.09.002

Hann, R. N., Yang, J., & Zheng, Y. (2023). *The Price of an Accountant Shortage: Evidence from Job Vacancy Duration and Internal Control Weaknesses*. https://doi.org/10.2139/ssrn.4695588

Hodge, S. (2023, August 23). *The Tax Compliance Costs of IRS Regulations*. Tax Foundation. Available at: https://taxfoundation.org/blog/tax-compliance-costs-irs-regulations/ [retrieved on: 23.08.2023].

Hoppe, T., Schanz, D., Sturm, S., & Sureth-Sloane, C. (2018). What are the Drivers of Tax Complexity for MNCs? Global Evidence. *Intertax*, *46*(8/9), 654–675. https://doi.org/10.54648/TAXI2018069

Jacob, M., & Schütt, H. H. (2020). Firm Valuation and the Uncertainty of Future Tax Avoidance. *European Accounting Review*, *29*(3), 409–435. https://doi.org/10.1080/09638180.2019.1642775

Kelley, S. O., Lewellen, C. M., Lynch, D. P., & Samuel, D. M. P. (2024). "Just BEAT it" do firms reclassify costs to avoid the base erosion and anti-abuse tax (BEAT) of the TCJA? *Journal of Accounting and Economics*, *77*(2), 101648. https://doi.org/10.1016/j.jacceco.2023.101648

Kirchler, E., Hoelzl, E., & Wahl, I. (2008). Enforced Versus Voluntary Tax Compliance: The "Slippery Slope" Framework. *Journal of Economic Psychology*, *29*(2), 210–225. https://doi.org/10.1016/j.joep.2007.05.004

Klassen, K. J., Lisowsky, P., & Mescall, D. (2017). Transfer Pricing: Strategies, Practices, and Tax Minimization. *Contemporary Accounting Research*, *34*(1), 455–493. https://doi.org/10.1111/1911-3846.12239

Kroeger, K. (2024). *Consequences of Public Accounting Offshoring*. https://doi.org/10.2139/ssrn.4705489

Krüger, V. (1996). How can a company achieve improved levels of quality performance: Technology versus employees? *The TQM Magazine*, *8*(3), 11–20. https://doi.org/10.1108/09544789610118412

Krupa, T., & Mullaney, M. (2024). *The Use of Artificial Intelligence in Decision-Making: Evidence from the Effectiveness of Corporate Tax Strategies*. https://doi.org/10.2139/ssrn.4710463

Lankford, W. M., & Parsa, F. (1999). Outsourcing: A primer. *Management Decision*, *37*(4), 310–316. https://doi.org/10.1108/00251749910269357

Laplante, S. K., Lewellen, C., Lynch, D., & Samuel, D. (2021). "Just BEAT It" Do firms reclassify costs to avoid the base erosion and anti-abuse tax (BEAT) of the TCJA? *WU International Taxation Research Paper Series*, *No. 2021-03*. https://doi.org/10.2139/ssrn.3784739

Lester, R., & Olbert, M. (2024). *Firms' Real and Reporting Responses to Taxation: A Review*. https://ssrn.com/abstract=4779893

Loyeung, A., Matolcsy, Z., Weber, J., & Wells, P. (2016). The cost of implementing new accounting standards: The case of IFRS adoption in Australia. *Australian Journal of Management*, *41*(4), 611–632. https://doi.org/10.1177/0312896216649015

Mahesh, B. (2020). Machine Learning Algorithms—A Review. *International Journal of Science and Research (IJSR)*, *9*(1), 381–386. https://doi.org/10.21275/ART20203995

Marcuss, R., Contos, G., Guyton, J., Langetieg, P., Lerman, A., Nelson, S., Schafer, B., & Vigil, M. (2013). Income Taxes and Compliance Costs: How Are They Related? *National Tax Journal*, *66*, 833–854. https://doi.org/10.17310/ntj.2013.4.03

Markle, K. (2009). Do Multinationals or Domestic Firms Face Higher Effective Tax Rates? *NBER Working Paper 15091*. https://doi.org/10.3386/w15091

Marneffe, W., & Vereeck, L. (2011). The meaning of regulatory costs. *European Journal of Law and Economics*, *32*(3), 341–356. https://doi.org/10.1007/s10657-010-9194-7

Mills, L. F. (1996). Corporate Tax Compliance and Financial Reporting. *National Tax Journal*, *49*(3), 421–435. https://doi.org/10.1086/NTJ41789215

Nessa, M., Schwab, C. M., Stomberg, B., & Towery, E. M. (2020). How do IRS Resources Affect the Corporate Audit Process? *The Accounting Review*, *95*(2), 311–338. https://doi.org/10.2308/accr-52520

OECD. (2023, July 30). *Tax policies for inclusive growth in a changing world: OECD report to G-20 Finance Ministers and Central Bank Governors, July 2018*. OECD Publishing. Available at: https://www.oecd.org/g20/topics/international-taxation/Tax-policies-for-inclusive-growth-in-a-changing-world-OECD.pdf

Pflitsch, M. (2024). *The Investors' Assessment of Cross-Border M&A – Repatriation Taxes, Agency Conflicts and the TCJA*. https://doi.org/10.2139/ssrn.4145698

Roberts, M. R., & Whited, T. M. (2011). Endogeneity in Empirical Corporate Finance. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.1748604

Roberts, M. R., & Whited, T. M. (2013). Endogeneity in Empirical Corporate Finance. In *Handbook of the Economics of Finance* (Vol. 2, pp. 493–572). Elsevier. 10.1016/B978-0-44-453594-8.00007-0

Samuel, D. (2023). The Effect of the Tax Cuts and Jobs Act on Foreign Investment of U.S. Multinational Corporations. *Singapore Management University School of Accountancy Research Paper No. 2023-157*. https://doi.org/10.2139/ssrn.4255473

Slemrod, J. B. (1989). 5. Complexity, Compliance Costs, and Tax Evasion. In J. A. Roth & J. T. Scholz (Eds.), *Taxpayer Compliance: Volume 2: Social Science Perspectives: Vol. Volume 2* (pp. 156–181). University of Pennsylvania Press. https://doi.org/10.9783/9781512806281-006

Slemrod, J. B. (2018). Is This Tax Reform, or Just Confusion? *Journal of Economic Perspectives*, *32*(4), 73–96. https://doi.org/10.1257/jep.32.4.73

Slemrod, J. B., & Blumenthal, M. (1996). The Income Tax Compliance Cost of Big Business. *Public Finance Quarterly*, *24*(4), 411–438. https://doi.org/10.1177/109114219602400401

Slemrod, J. B., & Venkatesh, V. (2002). The Income Tax Compliance Cost of Large and Mid-Size Businesses. *Ross School of Business Paper*, *No. 914*. https://doi.org/10.2139/ssrn.913056

Thomson Reuters Institute (Ed.). (2023, December 4). *2024-Corporate-Tax-Department-Technology-Report.pdf*. Available at: https://www.thomsonreuters.com/en-us/posts/wp-content/uploads/sites/20/2023/10/2024-Corporate-Tax-Department-Technology-Report.pdf

van Reenen, J. (1997). Employment and Technological Innovation: Evidence from U.K. Manufacturing Firms. *Journal of Labor Economics*, *15*(2), 255–284. https://doi.org/10.1086/209833

Wagner, A., Zeckhauser, R., & Ziegler, A. (2018). Unequal Rewards to Firms: Stock Market Responses to the Trump Election and the 2017 Corporate Tax Reform. *AEA Papers and Proceedings*, *108*, 590–596. https://doi.org/10.1257/pandp.20181091

Wagner, A., Zeckhauser, R., & Ziegler, A. (2020). The Tax Cuts and Jobs Act: Which Firms Won? Which Lost? *NBER Working Paper Series*, *w27470*. https://doi.org/10.3386/w27470

Watts, R. L., & Zimmerman, J. L. (1978). Towards a Positive Theory of the Determination of Accounting Standards. *The Accounting Review*, *53*(1), 112–134.

Wilde, J. H., & Wilson, R. J. (2018). Perspectives on Corporate Tax Planning: Observations from the Past Decade. *Journal of the American Taxation Association*, *40*(2), 63–81. https://doi.org/10.2308/atax-51993

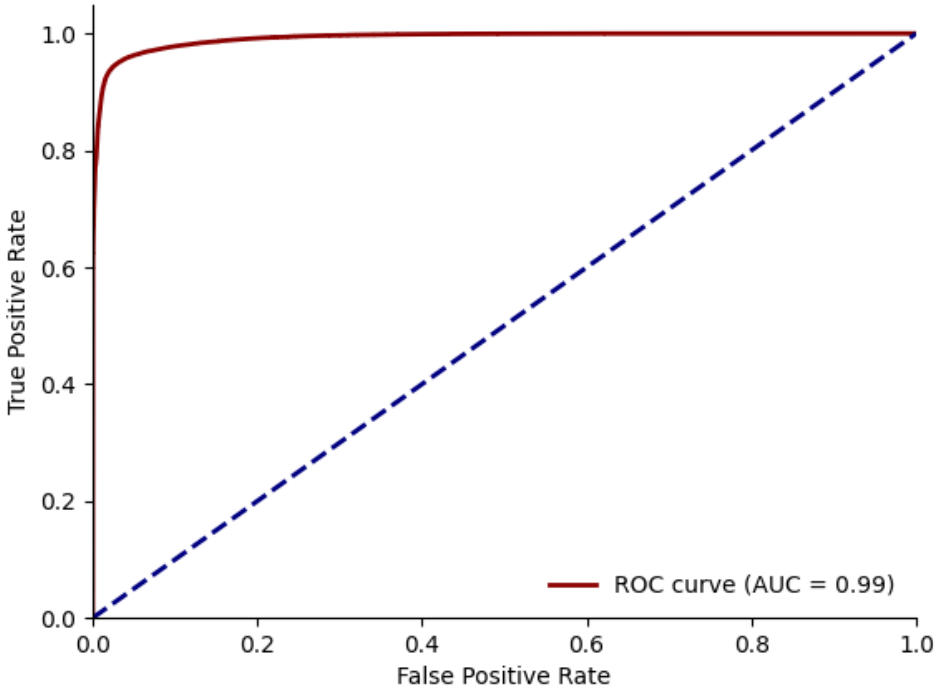
Zhang, M., Jensen, K., Sonniks, S., & Plank, B. (2022). SkillSpan: Hard and Soft Skill Extraction from English Job Postings. *Proceedings of the 2022 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies*, 4962–4984. https://doi.org/10.18653/v1/2022.naacl-main.366

Zhang, Y., Jin, R., & Zhou, Z.-H. (2010). Understanding bag-of-words model: A statistical framework. *International Journal of Machine Learning and Cybernetics*, *1*(1–4), 43–52. https://doi.org/10.1007/s13042-010-0001-0

Zwick, E. (2021). The Costs of Corporate Tax Complexity. *American Economic Journal: Economic Policy*, *13*(2), 467–500. https://doi.org/10.1257/pol.20180406

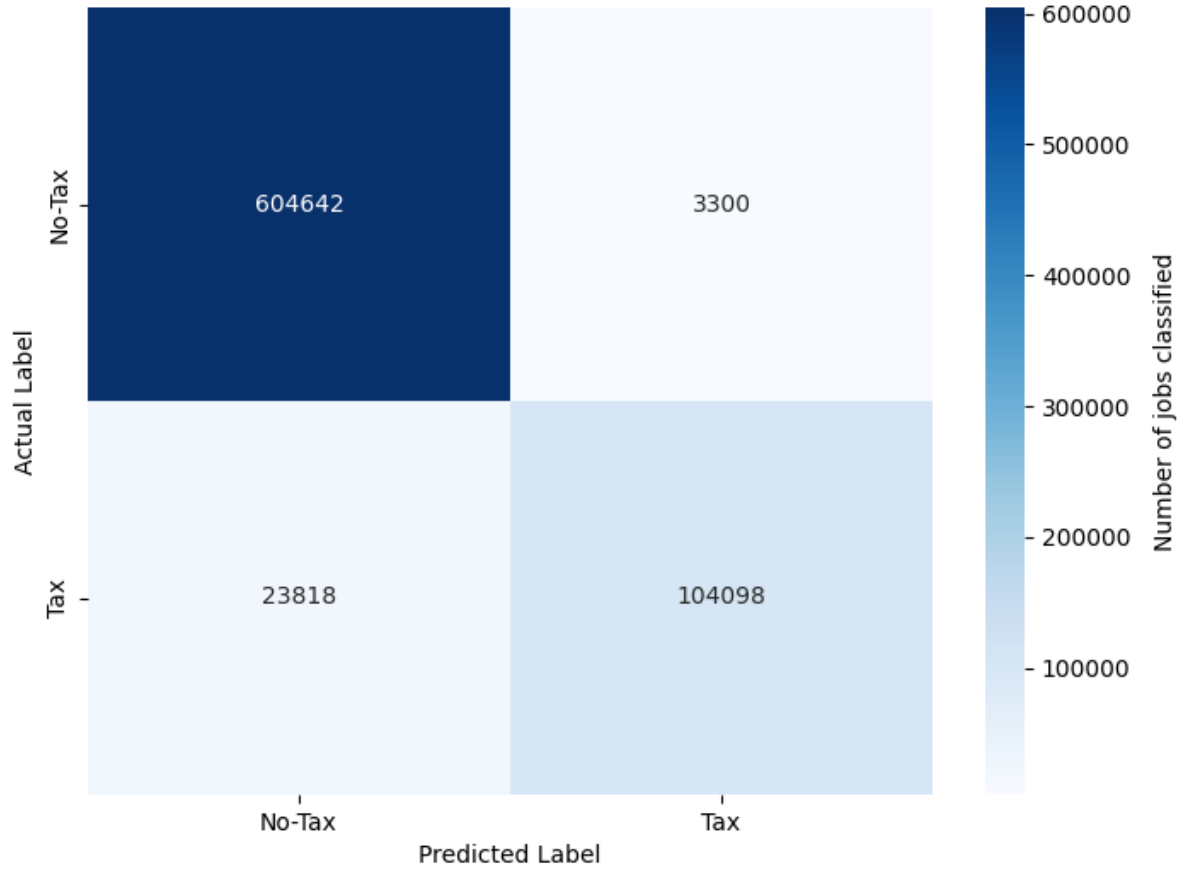
Figures and Tables

Figure 1
Receiver Operating Characteristic (ROC) Curve of the tax job classifier



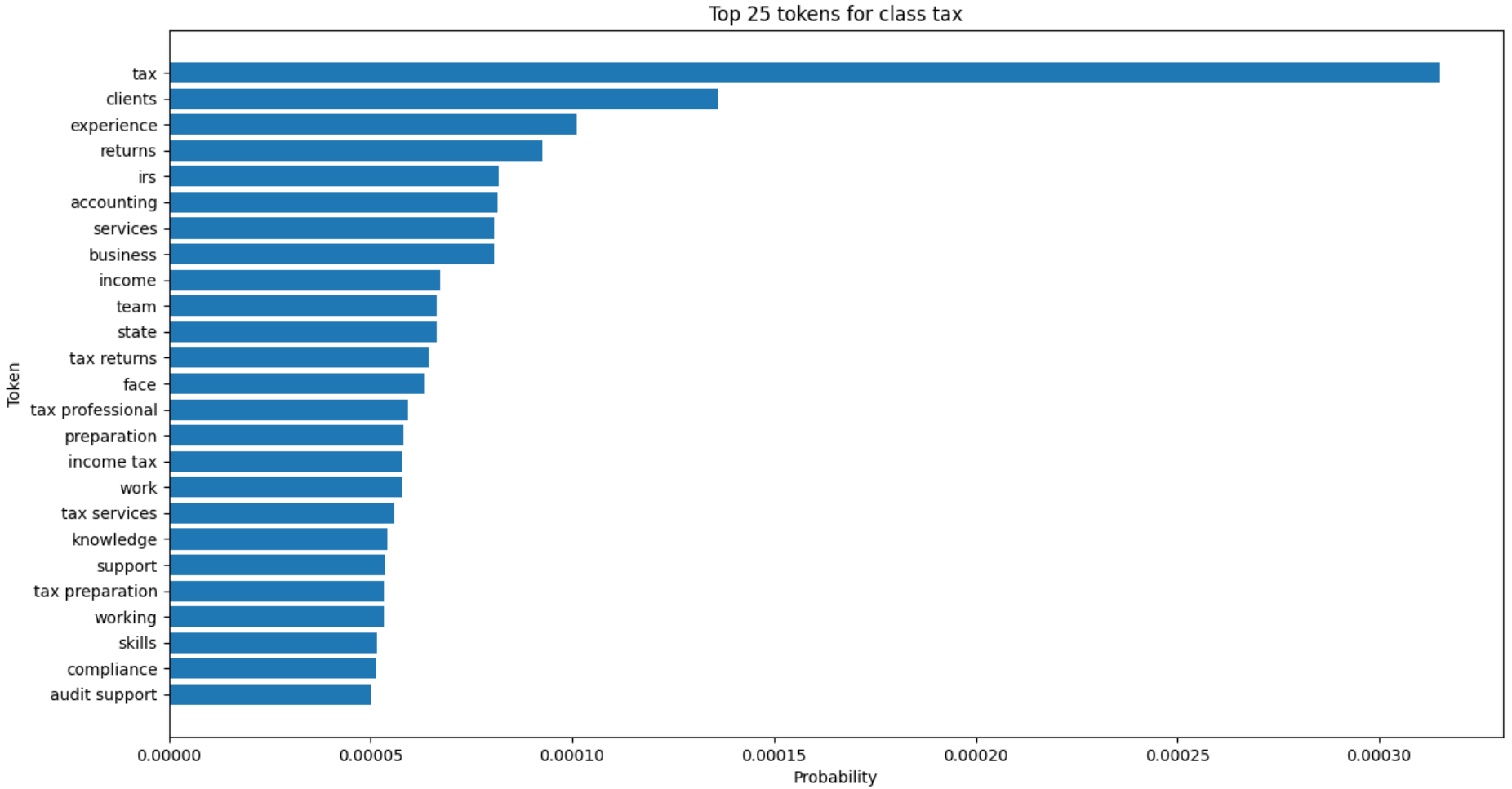
The figure shows the receiver operating characteristic (ROC) curve (red) of the bag of words tax job classifier. It describes the true against the false positive rate of the classification model. The solid red curve is the ROC curve. The area under the curve (AUC) can take values between 0 and 1. The larger the area under the curve value, the higher the precision of the classification model. The dashed blue line illustrates an area under the curve of 50% (comparable to a random classifier). The ROC curve shows a high classification certainty of 99%.

Figure 2
Confusion matrix of the of the tax job classifier



The figure displays the confusion matrix of the bag of words tax job classifier. The matrix depicts the accuracy of the job classification further, displaying the number of tax and non-tax jobs classified as tax or non-tax jobs (true and false positive). The darker the color of the cell, the more jobs were classified to that category. Overall, 99.5% (81.4%) of non-tax (tax) jobs were classified as non-tax (tax) and only 0.5% (18.6%) as tax (non-tax) jobs.

Figure 3
Bag of words tokens for tax jobs



This figure shows the 25 most common tokens identified by the bag of words classification model for the subsample of tax jobs. The y-axis represents the different tokens, and the x-axis shows the probability that the word is included in the category of tax job postings.

Figure 4
BERTopic skill topics

The figure shows the skill topics of all S&P 1500 tax jobs using the BERTopic model. Words in larger font sizes are more important within the text. Words presented centrally in the cloud are more important within the topic. Smaller words can present sub-themes or related concepts within the main topic. Skills were classified before using the JobSpanBERT model. Skills occurring less than 50 times are excluded to reduce the number of less relevant topics.

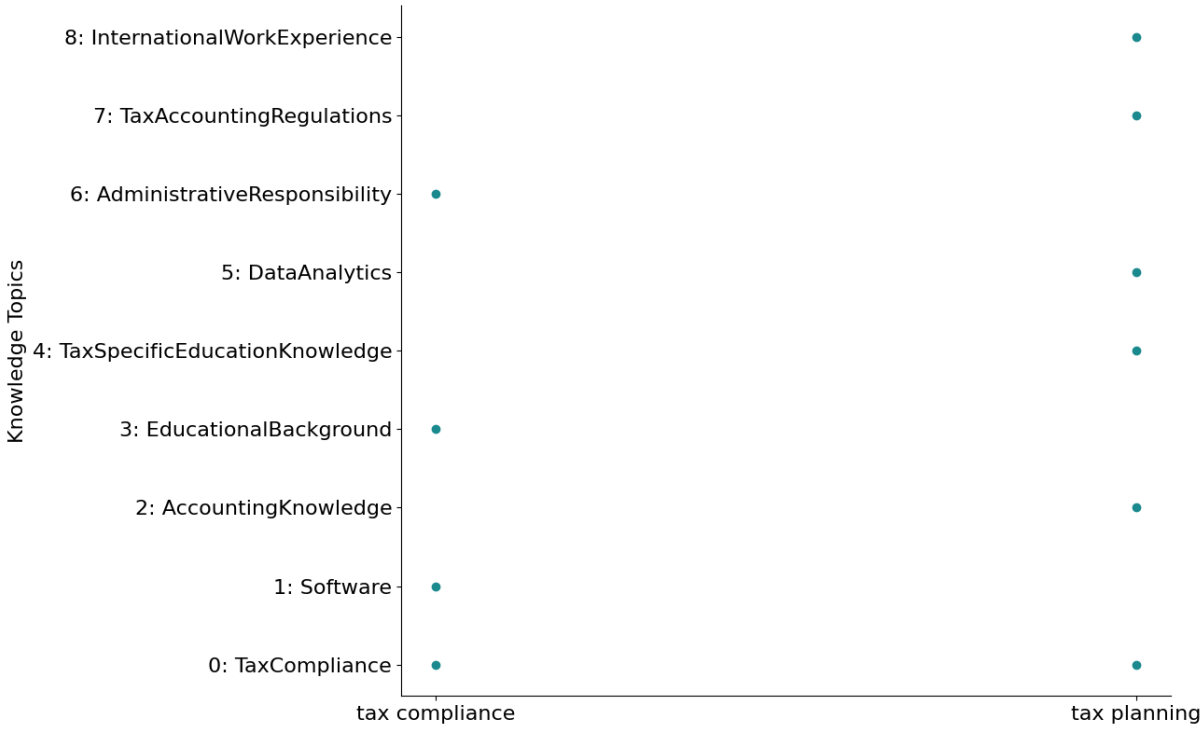
Figure 5
BERTopic knowledge topics

The figure shows the knowledge topics of all S&P 1500 tax jobs using the BERTopic model. Words in larger font sizes are more important within the text. Words presented centrally in the cloud are more important within the topic. Smaller words can present sub-themes or related concepts within the main topic. Knowledge was classified before using the JobSpanBERT model. Knowledge occurring less than 50 times is excluded to reduce the number of less relevant topics.

Figure 6
Skill topic allocation

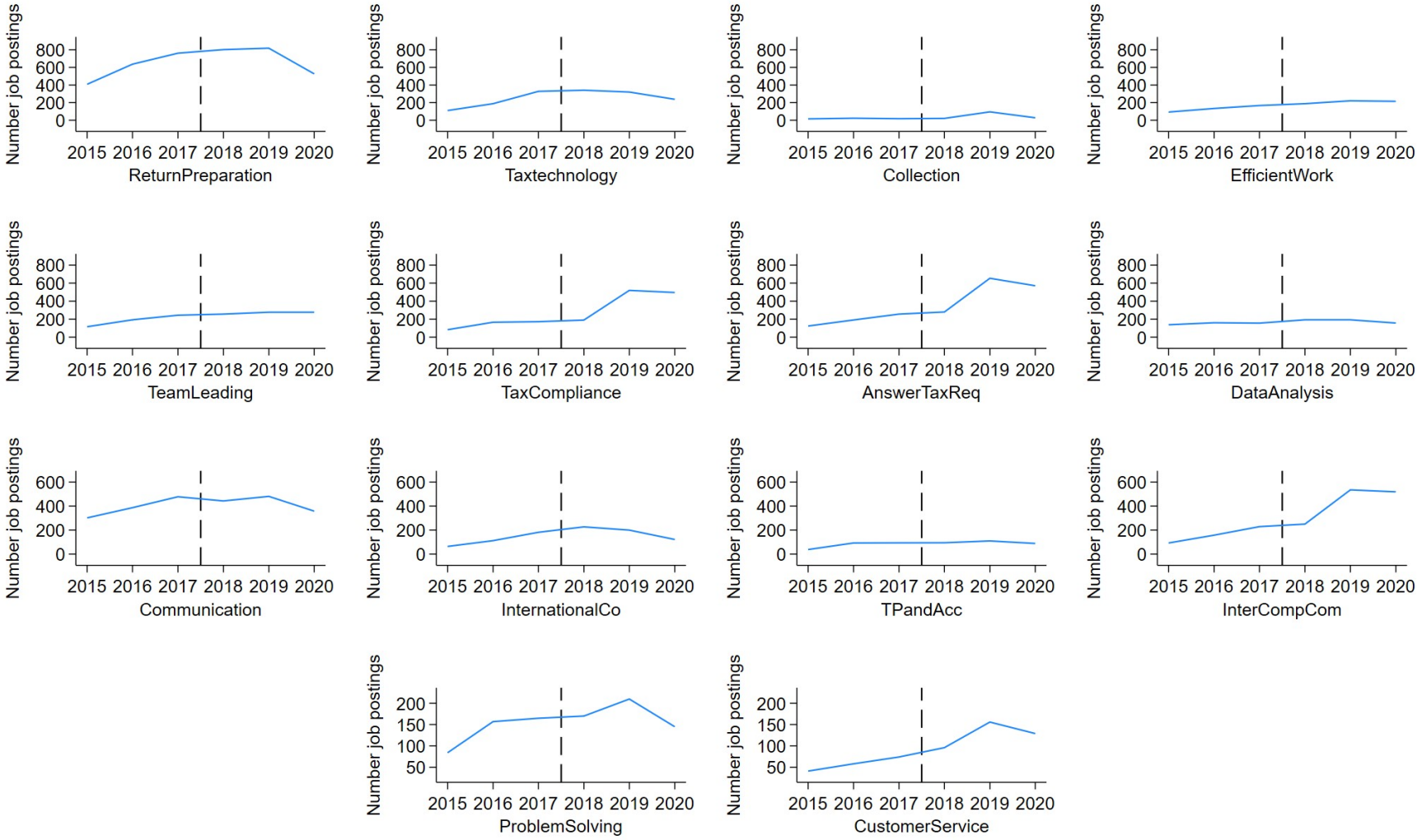
This figure shows the skill topic allocation to the categories of tax compliance and tax planning (H2).

Figure 7
Knowledge topic allocation



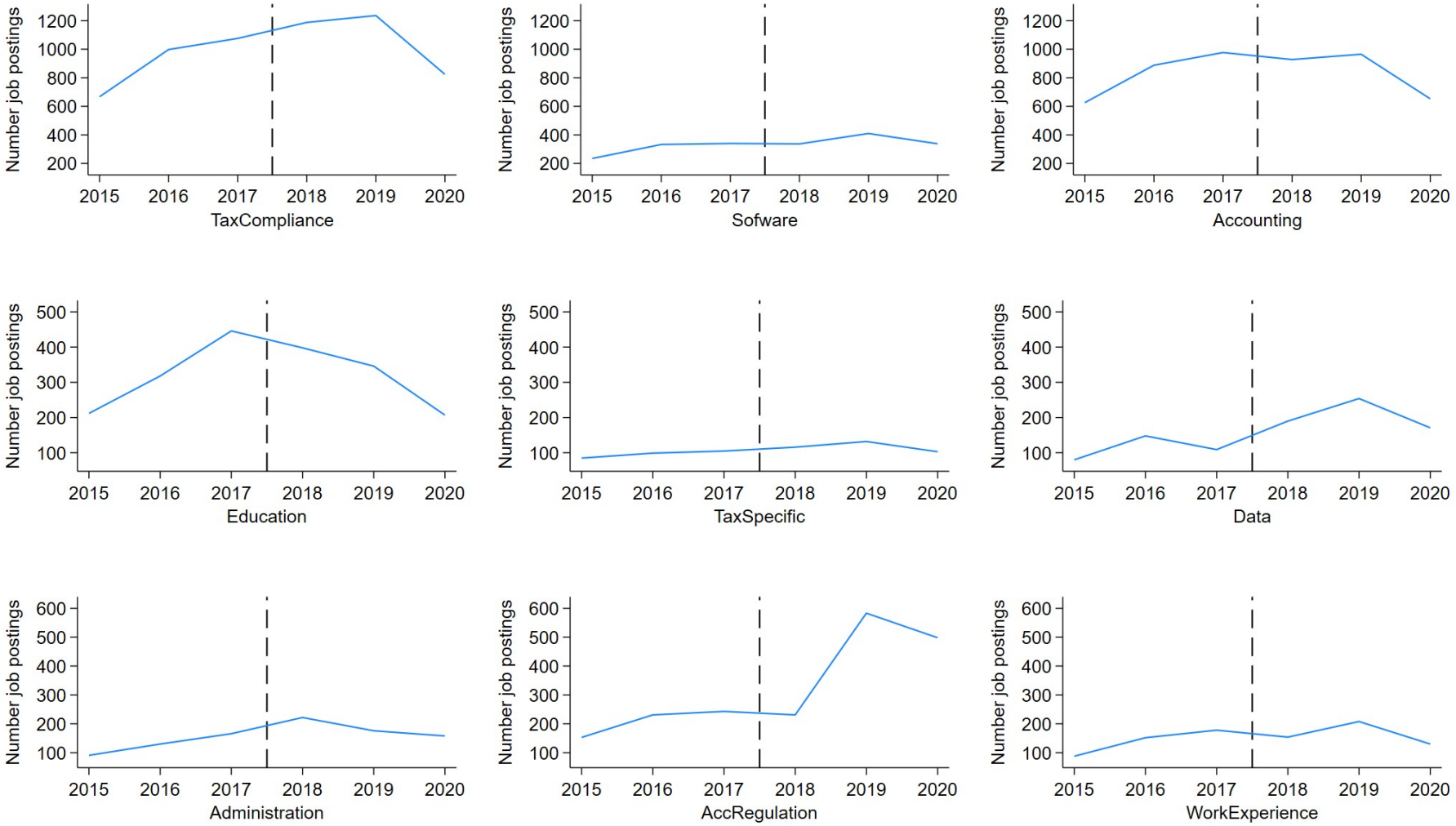
This figure shows the knowledge topic allocation to the categories of tax compliance and tax planning (H2).

Figure 8
Skill topics over time



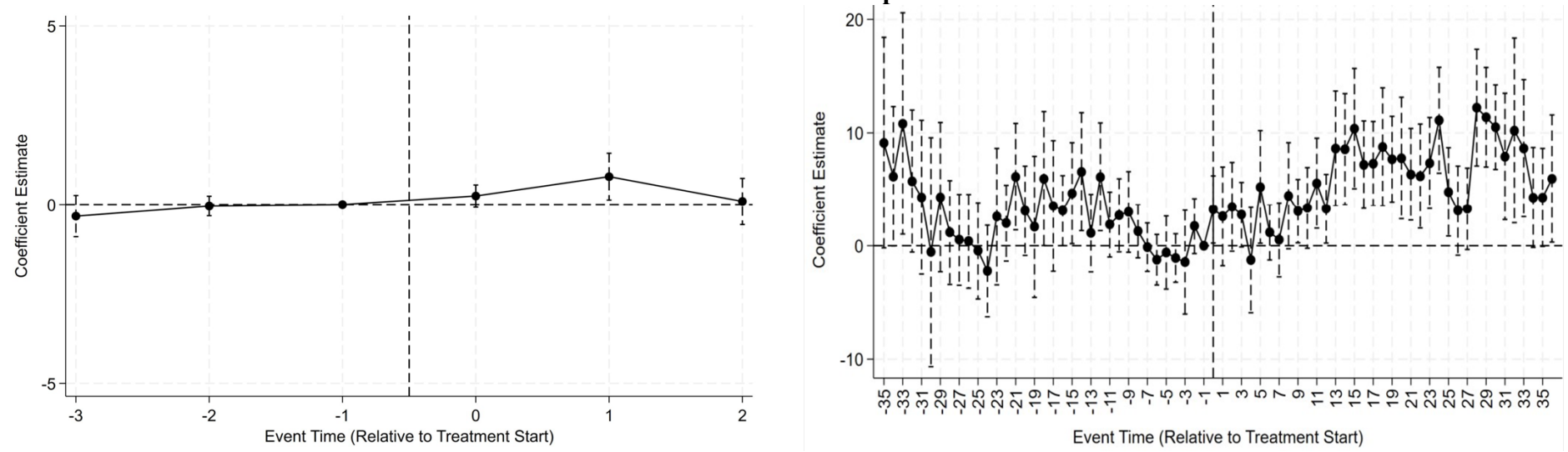
The figure shows the development of skill topics over time. The x-axis depicts the years 2015 to 2020. The y-axis depicts the total number of job postings for the S&P 1500 firms per year for a given topic. The vertical dashed line represents the enactment date of the TCJA.

Figure 9
Knowledge topics over time



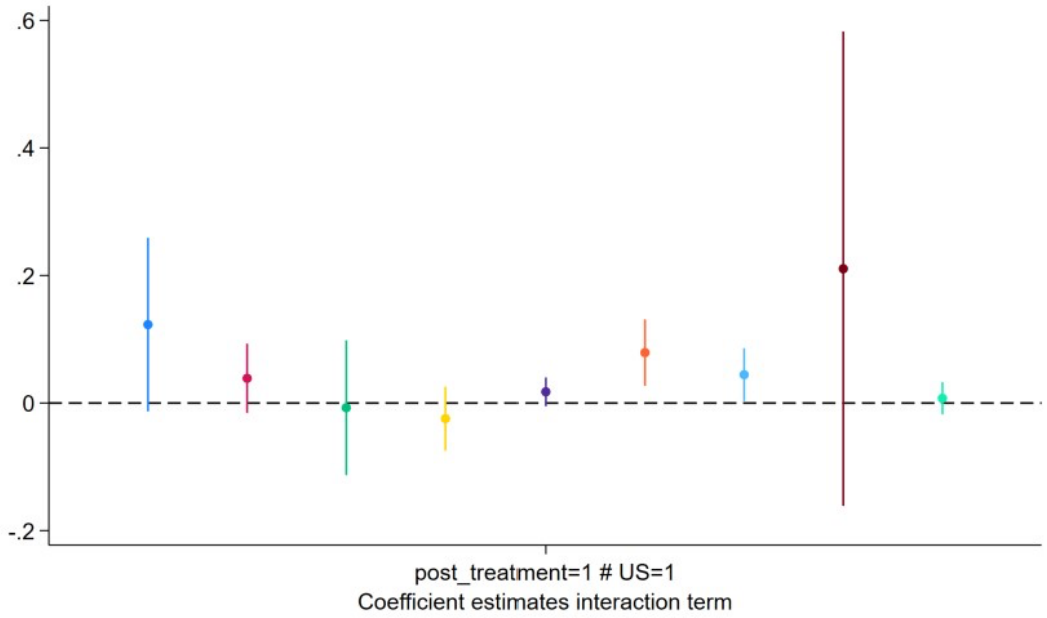
The figure shows the development of knowledge topics over time. The x-axis depicts the years 2015 to 2020. The y-axis depicts the total number of job postings for the S&P 1500 firms per year for a given topic. The vertical dashed line represents the enactment date of the TCJA.

Figure 10
Parallel trend assumption



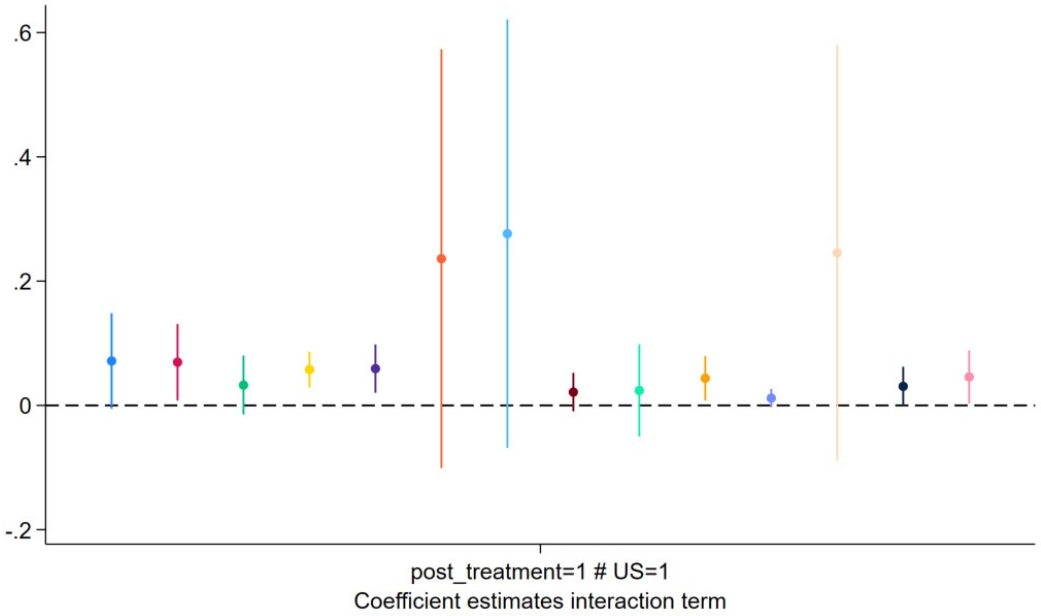
The figure shows coefficient estimates of the event study for our baseline specification comparing job postings of non-financial S&P 1500 U.S. firms and job postings of non-financial FTSE All Shares UK firms. The left (right) figure depicts the yearly (monthly) number of job postings. The dashed vertical line indicates the introduction of the TJCA.

Figure 11
Coefficient estimates interaction term DiD – Knowledge topics



The figure shows the coefficient estimates of the interaction term from the difference-in-differences analysis for the change in the demanded knowledge topics over time using non-financial S&P 1500 U.S. firms as the treatment and non-financial FTSE All Shares UK firms as the control group. The order of the knowledge topics from left to right is as follows: 0: TaxCompliance (blue), 1: Software (red), 2: AccountingKnowledge (green), 3: EducationalBackground (yellow), 4: TaxSpecificEducationKnowledge (grape), 5: DataAnalytics (tangerine), 6: AdministrativeResponsibility (cyan), 7: TaxAccountingRegulations (brown), 8: InternationalWorkExperience (springgreen).

Figure 12
Coefficient estimates interaction term DiD – Skill topics



The figure shows the coefficient estimates of the interaction term from the difference-in-differences analysis for the change in the demanded skill topics over time using non-financial S&P 1500 U.S. firms as the treatment and non-financial All Shares UK firms as the control group. The order of the skill topics from left to right is as follows: 0: PrepareReviewTaxReturns (blue), 1: TaxTechnology (red), 2: TaxCollection (green), 3: SelfMotivatedEfficiency (yellow), 4: TeamLeading (grape), 5: TaxCompliance (tangerine), 6: TaxRequests (cyan), 7: DataAnalysis (brown), 8: Communication (springgreen), 9: Coordination (orange), 10: TransferPricingAndAccounting (stateblue), 11: IntercompanyCommunication (bisque), 12: ProblemSolving (black), 13: CustomerService (rose).

Table 1
Definition of variables

Variables	Source	Definition
$JobPostings_{it}$	LinkUp	Number of newly posted job postings per firm per year.
$CompliancePostings_{it}$	LinkUp	Number of job postings per firm per year that are classified as tax compliance employees using machine learning.
$PlanningPostings_{it}$	LinkUp	Number of job postings per firm per year that are classified as tax planning employees using machine learning.
$ScaledCompliancePostings_{it}$	LinkUp	Number of job postings per firm per year that are classified as tax compliance employees using machine learning scaled by the total number of tax job postings per firm per year.
$ScaledPlanningPostings_{it}$	LinkUp	Number of job postings per firm per year that are classified as tax planning employees using machine learning scaled by the total number of tax job postings per firm per year.
$CompliancePlanning_{it}$	LinkUp	Continuous measure, taking the value of -1 for purely tax compliance- and 1 for purely tax planning-related jobs. The value is determined by subtracting the number of compliance topics from the number of tax planning topics included in the job posting scaled by the number of overall topics in the job posting.
$ComplianceFees_{it}$	Audit Analytics	Fees that are classified as fees for compliance purposes scaled by total assets (ComplianceFees/AT).
$PlanningFees_{it}$	Audit Analytics	Fees that are classified as fees for non-compliance purposes scaled by total assets (NonComplianceFees/AT).
$Skills_{it}$	LinkUp	Machine learning-based estimated vector of sought-after skills per firm per year.
$Knowledge_{it}$	LinkUp	Machine learning-based estimated vector of sought-after knowledge per firm per year.
$Post_t$		Indicator variable taking the value of one for years after the enactment of the TCJA (2018) and zero otherwise.
$Treated_i$	EIKON/Compustat	Indicator variable taking the value of one for U.S. firms and zero for UK firms, or Canadian firms.
AGE_{it}	Compustat	Firm age, calculated as the logarithm of the number of days between January 1st, 2018, and the first data date of the firm.
APTS	Audit Analytics	Auditor-provided tax services, measured by fees paid to the auditor for tax services scaled by total assets (TaxFees/AT).
LEV_{it}	Compustat	Leverage, calculated as long-term debt scaled by total assets (DLTT/AT).
INT_{it}	Compustat	Intangible asset intensity, measured by intangibles scaled by total assets (INTAN/AT).
$LOSS_{it}$	Compustat	Loss indicator, equals 1 if negative pretax income ($PI < 0$) and zero otherwise.
MTB_{it}	Compustat	Market-to-book value, measured as market value of equity divided by book value of common equity (PRCC_F * CSHO)/CEQ).
PPE_{it}	Compustat	Capital intensity, calculated as net property, plant, and equipment scaled by total assets (PPENT/AT).
ROA_{it}	Compustat	Return on assets, measured by earnings before interest and taxes scaled by total assets (EBIT/AT).

RD_{it}	Compustat	Research and development expense divided by lagged assets (XRD/AT).
$SIZE_{it}$	Compustat	Firm size, measured as logarithm of total assets (AT).

Table 2
Number of S&P 1500 tax job postings in the U.S.

Cleaning step	Number of job postings
All LinkUp tax jobs (keyword and O-Net taxonmy)	1,328,520
Exclude VAT, intern, payroll, property and indirect tax jobs	1,105,815
Include only U.S. tax jobs	975,761
Include only S&P 1500 firm tax jobs	298,627
Exclude financial (SIC 60 to 64) and wage tax assistance firms	27,844

This table presents the sample selection for tax job postings of the non-financial S&P 1500 firms with headquarters in the U.S.

Table 3
Classification report of the BoW model

	precision	recall	f1-score	support
0	0.96	0.99	0.98	607942
1	0.97	0.81	0.88	127916
accuracy			0.96	735858
macro avg	0.97	0.90	0.93	735858
weighted avg	0.96	0.96	0.96	735858

The table displays the classification report of the bag of words model used to classify the job postings as tax and no-tax.

Table 4
Summary statistics

Variables	N	mean	sd	p5	p95
JobPostings	9,246	1.698	8.746	0	7
Planning	9,246	1.119	6.658	0	5
Compliance	9,246	1.219	6.984	0	5
Post	9,246	0.504	0.500	0	1
SIZE	9,246	8.331	1.791	5.646	11.47
AGE	9,246	9.119	0.745	7.693	10.11
LOSS	9,246	0.143	0.350	0	1
APTS	9,246	100.5	327.5	0	450.1
US	9,246	0.777	0.416	0	1
ROA	9,246	0.0915	0.0937	-0.0231	0.259
LEV	9,246	0.239	0.198	0	0.603
MTB	9,246	693,382	1.865e+06	0.606	4.500e+06
INT	9,246	0.236	0.223	0	0.674
PPE	9,246	0.228	0.236	0.00478	0.762
RD	9,246	0.0204	0.0450	0	0.113

Sample	UK					US				
Variables	N	mean	sd	p5	p95	N	mean	sd	p5	p95
JobPostings	2,060	0.195	1.054	0	1	7,186	2.129	9.862	0	9
Planning	2,060	0.0942	0.671	0	0	7,186	1.412	7.518	0	6
Compliance	2,060	0.114	0.733	0	1	7,186	1.535	7.884	0	6
Post	2,060	0.484	0.500	0	1	7,186	0.510	0.500	0	1
SIZE	2,060	7.690	1.958	4.948	11.42	7,186	8.515	1.696	5.962	11.49
AGE	2,060	9.166	0.362	8.437	9.506	7,186	9.106	0.822	7.560	10.11
LOSS	2,060	0.163	0.369	0	1	7,186	0.137	0.344	0	1
APTS	2,060	68.70	279.5	0	334.2	7,186	109.6	339.5	0	474.9
ROA	2,060	0.0918	0.0946	-0.0271	0.257	7,186	0.0914	0.0934	-0.0217	0.260
LEV	2,060	0.193	0.169	0	0.511	7,186	0.253	0.203	0	0.624
MTB	2,060	3.112e+06	2.844e+06	375,962	1.122e+07	7,186	4.351	22.71	0.511	14.70
INT	2,060	0.250	0.233	0.000723	0.719	7,186	0.232	0.219	0	0.659
PPE	2,060	0.220	0.228	0.00177	0.701	7,186	0.230	0.238	0.00620	0.771
RD	2,060	0.0122	0.0326	0	0.0749	7,186	0.0227	0.0478	0	0.123

The table presents descriptive summary statistics for variables used in Equations (1) to (3).

Table 5
DiD results of changes in the number of job postings for U.S. treated firms vs. UK control firms

	(1) JobPostings	(2) JobPostings	(3) JobPostings	(4) JobPostings
Post	0.0786*			
	(1.69)			
US	1.7044***			
	(12.07)			
Post # US	0.4457*	0.4911*	0.4968*	0.4968**
	(1.89)	(1.91)	(1.72)	(2.31)
SIZE			0.4330	0.4330**
			(1.54)	(2.11)
MTB			-0.0000	-0.0000
			(-0.95)	(-0.81)
LOSS			-0.2822	-0.2822
			(-1.59)	(-1.32)
ROA			-0.3712	-0.3712
			(-0.49)	(-0.34)
LEV			-0.5403	-0.5403
			(-0.78)	(-0.91)
INT			-1.8203	-1.8203
			(-1.02)	(-1.52)
PPE			-0.3026	-0.3026
			(-0.23)	(-0.27)
RD			-0.0785	-0.0785
			(-0.03)	(-0.04)
APTS			0.0002*	0.0002**
			(1.90)	(2.32)
Company FE	No	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
Cluster SEs	Robust	Firm	Firm	Firm & Year
Sample	US-UK	US-UK	US-UK	US-UK
Observations	9,246	9,246	9,246	9,246

The table displays results for the difference-in-differences analysis for the change in the number of U.S. tax job postings before and after the enactment date of the TCJA. Non-financial S&P 1500 U.S. firms represent the treatment group, and non-financial FTSE All Shares UK firms are the control group. The dependent variable *JobPostings* is the number of newly posted job postings per firm per year. *US* is an indicator variable equal to one for all U.S. firms and zero otherwise. *Post* is an indicator variable equal to one for all observation periods after 2017, representing the implementation period of the TCJA. See Table 1 for the definitions of control variables. We report heteroskedasticity-robust standard errors clustered at the firm (firm and year) level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6
Heterogeneity splits for U.S. S&P 1500 firms changes number of tax jobs

	(1) JobPostings	(2) JobPostings	(3) JobPostings	(4) JobPostings	(5) JobPostings	(6) JobPostings
Post # Split	0.9811*	0.5086	-0.3286	0.7308	-0.1676	-0.5755
	(1.96)	(0.94)	(-0.80)	(0.77)	(-0.44)	(-1.28)
Split Variable	Quartile SIZE	MNC	no APTS	Quartile Intangibles	Quartile pre-CashETR	Quartile TaxDep Perf
Company FE	No	No	No	No	No	No
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Sample	US	US	US	US	US	US
Observations	3,615	7,186	7,186	3,437	3,216	3,311
Adj. R-sq	0.1038	0.0460	0.0460	0.0287	0.0725	0.0944

This table shows results for heterogeneity splits for non-financial S&P 1500 US firms. The dependent variable *JobPostings* is the number of newly posted job postings per firm per year. Column (1) shows a split based on firm size, comparing the first and fourth quartiles in terms of size. Column (2) presents results for multinational firms compared to domestic ones. Column (3) compares firms not purchasing APTS to those that do. Column (4) shows the results for firms in the first and fourth quartiles regarding intangibles. Columns (5) and (6) represent results for tax department performance (quartile splits). Column (5) measures the performance using the pre-reform cash ETR, and column (6) uses the tax department performance measure of Jacob & Schütt (2020). We report heteroskedasticity-robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 7
DiD results of changes in tax compliance and tax planning jobs U.S. treated firms vs. UK control Firms

	(1) PlanningPostings	(2) CompliancePostings	(3) ScaledPlanningPostings	(4) ScaledCompliancePostings	(5) CompliancePlanning
Post # US	0.4327*	0.4894*	0.0137	0.0230***	-0.1152*
	(1.77)	(1.92)	(1.23)	(1.96)	(-1.93)
F-Test		0.0567		0.0093*	
Firm FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Sample	US-UK	US-UK	US-UK	US-UK	US-UK
Observations	9,246	9,246	9,246	9,246	9,246
Adj. R-sq	0.3532	0.3371	0.3876	0.3794	0.2003

The table shows the difference-in-differences results for the change in the number of tax compliance and tax planning U.S. tax job postings before and after the enactment date of the TCJA. The table represents results for non-financial S&P 1500 US firms as treated and non-financial FTSE All Shares UK firms as control firms. Columns (1) and (2) represent the effect for the number of tax planning and tax compliance job postings, and columns (3) and (4) for the number of tax planning and tax compliance job postings scaled by the number of tax job postings per firm. The dependent variable in column (5) is a continuous measure, taking the value of -1 for purely tax compliance- and 1 for purely tax planning-related jobs, based on the topic allocation of Figure 6 and Figure 7. We report heteroskedasticity-robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 8
Heterogeneity splits for U.S. S&P 1500 firms changes in planning and compliance jobs

	(1) JobPostings	(2) PlanningPostings	(3) CompliancePostings
Post # Size	0.9811*	0.6487*	0.7036*
	(1.96)	(1.85)	(1.86)
Split Variable	Quartile SIZE	Quartile SIZE	Quartile SIZE
Company FE	No	No	No
Year FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Sample	US	US	US
Observations	3,615	3,615	3,615
Adj. R-sq	0.1038	0.1072	0.1010

This table shows results for heterogeneity splits for non-financial S&P 1500 US firms. Quartile compares firms in the first and fourth quartiles in terms of size. Column (1) represents the results for the number of tax jobs. Column (2) shows results for the number of tax planning jobs, and column (3) for tax compliance jobs. We report heteroskedasticity-robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 9
Change in auditor provided tax services (ATPS)

	(1) APTS	(2) PlanningFees	(3) ComplianceFees
Post	-26.7642***	-2.5292**	-0.4468
	(-3.34)	(-1.98)	(-0.38)
Firm FE	Yes	Yes	Yes
Sample	U.S.	U.S.	U.S.
Observations	7,186	7,186	7,186
Adj. R-sq	0.3885	0.5924	0.7587

The table shows the change in scaled APTS for the post-TCJA period in column (1). In columns (2) and (3) we investigate the results for fees on compliance and non-compliance. Data on APTS stems from the database Audit Analytics. All models include firm fixed effects. The dependent variable *APTS* includes all tax fees of a firm scaled by the size of the firm using total assets. *ComplianceFees* include those fees that are classified as fees for compliance purposes and *PlanningFees* as those for non-compliance activities, both again are scaled by the size of the firm using total assets. We report heteroskedasticity-robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 10
Robustness tests U.S. and UK

	(1) JobPostings	(2) ln_JobPostings	(3) JobPostings	(4) JobPostings
JobPostings				
Post	0.3774*	0.0323*	0.5728*	0.0410*
	(1.68)	(1.74)	(1.83)	(1.71)
Year FE	Yes	Yes	No	Yes (Month FE)
Firm FE	No	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Model	ZIP	OLS	Collapsed	Monthly
Sample	US-UK	US-UK	US-UK	US-UK
Observations	7,706	9,246	3,084	110,952
Adj./Pseudo R-sq	0.1582	0.6386	0.3934	0.1024

This table shows the robustness tests for the baseline difference-in-differences analysis for the change in the number of U.S. tax job postings before and after the enactment date of the TCJA for non-financial S&P 1500 U.S. firms and non-financial FTSE All Shares UK firms. The dependent variable *JobPostings* is the number of newly posted job postings per firm per year. *US* is an indicator variable equal to one for all U.S. firms and zero otherwise. *Post* is an indicator variable equal to one for all observation periods after 2017, representing the implementation period of the TCJA. Column (1) shows a zero-inflated Poisson model (ZIP), column (2) uses the natural logarithm of *JobPostings* as the dependent variable, column (3) collapses pre- and post-period following Bertrand et al. (2004), and column (4) reports results on monthly job postings. We report robust standard errors clustered at the firm level in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

TRR 266 Accounting for Transparency

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