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Is professional exam performance associated with career success for Big 4 auditors? Evidence on gender differences

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Abstract

This study examines whether better performance on the Certified Public Accountant (CPA) exam is associated with an auditor's career success and whether any relation differs based on gender. Our study adds to prior studies on the career development of auditors by showing that the auditor's performance on the exam predicts success during the auditor's career. Although there is little difference in the average CPA exam scores of male versus female auditors, we document gender differences in the relation between performance on the CPA exam and career success. Male auditors who pass the exam with superior results receive higher annual compensation than those with weaker results. They are also more likely to become partners in Big 4 accounting firms and have larger client portfolios. For female auditors, we find weaker or no association between CPA exam scores and compensation or other indicators of career success. Our path analysis shows that the mechanisms underlying career success work differently for men and women. CPA exam scores of male auditors have a direct effect on compensation and an indirect (mediating) effect through promotion to partner and client portfolio size. However, for female auditors, exam scores have no effect on promotion to partner or client portfolio size, and exam scores have a much smaller effect on compensation. Our findings suggest that CPA exam scores translate into career success for male auditors but not for female auditors.

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KEYWORDS
auditor careers, career success, Certified Public Accountant (CPA) exam, female accountants, gender differences, professional examinations

Les résultats à un examen d'agrément professionnel sont-ils associés à une carrière fructueuse chez les auditeurs des 4 gros cabinets? Données probantes sur les différences entre les sexes

Résumé

La présente étude vérifie si de bons résultats à l'examen de Certified Public Accountant (expert-comptable agréé aux États-Unis) (CPA) sont associés à la réussite professionnelle des auditeurs, et si certains liens varient en fonction du sexe. Notre étude complète la recherche antérieure sur l'évolution de carrière des auditeurs en montrant que les résultats d'un auditeur à l'examen prédisent la réussite de sa carrière. Bien qu'il n'y ait qu'un léger écart entre les auditeurs et les auditrices sur le plan des notes moyennes à l'examen de CPA, nous établissons certaines différences entre les sexes concernant le lien entre les résultats à l'examen de CPA et la réussite professionnelle. Les auditeurs de sexe masculin qui obtiennent de bonnes notes à l'examen reçoivent une meilleure rémunération annuelle que ceux qui ont obtenu des notes plus faibles. Ils sont aussi plus susceptibles de devenir associés dans un des 4 grands cabinets comptables et d'avoir des portefeuilles de clients importants. En ce qui concerne les auditrices, nous dégageons un lien plus faible ou inexistant entre les notes obtenues à l'examen de CPA et la rémunération ou d'autres indicateurs de la réussite professionnelle. Notre analyse des trajectoires montre que les mécanismes qui sous-tendent la réussite professionnelle fonctionnent différemment pour les hommes et pour les femmes. Les notes des auditeurs à l'examen de CPA ont une incidence directe sur la rémunération et un effet indirect (médiateur) sur la promotion au rang d'associé et la taille des portefeuilles des clients. Toutefois, pour les auditrices, les notes à l'examen n'ont aucune incidence sur la promotion au rang d'associée et la taille des portefeuilles des clients, et un effet beaucoup plus ténu sur la rémunération. Nos résultats portent à croire que les notes à l'examen de CPA favorisent la réussite professionnelle des auditeurs, mais pas celle des auditrices.

MOTS-CLÉS
carrière des auditeurs, comptables de sexe féminin, différences entre les sexes, examen de Certified Public Accountant (CPA), examens d'agrément professionnel, réussite professionnelle

1 | INTRODUCTION

The business community generally accepts that professional examinations are required to ensure that auditors are sufficiently competent to perform their duties (AICPA, 2018; International Accounting Education Standards Board [IAESB], 2019).[1] In most countries, regulations authorize only those who pass the Certified Public Accountant (CPA) exam (or equivalent) to practice auditing. However, passing the CPA exam is a considerable hurdle for some candidates. Therefore, it is worthwhile to know whether CPA exam scores translate into subsequent career success for auditing candidates. This motivates our first research question: whether and how CPA exam performance is associated with subsequent career success in auditing.[2] Our study also contributes to the topical issue of the challenges faced by female auditors. Female auditors are often perceived as having fewer opportunities for career advancement compared to their male counterparts (Almer et al., 2021; Hardies, Lennox, et al., 2021). Differences in career success between men and women motivate our second research question: do differences between genders play a role in the relations between performance on the CPA exam and career success in auditing?

Although professional requirements mandate an exam or similar test of competence for auditors, it is not clear whether exam results are associated with career success. To pass the exam, a candidate must acquire sufficient technical knowledge in accounting and auditing. Successful candidates invest a considerable amount of time and effort in becoming licensed accounting professionals. Setting and administering CPA exams also pose significant costs for the accounting profession. Previous research shows that other factors, such as effort (Ciconte et al., 2024), soft skills (Bol et al., 2018; Coram & Robinson, 2017), and networking (Downar et al., 2021) are important. We are not aware of research that examines the career success of individuals and investigates whether it relates to their exam results. With regard to female auditors, women earn less than men (Blau & Kahn, 2017; Cha & Weeden, 2014; Goldin, 2014; Weichselbaumer & Winter-Ebmer, 2005) and the auditing profession is not immune to this phenomenon (Dong, 2022; Knechel et al., 2013; Vandenhaute et al., 2020). Other research suggests that they face disadvantages in their careers (Barnes et al., 2024; Hardies et al., 2016; Lennox & Wu, 2018), and it may be that women with similar exam scores to men may not have similar career success.

Similar to standardized tests that universities use in admissions screening, such as the Graduate Management Admission Test (GMAT), the CPA exam can be thought of as a simple device for identifying people who are more talented or capable than others (Rosen, 2008; Spence, 1973). However, unlike the GMAT, which candidates take before admission to an academic program and which aims to measure more generic cognitive abilities, the CPA exam is taken after the candidate completes academic education requirements and gains professional experience, and it aims to assess the candidate's knowledge in the *specific domain of accounting and auditing*. The professional requirements are intended to protect the public interest, presumably from poor-quality auditing. For example, AICPA (2018) asserts that "[t]he purpose of the Uniform CPA Examination is to provide reasonable assurance [. . .] that those who pass the CPA Examination possess the level of technical knowledge and the skills necessary for initial licensure in protection of the public interest." The IAESB (2019) makes a similar statement.

Our Finnish setting provides us with a unique data set that facilitates tests for the relations between CPA exam scores, compensation, and other career outcomes. Our data set comprises 3,761 auditor-year observations, from 476 unique Big 4 auditors, from 2003 to 2016. First, we

[1]We use the term "auditor" to refer to an authorized public accountant, that is, an individual who has passed the Certified Public Accountant (CPA) exam and is listed in the auditor registry.

[2]Because passing the CPA exam is required to practice auditing, we cannot use passing the exam as the basis for our analysis. Instead, we study whether those candidates that passed the exam (i.e., CPAs) with better scores later have better career success in auditing compared to their less successful peers.

hand-collect the CPA exam scores for all auditors from the archives of the Auditing Board, which is a body that oversees the auditing profession. Second, to measure compensation, we obtain annual income data for individual auditors from the tax authorities. Third, because Finland's Company Law requires that all companies file their financial statements and audit reports in a public register, we can identify the auditors of listed and private companies. This allows us to calculate complete client portfolios for the auditors in our sample. Like many other European countries (Downar et al., 2021), in Finland, auditors who are not partners can have their own client portfolios and sign audit reports, allowing us to identify when auditors are promoted to partner.

We examine whether CPA exam scores are correlated with the compensation of Big 4 auditors and whether gender moderates this association. CPA exam scores can affect compensation directly or indirectly, through other outcomes of career success, or both directly and indirectly.[3] Career success in the auditing profession can take several forms. In addition to compensation, promotion to audit partner in a Big 4 firm and having large or prestigious clients are regarded as career success (Baysden & Wilson, 2014; Carter et al., 2014; Downar et al., 2021; Knechel et al., 2013; Qiang et al., 2017).[4] Whether the auditing profession discriminates against female auditors is another important current issue (Almer et al., 2021; Hardies, Lennox, et al., 2021). This motivates us to examine whether the mechanism by which CPA exam scores influence compensation differs for female versus male auditors.

Our tests show a positive association between exam scores and career outcomes. However, our analyses reveal that this association applies primarily to men. We find that male Big 4 signing auditors who achieved higher scores when they passed the exam also earn more, are more likely to be promoted to partner in Big 4 accounting firms, have larger client portfolios, and audit more prestigious clients than male Big 4 signing auditors who achieved lower CPA exam scores. Moreover, our path analysis shows that higher exam scores are associated with higher compensation, both directly and indirectly through promotion to Big 4 partner and portfolio size. The results differ for women. For female auditors, we do not find an indirect relation between CPA exam scores and compensation through other career outcomes such as promotion to a Big 4 partner or portfolio size, and the direct relation between exam performance and compensation is much smaller for women than for men. In sum, we find that CPA exam scores are positively associated with subsequent career success, but mainly for male auditors, indicating important gender differences in how auditors build their careers in Big 4 accounting firms.

This study contributes to existing literature in several ways. Our response to the first research question adds to the literature on factors leading to career success in auditing (Bol et al., 2018; Ciconte et al., 2024; Coram & Robinson, 2017; Downar et al., 2021).[5] Coram and Robinson (2017) show that sophisticated performance measurement systems are used by audit firms to measure the contribution of individual partners. Bol et al. (2018) show that firms value the tacit knowledge of both experienced and inexperienced auditors. Downar et al. (2021) examine promotion to partner in Big 4 accounting firms in Germany. The authors find that winning new prestigious clients, engaging in formal and informal networking activities, and a

[3]Careers of CPAs are not limited to public accounting. Alternative career paths include being accountants in industry, providing advisory services, and being executives of corporations. The CPA exam's stated purpose, however, is to guarantee that public accountants possess sufficient competence as auditors to protect the public from the effects of poor-quality auditing. Our study is motivated by this stated purpose of the CPA exam and therefore we limit our study to CPAs' career success as auditors.

[4]Media and research on gender differences in career success in auditing often use Big 4 partner status as an indicator of career success (Khlif & Achek, 2017; Lennox & Wu, 2018). We acknowledge that not every auditor wants to become a Big 4 partner (Jones & Iyer, 2020) but many sources support the view that this is a common auditor goal (Baysden & Wilson, 2014; Carter et al., 2014; Qiang et al., 2017).

[5]There are a number of studies that examine the effects on the labor market for auditors by investigating the effect of the change to a 150-hour requirement in the United States (Allen & Woodland, 2010; Barrios, 2022; Gramling & Rosman, 2013; Jevons Lee et al., 1999) Many of the previous studies examined a single issue, the introduction in the United States of the 150-hour requirement for CPAs. Several studies found that this change led to restrictions on the supply of audit staff (Allen & Woodland, 2010; Barrios, 2022; Jevons Lee et al., 1999) However, these studies are silent about the factors leading to career success for individual auditors.

higher social status due to academic and professional credentials increase the likelihood of being promoted to Big 4 partner. Ciconte et al. (2024) examine auditors' commercial effort and show some support for auditors' commercial effort being related to audit quality. Our study extends the previous studies by showing that CPA exam scores are another important driver of career success. These scores predict promotion to partner, client portfolio, and compensation. Hence, our study adds to prior research on the career development of auditors by showing that an auditor's performance on the exam predicts success throughout their career.

Our study also adds to the scarce evidence on auditor compensation. Knechel et al. (2013) examine the determinants of compensation for the Big 4 audit partners in Sweden. Regarding partner-specific compensation, the authors find that the size of the personal client portfolio, acquisition of new clients, expert knowledge, and industry specialization are associated with higher compensation. We extend the findings in Knechel et al. (2013) by showing that success in the CPA exam predicts these observable career outcomes related to the auditor's personal compensation. Our findings are consistent with the view that the same characteristics that are related to success in the professional exam remain important for compensation during the auditor's career.

In our response to the second research question, we contribute to an emerging stream of research on gender effects (Hossain et al., 2018; Hottegindre et al., 2017; Ittonen et al., 2013; Ittonen & Peni, 2012; Niskanen et al., 2011; Yang et al., 2018) and gender discrimination in auditing (Almer et al., 2021; Hardies, Lennox, et al., 2021). Lennox and Wu (2018) suggest that gender discrimination against female accountants is an important topic because accounting firms face allegations that they deny highly qualified females the opportunity to be promoted to partner or to work on prestigious engagements, and that they base promotion decisions on networking at events that tend to be male-oriented. Recent studies on gender effects find that Big 4 accounting firms are less likely to promote women to partner (Almer et al., 2022; Downar et al., 2021) and that women tend to audit less prestigious clients (Almer et al., 2021) and earn less than men (Dong, 2022; Knechel et al., 2013).[6] Female audit partners in Belgium receive lower compensation than male partners and have to meet higher performance thresholds (Hardies, Lennox, et al., 2021). Our study confirms these findings. Our data show, however, that women perform as well as men on the CPA exam. Surprisingly, although success in the CPA exam translates into subsequent success for men, it does not do so for women. Our findings on how performance on the CPA exam translates into career success for men but not women contribute to the understanding of gender bias in the auditing profession.

2 | LITERATURE AND DEVELOPMENT OF HYPOTHESES

The IAESB, which is an independent board supported by the International Federation of Accountants, prescribes educational requirements for entry into the accounting profession worldwide. It states that a formal assessment of professional competence should occur before admission to the accounting profession. This assessment should be highly reliable and be based on verifiable evidence (IAESB, 2019, IES 6, 80). The CPA exam is designed to measure technical knowledge and skills related to accounting and auditing. It tests how well the candidate understands and can apply accounting principles and financial reporting standards, as well as the requirements of relevant legislation (e.g., company law). It also tests the candidate's

[6]Other results of previous research on gender effects are mixed. They show that female auditors have lower audit quality in Australia (Hossain et al., 2018), but higher audit quality in Sweden and Finland (Ittonen et al., 2013; Mnif & Cherif, 2023). with mixed results in China (Yang et al., 2018) and in an early study in Finland (Niskanen et al., 2011). Women commit different types of disciplinary offenses than men (Hottegindre et al., 2017) and receive higher audit fees (Ittonen & Peni, 2012).

knowledge of professional auditing standards (International Standards on Auditing) and how well the candidate can apply these standards.

Whether CPA exam results are associated with career success depends on whether accounting firms acknowledge and value the competencies that correlate with CPA exam scores. It is not given that CPA exam performance would be associated with an auditor's career success.[7] Big 4 job performance evaluations are not limited to the knowledge tested in the CPA exam. An auditor's compensation is also related to effort (Ciconte et al., 2024). Firms also assess "soft skills" including the teamwork, leadership, and communication skills of their auditors (Bol et al., 2018; Coram & Robinson, 2017). These soft skills can also be very important for a person's career (Heckman & Kautz, 2012; Seibert et al., 2001; Todd et al., 2009; Wolff & Moser, 2009).[8] In a study of auditors' career paths, Downar et al. (2021) find that in addition to making money for the firm, networking (or "knowing the right people") also matters for career success. Although these other factors may also be important, we investigate whether auditor performance on the CPA exam is associated with career success. Specifically, we investigate whether auditors who score higher on the exam earn more, are more likely to be promoted to partner, and receive more demanding and complex audit engagements. This leads to our first hypothesis, stated in the alternative.

> **Hypothesis 1 (H1).** CPA exam performance is positively associated with career success in auditing.

In general, women earn less than men (Blau & Kahn, 2017; Cha & Weeden, 2014; Goldin, 2014; Weichselbaumer & Winter-Ebmer, 2005), and this holds for the auditing profession (Dong, 2022; Knechel et al., 2013; Vandenhaute et al., 2020). Even when female Big 4 auditors provide higher-quality audits (Hardies et al., 2016) and charge higher audit fees (Hardies, Lennox, et al., 2021), they are less successful in being promoted to partner (Almer et al., 2022; Downar et al., 2021; Lennox & Wu, 2018), are less likely to audit prestigious clients (Almer et al., 2021; Hardies, Lennox, et al., 2021), and face obstacles that men do not encounter (Barker & Monks, 1998). Obstacles can arise because female auditors are more likely than their male counterparts to prioritize factors other than the commercial aspects of auditing (Jonnergård et al., 2010). Alternatively, work–life balance might play a role (Barnes et al., 2024; Ghio et al., 2023; Jones & Iyer, 2020). Although some women have been able to break the "glass ceiling" and overcome these obstacles (Almer et al., 2021), their success can be costly to their personal lives (Barker & Monks, 1998; Folke & Rickne, 2020). In either case, women with similar exam scores to men may not have similar career success. Meanwhile, the Big 4 accounting firms have made public commitments to support gender diversity (Kornberger et al., 2010; Quattrocelli, 2020). The prevailing view suggesting that women face disadvantages in their careers leads to our second hypothesis, stated in the alternative.

> **Hypothesis 2 (H2).** The positive association between CPA exam performance and career success in auditing is weaker for female auditors than for male auditors.

[7]It is possible that CPA exam results do not sufficiently distinguish between those who *pass* the exam because the exam may simply be a mechanism to screen out those who do not reach the minimum technical competence for a professional auditor.

[8]Heckman and Kautz (2012) conclude that: "The larger message of this paper is that soft skills predict success in life, that they causally produce that success, and that programs that enhance soft skills have an important place in an effective portfolio of public policies." However, they do not refer to accountants, and their data come from studies of the wider population. Seibert et al. (2001) study how social capital affects career success. They do not examine accounting careers. Todd et al. (2009) find that political skill contributed to career outcomes for a wide range of occupations. Wolff and Moser (2009) find that networking was related to career success for participants from a wide range of industrial sectors.

3 | RESEARCH DESIGN

We test our hypotheses in two steps. First, we estimate a set of regressions that regress auditor compensation and other indicators of career success on CPA exam scores. To test for gender differences in the relation between CPA exam scores and career outcomes, we interact CPA exam scores with an indicator variable for gender. Second, to further analyze the association between CPA exam scores and compensation, we employ path analysis and examine the roles of other career outcomes as mediators. Again, we test the moderating effect of gender on all paths in our model.

3.1 | Test variable (*EXAMSCORE*)

To measure the exam score, we compute the mean value of all components of the licensure test for each passing CPA. We standardize exam scores using the Standard Nine method (Thorndike, 1982). We categorize the yearly mean scores into nine stanines. These stanines provide a standardized scale ranging from 1 (the lowest standardized score category) to 9 (the highest standardized score category).

3.2 | Career outcome analysis

We expect CPA exam scores to be related to compensation and other career successes (H1). To test this, we regress career outcomes on our test variable (*EXAMSCORE*).

$$\begin{aligned} CAREER\ OUTCOME_{a,t} = {} & \alpha_0 + \alpha_1 EXAMSCORE_a + \alpha_2 FEMALE_a \\ & + \alpha_3 EXAMSCORE_a \times FEMALE_a + \alpha_4 SWEDISH_a + \alpha_5 LNEXP_{a,t} \\ & + \alpha_6 RETAKE_a + \kappa YEAR + \varphi EXAMYEAR + \varepsilon_{a,t}. \end{aligned} \quad (1)$$

The subscripts a and t refer to the individual signing auditor from a Big 4 accounting firm and time, respectively. The test variable *EXAMSCORE* is the standardized CPA exam score. To examine the effect of auditor gender, we include *FEMALE*, which indicates female signing auditors, and we create an interaction variable, *EXAMSCORE* × *FEMALE*, to examine whether the relation between the exam score and career outcomes varies with gender (H2).[9] To control for differences related to ethnic backgrounds between the Finnish-speaking majority and the Swedish-speaking minority, we include *SWEDISH*, which indicates Swedish-speaking auditors. We also control for work experience, *LNEXP*, which we calculate as the log of one plus the number of years to date since the auditor has passed the CPA exam. In addition, we control for the fact that some individuals did not pass the exam on their first attempt by including *RETAKE* to indicate that more than one attempt was needed. Finally, the estimations include fiscal year, *YEAR*, and exam year, *EXAMYEAR*, fixed effects to control for differences in compensation and other career outcomes across time.

In Equation (1), the main *CAREER OUTCOME* dependent variable is compensation, *LNCOMP*, calculated as the natural logarithm of the total earned income (in euros) of auditor a in year t. We also estimate the equation with seven other *CAREER OUTCOME* variables: promotion to partner, portfolio size, industry specialization, working in the capital area, average client size, client risk, and leadership role.

[9]In an untabulated test, we also estimate the same equation (without *FEMALE*) for subsamples of female and male auditors.

A major step in a Big 4 auditor's career is promotion to partner (Carter et al., 2014; Downar et al., 2021; Meuwissen, 1998). We use an indicator for whether the signing auditor is promoted to audit partner (*PARTNER*) as a *CAREER OUTCOME* in Equation (1). Another important indicator of career success is the auditor's portfolio of clients. Auditors in charge of audits of larger and more prestigious clients are considered to be more successful (Jones & Iyer, 2020). Having a larger client portfolio and more prestigious clients also affects auditor compensation (Knechel et al., 2013; Vandenhaute et al., 2020). We estimate Equation (1) using the auditor's client portfolio size, *LNPORTF*, as a *CAREER OUTCOME*. We calculate *LNPORTF* as the natural logarithm of the sum of the total assets (in euros) of clients audited by auditor a in year t.

In addition to compensation (*LNCOMP*), partner status (*PARTNER*), and size of the client portfolio (*LNPORTF*), we estimate Equation (1) using other potential career outcomes: industry specialization (*IND_SPEC*), work in the capital area (*CAPITAL_AREA*), average client size (*AVSIZE*), average client risk (*AVRISK*), and leadership roles measured as being the signing auditor for one or more listed companies (*LEADERSHIP*). Each measure indicates increased responsibility and status within the firm. We make inferences about how auditors' CPA exam performance is related to career success in Big 4 accounting firms based on the results from these eight separate regressions.

3.3 | Path analysis equations

Next, we employ path analysis to examine whether the effect of CPA exam scores on compensation is transmitted through promotion to Big 4 audit partner (*PARTNER*) and/or client portfolio size (*LNPORTF*). Figure 1 shows our path analysis model, in which all paths are conditioned by gender. In our model, there are paths from *EXAMSCORE* to compensation (*LNCOMP*) (c'_1), promotion to partner (*PARTNER*) (a_1), and client portfolio size (*LNPORTF*) (a_2). The model also considers the path from promotion to portfolio size

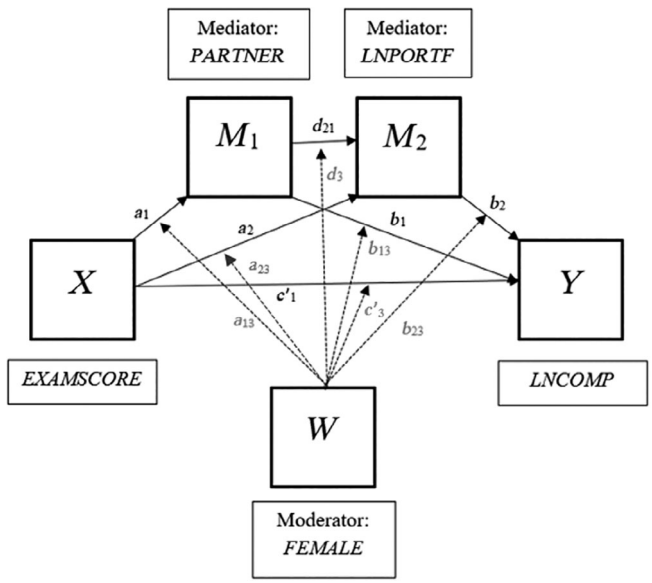

FIGURE 1 Diagram of the path analysis model. This figure shows direct and indirect paths between *EXAMSCORE* and *LNCOMP* mediated by *PARTNER* and *LNPORTF*, moderated by *FEMALE*.

(*LNPORTF*) (d_{21}) and the paths from mediators (*PARTNER* and *LNPORTF*) to compensation (b_1, b_2). In sum, in addition to the direct effect, there are three pathways by which *EXAMSCORE* can influence compensation: through *PARTNER*, through *LNPORTF*, and through both *PARTNER* and *LNPORTF*. To test H2, all paths are conditioned by introducing *FEMALE* as a moderator variable.

We use a system of equations to deconstruct the association between exam scores (*EXAMSCORE*) and annual auditor compensation (*LNCOMP*) into direct and indirect paths. Equations (2–4) examine the relations among individual auditor characteristics, exam performance, and career outcomes. Equation (2) examines the relation between an individual Big 4 auditor's exam performance (*EXAMSCORE*) and the likelihood of promotion to partner (*PARTNER*), moderated by gender (*FEMALE*).

$$\begin{aligned} PARTNER_{a,t} = \; & i_{m1} + \alpha_1 EXAMSCORE_a + \alpha_{13} EXAMSCORE_a \times FEMALE_a + e_{11} FEMALE_a \\ & + e_{12} SWEDISH_a + e_{13} LNEXP_{a,t} + e_{14} RETAKE_a + \kappa YEAR \\ & + \wp EXAMYEAR + \varepsilon_{a,t}. \end{aligned} \tag{2}$$

Equation (3) examines the impact of exam score (*EXAMSCORE*) and partner status (*PARTNER*) on an auditor's portfolio size (*LNPORTF*), moderated by gender (*FEMALE*).

$$\begin{aligned} LNPORTF_{a,t} = \; & i_{m2} + \alpha_2 EXAMSCORE_a + d_{21} PARTNER_{a,t} + \alpha_{23} EXAMSCORE_a \times FEMALE_a \\ & + d_3 PARTNER_{a,t} \times FEMALE_a + e_{21} FEMALE_a + e_{22} SWEDISH_a \\ & + e_{23} LNEXP_{a,t} + e_{24} RETAKE_a + \kappa YEAR + \wp EXAMYEAR + \varepsilon_{a,t}. \end{aligned} \tag{3}$$

Equation (4) examines the impact of exam score (*EXAMSCORE*), partner status (*PARTNER*), and portfolio size (*LNPORTF*) on auditor compensation (*LNCOMP*), moderated by gender (*FEMALE*).

$$\begin{aligned} LNCOMP_{a,t} = \; & i_y + c_1' EXAMSCORE_a + b_1 PARTNER_{a,t} + b_2 LNPORTF_{a,t} \\ & + c_3' EXAMSCORE_a \times FEMALE_a + b_{13} PARTNER_{a,t} \times FEMALE_a \\ & + b_{23} LNPORTF_{a,t} \times FEMALE_a + e_{31} FEMALE_a + e_{32} SWEDISH_a \\ & + e_{33} LNEXP_{a,t} + e_{34} RETAKE_a + \kappa YEAR + \wp EXAMYEAR + \varepsilon_{a,t}. \end{aligned} \tag{4}$$

In all equations, we control for additional variables, including ethnicity (*SWEDISH*), work experience (*LNEXP*), and an indicator for whether the candidate made more than one attempt to pass the exam (*RETAKE*), as well as fiscal year (*YEAR*) and exam year (*EXAMYEAR*) fixed effects. Subscripts *a* and *t* refer to the individual auditor and time, respectively. We also examine to what extent each direct or indirect relation is moderated by gender (*FEMALE*). We also explore alternative mediators and their simultaneous effects to assess the robustness of our findings. Appendix 1 provides all variable definitions.

4 | DATA AND DESCRIPTIVE STATISTICS

We compile data from various sources, merging it using a unique auditor identifier. We present descriptive statistics at both the auditor and auditor-year levels, allowing us to distinguish between characteristics that are time-invariant and those that vary over time.

4.1 | Data

We source the audit information for our Finnish sample companies from Suomen Asiakastieto Oy, a credit agency. The data set includes auditor names, associated accounting firms, and licensure types. Next, we gather financial statement data and other financial information for all Finnish companies from the ORBIS database maintained by Bureau van Dijk. These data allow us to form each CPA's annual client portfolio of public and private client companies and to compute the necessary variables at the client portfolio level. See Appendix 2 for an explanation of CPA exams, licensure types, and careers in Finland.

We merge our data sets from the Finnish Tax Administration, the Auditing Board archives, and information on the auditors' gender, Big 4 promotion, and ethnicity from the auditor registry archives maintained by the Central Chamber of Commerce in Finland. When an individual takes multiple attempts to pass the exam, we include only the latest result. We limit our sample to Big 4 auditors to ensure better comparability between auditors. This selection is supported by findings that becoming a Big 4 audit partner is viewed as an aspirational goal for many CPAs (Baysden & Wilson, 2014). Moreover, the majority of CPAs are affiliated with Big 4 accounting firms. Our final data set comprises 3,761 auditor-year observations from 476 unique Big 4 auditors.

4.2 | Descriptive statistics

Table 1 presents descriptive statistics for our sample of observations from 2003 to 2016. The data set includes only signing auditors—both partners and non-partners—working for the Big 4 accounting firms.[10] Most auditors in charge of audit engagements are not partners, as indicated by the mean value (0.400) of *PARTNER*. On average, signing auditors working for Big 4 accounting firms receive annual compensation of €118,000 (with a median of €82,000), ranging from €3,000 to €824,000.[11] The mean value of *FEMALE* is 32.4%, indicating that just below one third of sample observations are female. Of the 476 auditors in our sample, 11.8% belong to the Swedish minority group, and 30.5% took more than one attempt to pass the CPA exam. Approximately 55.3% of audit reports are signed by auditors working in the Helsinki capital area.

Table 2 presents mean values of our variables categorized by CPA exam score stanines, providing univariate insights into the relation between exam scores and our other variables of interest. The rightmost column in each panel displays the results of a trend test across the stanines to assess whether a significant trend across the CPA exam score stanines exists. The data show an increase in the number of signing auditors elevated to partner status as exam scores rise, offering univariate evidence of a positive correlation between exam score and appointment to partner. In the lowest exam score stanine, only 23.0% of signing auditors attain partner status, but in the highest stanine, this figure increases to 47.1%. Furthermore, signing auditors with higher exam scores receive higher compensation, providing preliminary univariate evidence of a positive correlation between compensation level and exam score. Additionally, auditors with higher exam scores tend to have larger portfolios, with more prestigious and riskier clients,[12] and are predominantly based in the capital area.

Table 3 presents descriptive analyses by gender. Panel A shows that the mean values of exam scores for female and male signing auditors are not significantly different. Similarly, we

[10]In Finland, a CPA is eligible to sign an audit report but accounting firms have different policies on which CPAs can sign audit reports. For clarity we use the term CPA, although the designation used in Finland is KHT (as discussed in Appendix 2).

[11]There is one auditor-year observation with zero income, which we exclude from the analysis, but this CPA earns a normal amount of annual income in other years. CPAs in our sample occasionally have exceptionally low income for 1 year, returning to normal in other years. In a sensitivity test, we find that our inferences regarding compensation remain the same after we remove 18 auditor-year observations with compensation below €25,000.

[12]*AVRISK* measures the Altman (2013) Z-score so that higher values represent lower risk.

TABLE 1 Univariate descriptive statistics.

Panel A: Auditor level ($N = 476$)							
	Mean	**SD**	**Min**	**Q1**	**Median**	**Q3**	**Max**
EXAMSCORE	5.092	1.994	1.000	4.000	5.000	6.000	9.000
FEMALE	0.324	0.468	0.000	0.000	0.000	1.000	1.000
SWEDISH	0.118	0.323	0.000	0.000	0.000	0.000	1.000
RETAKE	0.305	0.461	0.000	0.000	0.000	1.000	1.000
Panel B: Auditor-year level ($N = 3{,}761$)							
	Mean	**SD**	**Min**	**Q1**	**Median**	**Q3**	**Max**
LNCOMP	11.470	0.596	8.096	11.061	11.310	11.823	13.622
PARTNER	0.400	0.490	0.000	0.000	0.000	1.000	1.000
LNPORTF	18.945	2.357	7.831	17.554	19.093	20.664	24.558
IND_SPEC	0.161	0.368	0.000	0.000	0.000	0.000	1.000
CAPITAL_AREA	0.553	0.497	0.000	0.000	1.000	1.000	1.000
AVSIZE	14.021	1.183	7.831	13.232	13.929	14.736	20.384
AVRISK	2.434	0.957	−5.277	1.944	2.418	2.889	10.811
LEADERSHIP	0.243	0.429	0.000	0.000	0.000	0.000	1.000
LNEXP	2.393	0.737	0.000	1.946	2.565	2.944	3.584

Note: Panels A and B report univariate descriptive statistics at the auditor and auditor-year levels. See Appendix 1 for the variable definitions.

find no significant gender difference in the proportion of Swedish-speaking auditors or the number of attempts required to pass the exam. Panel B illustrates that the average compensation for female signing auditors is lower than that of their male counterparts. The average compensation for a female partner is €152,459, whereas male partners' average compensation is €187,715, and the difference is statistically significant. The panel also highlights that female signing auditors are less likely to reach partner positions, at 27.1% versus 45.4% for male signing auditors. Engagements signed by female auditors tend to be larger but less risky, on average. Nevertheless, a comparison of mean values for *LEADERSHIP* indicates that female auditors have fewer listed company clients. This finding is consistent with findings in recent studies indicating that female auditors are less likely than male auditors to manage portfolios of prestigious clients (Almer et al., 2021). Moreover, female auditors manage smaller client portfolios (*LNPORTF*). Other comparisons indicate that female auditors have less industry specialization, a higher likelihood of being in the capital area, and less experience.

We supplement Table 3 descriptives with gender using two graphs. Figure 2 reports the proportions of male and female auditors promoted to Big 4 partner. It shows that the proportion of male auditors promoted to partner is consistently higher across all exam score stanines. Figure 3 reports the average compensation of Big 4 auditors by gender and across exam scores. It demonstrates that, on average, male auditors receive higher compensation across all exam score stanines, especially in the two stanines with the highest scores.

5 | RESULTS

In this section, we present the results from tests of our two hypotheses: that performance on the CPA exam is positively associated with career success in auditing (H1) and that this positive association is weaker for female auditors than for male auditors (H2). We first regress auditor compensation and other measures of career success on CPA exam scores. To assess whether

TABLE 2 Mean values by *EXAMSCORE* stanines and tests for trends.

Panel A: Auditor level ($N = 476$)										
	1 $N = 17$	**2** $N = 36$	**3** $N = 54$	**4** $N = 70$	**5** $N = 99$	**6** $N = 85$	**7** $N = 57$	**8** $N = 33$	**9** $N = 25$	**Prob > |z|**
FEMALE	0.412	0.250	0.370	0.400	0.333	0.259	0.281	0.333	0.320	0.370
SWEDISH	0.235	0.194	0.093	0.129	0.111	0.118	0.123	0.030	0.080	0.062
RETAKE	0.353	0.361	0.352	0.257	0.273	0.247	0.316	0.303	0.520	0.742
Panel B: Auditor-year level ($N = 3{,}761$)										
	1 $N = 126$	**2** $N = 276$	**3** $N = 396$	**4** $N = 587$	**5** $N = 781$	**6** $N = 680$	**7** $N = 444$	**8** $N = 261$	**9** $N = 210$	**Prob > |z|**
LNCOMP	11.257	11.456	11.316	11.422	11.411	11.540	11.453	11.627	11.878	0.000
PARTNER	0.230	0.565	0.285	0.329	0.434	0.446	0.365	0.429	0.471	0.006
LNPORTF	18.647	18.591	18.704	18.687	18.750	19.212	19.099	19.242	19.924	0.000
IND_SPEC	0.246	0.109	0.172	0.162	0.133	0.176	0.153	0.203	0.181	0.319
CAPITAL_AREA	0.754	0.587	0.396	0.526	0.492	0.593	0.610	0.640	0.619	0.000
AVSIZE	13.803	13.902	13.755	14.025	13.960	14.087	14.102	14.165	14.466	0.000
AVRISK	2.450	2.433	2.565	2.503	2.432	2.345	2.328	2.523	2.387	0.001
LEADERSHIP	0.119	0.236	0.207	0.228	0.200	0.235	0.264	0.356	0.438	0.000
LNEXP	2.372	2.312	2.333	2.385	2.398	2.420	2.325	2.551	2.488	0.000

Note: Panels A and B report mean values by *EXAMSCORE* stanines from the lowest scores (1) to the highest scores (9) at the auditor and auditor-year levels. The rightmost column (Prob > $|z|$) reports results from the nonparametric test for trends across ordered groups developed by Cuzick (1985). This test, which is an extension of the Wilcoxon rank-sum test, incorporates a correction for ties. See Appendix 1 for the variable definitions.

TABLE 3 Univariate analysis by gender.

Panel A: Auditor level ($N = 476$)

	Female $N = 154$					Male $N = 322$					
	Mean	**SD**	**Min**	**Median**	**Max**	**Mean**	**SD**	**Min**	**Median**	**Max**	**Kruskal–Wallis test χ^2**
EXAMSCORE	4.974	2.003	1.000	5.000	9.000	5.149	1.990	1.000	5.000	9.000	1.168
SWEDISH	0.110	0.314	0.000	0.000	1.000	0.121	0.327	0.000	0.000	1.000	0.115
RETAKE	0.357	0.481	0.000	0.000	1.000	0.280	0.449	0.000	0.000	1.000	2.958

Panel B: Auditor-year level ($N = 3{,}761$)

	Female $N = 1{,}105$					Male $N = 2{,}656$					
	Mean	**SD**	**Min**	**Median**	**Max**	**Mean**	**SD**	**Min**	**Median**	**Max**	**Kruskal–Wallis test χ^2**
LNCOMP	11.268	0.498	8.862	11.161	13.247	11.555	0.613	8.096	11.376	13.622	205.373***
PARTNER	0.271	0.445	0.000	0.000	1.000	0.454	0.498	0.000	0.000	1.000	108.313***
LNPORTF	18.092	2.408	9.210	18.057	23.891	19.300	2.243	7.831	19.466	24.558	227.733***
IND_SPEC	0.093	0.291	0.000	0.000	1.000	0.190	0.392	0.000	0.000	1.000	53.728***
CAPITAL_AREA	0.589	0.492	0.000	1.000	1.000	0.537	0.499	0.000	1.000	1.000	8.488***
AVSIZE	14.118	1.338	9.210	13.940	19.277	13.981	1.110	7.831	13.923	20.384	5.094***
AVRISK	2.525	1.123	−3.453	2.497	8.917	2.395	0.876	−5.277	2.394	10.811	15.066***
LEADERSHIP	0.133	0.340	0.000	0.000	0.000	0.289	0.453	0.000	0.000	1.000	56.773***
LNEXP	2.223	0.741	0.000	2.303	3.526	2.464	0.724	0.000	2.639	3.584	102.140***

Note: Panels A and B report univariate descriptive statistics for women and men at the auditor and auditor-year levels, respectively. The rightmost column reports chi-square statistics from Kruskal–Wallis tests. See Appendix 1 for the variable definitions.

*, **, and *** represent significance levels of 10%, 5%, and 1%, respectively.

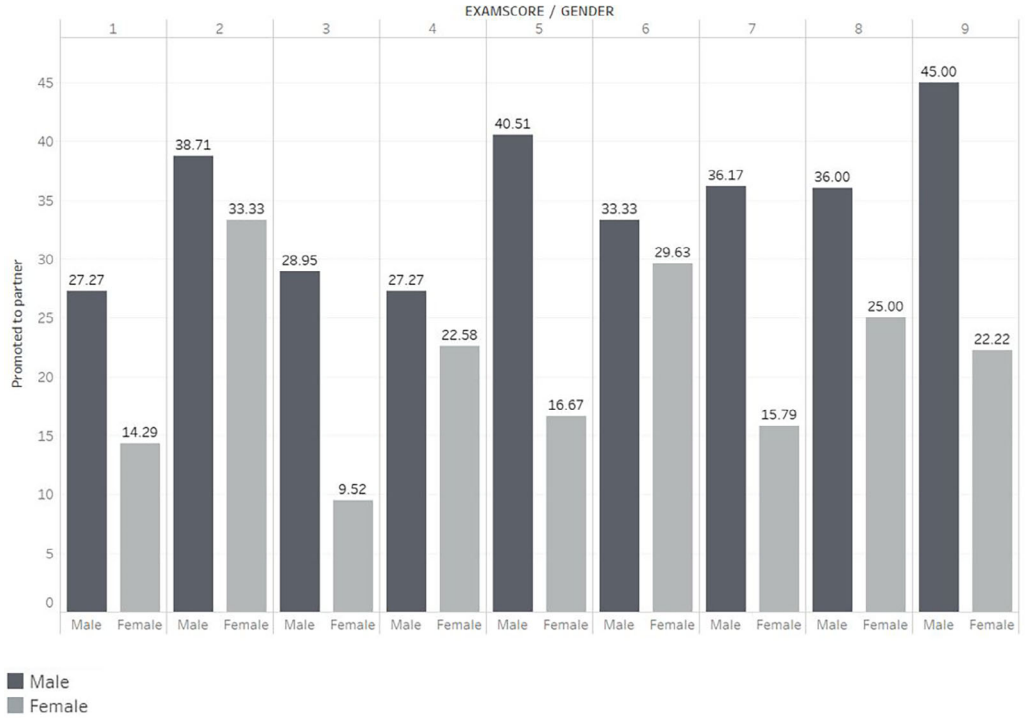

FIGURE 2 Proportion (%) of Big 4 signing auditors (male and female) promoted to Big 4 audit partner, by CPA exam score stanine, from 2003 to 2016. We calculate proportions at the auditor level because repeated observations at the auditor-year level result in proportions that do not represent the underlying sample distribution.

gender differences exist, we augment the model with gender and interact it with exam scores. We further explore the dynamics of career success through path analysis, revealing the underlying mechanisms and highlighting how these processes differ between men and women.

5.1 | Regression results for the relation between exam scores and measures of career success

Table 4 presents the results. It shows a positive association between CPA exam scores and most of our career success variables for male auditors, but not for their female counterparts. For instance, in Column 1, the positive coefficient estimate on *EXAMSCORE* for male CPAs (0.058, $p < 0.01$) indicates a 6% increase ($(e^{0.058} - 1) \times 1$) in annual compensation (*LNCOMP*) for a one-stanine improvement in exam scores. Conversely, for female CPAs, the impact on compensation is substantially lower, at 1% ($(e^{0.058-0.048} - 1) \times 100$). Similarly, the results indicate that exam scores are positively associated with promotion to partner, client portfolio size, and leadership (*PARTNER*, *LNPORTF*, *LEADERSHIP*) for male auditors, but these associations are weaker or absent for female auditors. Regarding client portfolio characteristics and average portfolio risk (*AVRISK*), which is an inverse measure of client risk, we find that for male auditors who performed better on the CPA exam, the average bankruptcy risk of their portfolios is higher (−0.035, $p < 0.01$), but this inverse relation is moderated by *FEMALE* (0.080, $p < 0.01$), such that this finding does not apply to female auditors. Average client size (*AVSIZE*) is positively associated with exam scores for both male and female auditors, with no

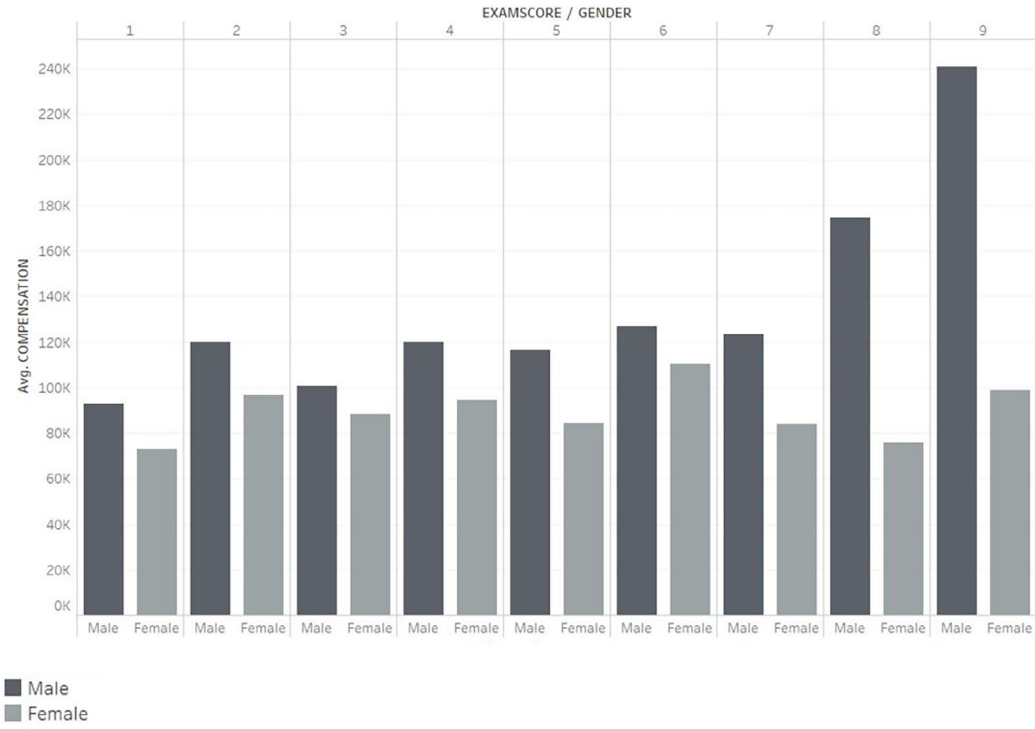

FIGURE 3 Average compensation of Big 4 male and female signing auditors, by CPA exam score stanine, from 2003 to 2016. Average compensation is shown in thousands of euros.

moderating effect. For the remaining two career outcomes, we find that working in the capital area (*CAPITAL_AREA*) is positively associated with exam scores for both male and female auditors, with no moderating effect, but industry specialization (*IND_SPEC*) is not associated with exam scores for men and negatively associated for women.

Turning to the control variables, the coefficient on *SWEDISH* is positive and highly significant in most regressions, indicating that a Swedish background is associated with career success in auditing in our setting. *LNEXP* is significantly associated with the most dependent variables in the expected direction, consistent with experience increasing career success. Conversely, candidates who require multiple attempts to pass the exam (*RETAKE*) are less successful in terms of the most measures. In summary, Table 4 shows that the key variables representing career success—compensation, promotion to Big 4 partner, portfolio size, and leadership role—are positively associated with performance on the CPA exam for male auditors, but much less so or not at all for female auditors.

Next, we investigate the mechanisms through which an auditor's CPA exam scores can influence auditor compensation. Audit partners plausibly earn more than non-partner signing auditors, and Knechel et al. (2013) show that compensation increases with client portfolio size. Therefore, the positive relation between CPA exam performance and compensation may be transmitted through partner status and/or portfolio size, which are measures of career success.[13] We use path analysis to model these potential indirect effects.

[13]In our robustness checks, we test whether the other measures of career success also act as mediators that have an indirect effect on the relation between *EXAMSCORE* and compensation.

TABLE 4 Results from regressing compensation and other outcomes on the auditor's *EXAM SCORE* and control variables.

	(1) *LNCOMP*	(2) *PARTNER*	(3) *LNPORTF*	(4) *IND_SPEC*	(5) *CAPITAL_AREA*	(6) *AVSIZE*	(7) *AVRISK*	(8) *LEADERSHIP*
EXAMSCORE	0.058***	0.149***	0.070***	0.032	0.054***	0.064***	−0.035***	0.208***
	(11.25)	(7.55)	(2.99)	(1.14)	(2.64)	(5.94)	(−4.27)	(8.08)
FEMALE	0.061	−0.254	−0.012	−0.086	0.095	0.122	−0.268***	0.678**
	(1.39)	(−1.30)	(−0.05)	(−0.29)	(0.51)	(1.08)	(−2.61)	(2.44)
EXAMSCORE × *FEMALE*	−0.048***	−0.122***	−0.118***	−0.119**	0.052	0.022	0.080***	−0.296***
	(−5.97)	(−3.46)	(−2.72)	(−2.12)	(1.50)	(1.04)	(4.19)	(−5.68)
SWEDISH	0.160***	0.507***	0.704***	0.214	0.612***	0.300***	0.041	0.490***
	(7.55)	(5.30)	(6.18)	(1.63)	(6.21)	(5.90)	(0.96)	(4.20)
LNEXP	0.300***	1.815***	2.646***	1.021***	0.675***	0.373***	−0.092	1.443***
	(13.33)	(16.03)	(11.56)	(3.29)	(5.73)	(5.07)	(−1.33)	(7.57)
RETAKE	−0.049***	−0.075	−0.262***	−0.096	−0.115	−0.209***	−0.109***	−0.304***
	(−2.71)	(−1.07)	(−2.78)	(−0.84)	(−1.55)	(−4.94)	(−3.06)	(−3.12)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exam-year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	10.454***	13.553***	−7.127***	−4.827***	−1.048**	12.586***	3.020***	−6.286***
	(127.15)	(35.60)	(−9.83)	(−5.08)	(−2.50)	(54.15)	(13.99)	(−9.29)
Observations	3,761	3,761	3,761	3,761	3,761	3,761	3,761	3,761
Adj. (Pseudo) R^2	0.347	0.333	0.214	0.089	0.048	0.098	0.062	0.137

Note: This table reports results from estimating pooled ordinary least squares or logistic regressions of auditor compensation and other outcomes on *EXAMSCORE* and control variables. The estimations include fiscal-year and exam-year fixed effects. The coefficient estimates are listed in the first row of each cell, with *t*-values or *z*-values reported in parentheses. See Appendix 1 for the variable definitions. We adjust standard errors for heteroskedasticity and cluster at the auditor level (Petersen, 2008).
*, **, and *** represent significance levels of 10%, 5%, and 1%, respectively, based on two-tailed tests.

5.2 | Path analysis

Table 5 and Figure 4 present the results from our path analysis. Panel A of Table 5 and Figure 4 report the regression coefficients for each path. As Figure 4 shows, in addition to the direct effect of *EXAMSCORE* on compensation (*LNCOMP*), there are indirect effects transmitted through the mediating variables promotion to a partner (*PARTNER*) and client portfolio size (*LNPORTF*). We compute the indirect effects by multiplying the coefficients on the paths from the exam score to the mediator by the coefficients from the mediator to compensation. All paths are moderated by the gender indicator variable (*FEMALE*). Panel B reports the indirect, direct, and total effects of *EXAMSCORE* on compensation for male and female auditors separately.

Consistent with H1, the results from our path analysis show positive associations between exam scores and career success (*LNCOMP*, *PARTNER*, *LNPORTF*) for male auditors, as indicated by the significance of their coefficients ($c'_1 = 0.040$, $a_1 = 0.069$, and $a_2 = 0.133$) reported in Figure 4 and Table 5, Panel A. *FEMALE* ($c'_3 = -0.028$, $a_{13} = -0.116$, and $a_{23} = -0.097$) moderates these paths, weakening the positive associations between exam scores and career success for female auditors, consistent with H2. For instance, results for *LNCOMP* in Panel A show path c'_1 from *EXAMSCORE* to *LNCOMP* (0.040), which is moderated by gender ($c'_3 = -0.028$, $p < 0.00$), meaning that the direct relation between CPA exam score (*EXAMSCORE*) and compensation for female auditors is smaller than that for their male counterparts ($c'_1 + c'_3 = 0.011$, $p < 0.05$). In terms of economic significance, the direct effect for a male auditor indicates that given mean compensation of €129,000, male auditors' compensation increases by €5,289 ($(e^{0.040} - 1) \times 100 = 4.1\%$) for each stanine of improvement in exam score. The direct effect for a female auditor indicates that given mean compensation of €91,000, female auditors' compensation increases by only €1,000 ($(e^{0.011} - 1) \times 100 = 1.1\%$) for each stanine of improvement in exam score.

Figure 4 illustrates three indirect effects of CPA exam scores on compensation: one through the path from *PARTNER* to *LNCOMP*, another through *LNPORTF* to *LNCOMP*, and a third through both *PARTNER* and *LNPORTF* to *LNCOMP*. First, by examining the paths from *PARTNER* to *LNCOMP* and from *LNPORTF* to *LNCOMP*, we can infer how the effect of *EXAMSCORE* on compensation is mediated by these two factors. Figure 4 and Table 5, Panel A, indicate that the path from *PARTNER* to *LNCOMP* has a positive coefficient ($b_1 = 0.492$, $p < 0.00$). For male auditors, the indirect effect of *EXAMSCORE* on compensation (*LNCOMP*) through promotion to partner (*PARTNER*) is the product of the coefficients on the paths from *EXAMSCORE* to *PARTNER* and from *PARTNER* to *COMPENSATION* ($a_1b_1 = 0.035$, $p < 0.01$). Regarding the indirect effect through client portfolio size, Figure 4 and Panel A show that the coefficient on the path from *EXAMSCORE* to *LNPORTF* (a_2) is 0.133 ($p < 0.00$), and the coefficient on the path from *LNPORTF* to *LNCOMP* (b_2) is 0.081 ($p < 0.00$). Thus, the indirect effect of *EXAMSCORE* on compensation through portfolio size (*LNPORTF*) is a_2 multiplied by b_2, equaling 0.010 ($p < 0.00$).

In addition to the two indirect effects, there is a serial mediation effect (Hayes, 2018) of exam score mediated first by partner promotion (*EXAMSCORE* → *PARTNER*), then partner promotion influencing portfolio size (*PARTNER* → *LNPORTF*), and finally portfolio size contributing to compensation (*LNPORTF* → *LNCOMP*). Multiplying the coefficients of these paths ($a_1d_{21}b_2$) yields 0.008 ($= 0.069 \times 1.417 \times 0.081$, $p < 0.00$). Combining these three pathways yields the total indirect effect of *EXAMSCORE* on *LNCOMP*. Table 5, Panel B, shows that for male auditors, this total indirect effect is positive and significant (0.053, $p < 0.00$). Panel B also reports the direct effect ($c'_1 = 0.040$, $p < 0.00$) and the total effect (0.093, $p < 0.00$) for male auditors. The economic significance of the total effect for male partners, whose mean compensation is €187,700, is that total compensation increases by €18,208 ($(e^{0.093} - 1) \times 100 = 9.7\%$) for each CPA exam score stanine.

TABLE 5 Moderated mediation model for the analysis of *EXAMSCORE* on career success depicted in Figure 1 ($N = 3{,}761$).

Panel A: Regression results of promotion to partner, client portfolio and compensation

		PARTNER				*LNPORTF*				*LNCOMP*		
		Coeff.	**SE**	***p***		**Coeff.**	**SE**	***p***		**Coeff.**	**SE**	***p***
EXAMSCORE	a_1	0.069	0.023	0.003	a_2	0.133	0.018	0.000	c'_1	0.040	0.003	0.000
PARTNER					d_{21}	1.417	0.076	0.000	b_1	0.492	0.017	0.000
LNPORTF									b_2	0.081	0.004	0.000
EXAMSCORE × *FEMALE*	a_{13}	−0.116	0.044	0.008	a_{23}	−0.097	0.033	0.003	c'_3	−0.028	0.007	0.000
PARTNER × *FEMALE*					d_3	0.486	0.143	0.001	b_{13}	−0.067	0.034	0.050
LNPORTF × *FEMALE*									b_{23}	0.002	0.007	0.713
FEMALE	e_{11}	−0.023	0.237	0.922	e_{21}	−0.365	0.183	0.046	e_{31}	0.057	0.121	0.638
SWEDISH	e_{12}	0.705	0.114	0.000	e_{22}	0.299	0.087	0.001	e_{32}	0.063	0.018	0.001
LNEXP	e_{13}	2.541	0.254	0.000	e_{23}	1.692	0.113	0.000	e_{33}	0.046	0.02	0.060
RETAKE	e_{14}	−0.256	0.092	0.005	e_{24}	−0.014	0.068	0.835	e_{34}	−0.021	0.014	0.146
Year FE		Yes				Yes				Yes		
Exam-year FE		Yes				Yes				Yes		
Intercept	i_{m1}	−6.817	0.785	0.000	i_{m2}	13.033	0.374	0.000	i_y	9.359	0.098	0.000

Panel B: Indirect, direct, and total effects of *EXAMSCORE* on auditor compensation for male and female auditors

		Indirect effects			**Direct effects**			**Total effects**		
		Coeff.	**SE**	***p***	**Coeff.**	**SE**	***p***	**Coeff.**	**SE**	***p***
Male										
Total		0.053	0.014	0.000	0.040	0.003	0.000	0.093	0.015	0.000
PARTNER	a_1b_1	0.035	0.011	0.005						
LNPORTF	a_2b_2	0.010	0.001	0.000						
PARTNER → *LNPORTF*	$a_1d_{21}b_2$	0.008	0.003	0.003						

TABLE 5 (Continued)

Panel B: Indirect, direct, and total effects of *EXAMSCORE* on auditor compensation for male and female auditors

		Indirect effects			Direct effects			Total effects		
		Coeff.	**SE**	***p***	**Coeff.**	**SE**	***p***	**Coeff.**	**SE**	***p***
Female										
Total		−0.025	0.023	0.265	0.011	0.005	0.048	−0.014	0.023	0.549
PARTNER	$(a_1 + a_{13}) \times (b_1 + b_{13})$	−0.023	0.018	0.206						
LNPORTF	$(a_2 + a_{23}) \times (b_2 + b_{23})$	0.003	0.002	0.152						
PARTNER → *LNPORTF*	$(a_1 + a_{13}) \times (d_{21} + d_3) \times (b_2 + b_{23})$	−0.006	0.004	0.208						

Note: Coefficient estimates, standard errors, and *p*-values are presented. *p*-values are based on two-tailed tests. The estimations include fiscal-year and exam-year fixed effects. We adjust standard errors for heteroskedasticity and cluster at the auditor level (Petersen, 2008). See Appendix 1 for the variable definitions.

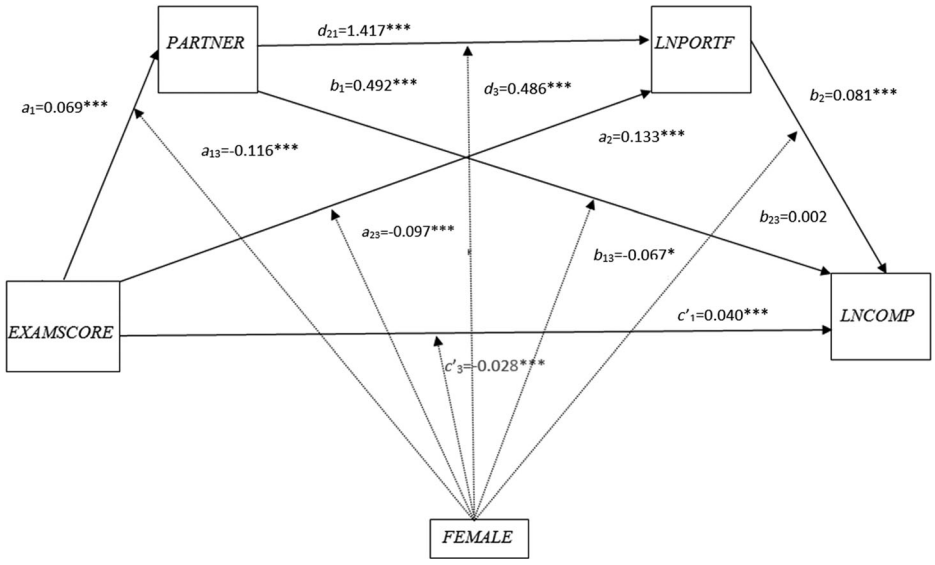

FIGURE 4 Path analysis of *EXAMSCORE* and career success measures for male and female auditors. We adjust standard errors for heteroskedasticity and cluster at the auditor level (Petersen, 2008). We include *SWEDISH*, *RETAKE*, *LNEXP*, and fiscal-year and exam-year fixed effects in all the models. See Appendix 1 for the variable definitions. *, **, and *** represent significance levels of 10%, 5%, and 1%, respectively, based on two-tailed tests.

As Table 5, Panel A, reports, these relations differ for female auditors. Regarding the indirect effects, we do not observe any significant relations between exam scores and compensation. Moreover, our moderated mediation analysis reveals that the path from *PARTNER* to *LNPORTF* is moderated by *FEMALE*. The coefficient on the interaction of *FEMALE* and *PARTNER* is positive and significant ($d_3 = 0.486$, $p < 0.00$), which means that being a female partner is associated with a greater increase in portfolio size than being a male partner. However, female audit partners receive significantly lower overall compensation because for *LNCOMP*, the coefficient on the interaction of *PARTNER* × *FEMALE* is negative and significant ($b_{13} = -0.067$, $p < 0.05$). Furthermore, as shown by the insignificant coefficient on the interaction between *FEMALE* and *LNPORTF* in the *LNCOMP* regression ($b_{23} = 0.002$, $p = 0.71$), the extent to which larger portfolios are associated with an increase in compensation for female audit partners is not significantly different from that of their male counterparts.

Panel B reports indirect effects for female auditors. The results confirm that being a partner or having a large portfolio does not mediate the effect of *EXAMSCORE* on *LNCOMP* for female auditors. Moreover, although we observe a small positive direct effect of *EXAMSCORE* on *LNCOMP* (0.011, $p < 0.05$),[14] the total effect, which combines the direct effect and indirect effects, is not significant. Combined, we conclude that *EXAMSCORE* has no significant influence on compensation for female auditors.

In summary, although better CPA exam scores correlate with career success in auditing, this relation is markedly different between genders. For men, exam scores have an influence on compensation both directly and indirectly, via promotion and portfolio size. For female auditors, the effects are either not significant or substantially weaker than those for male auditors.

[14] $0.040 - 0.028 = 0.12$, with a small difference resulting from rounding.

5.3 | Robustness checks

We further examine the sensitivity of the data by performing tests using entropy balancing. We then examine the effects of university education, address potential survivorship bias, and consider alternative mediators and mediating relations.

5.3.1 | Entropy balancing

We apply entropy balancing to achieve better covariate balance (Hainmuller, 2012). We include auditor-specific control variables (*SWEDISH*, *RETAKE*, and *LNEXP*) in the entropy-balancing procedure. We specify three balance constraints for the covariates (i.e., the mean, variance, and skewness). The inferences from untabulated results for the entropy-balanced samples are consistent with those from our main tests.

5.3.2 | University education

To alleviate concerns that differences in quality among university programs drive higher scores and impact partner promotion and compensation, we use self-reported data from LinkedIn to add university fixed effects to our regressions. Untabulated results indicate that after controlling for the university from which the auditor graduated, our main inferences hold.

5.3.3 | Survivorship bias

Our sample is restricted to auditors who passed the CPA exam and subsequently sign audit reports for the Big 4 accounting firms. This includes those who left public accounting prior to becoming partners. However, to address potential survivorship bias, we reanalyze the subgroup of auditors who worked (or continued to work) as auditors for at least 7 years (which is the average number of years to partner promotion). The untabulated results are consistent with our main findings.

5.3.4 | Alternative mediators

Because prior studies suggest that auditors who are industry specialists provide higher-quality audits (Hardies, Hossain, et al., 2021) and responsibility for listed company audits indicates leadership within the firm (Dong, 2022), we test whether industry specialization and/or leadership mediate the relation between *EXAMSCORE* and compensation. We test this by conducting a path analysis like that shown in Figure 1, but replacing *LNPORTF* with *IND_SPEC* and then with *LEADERSHIP*. The untabulated results indicate that auditing listed clients is a positive and significant mediator in the relation between *EXAMSCORE* and compensation. However, as in our main test, this relation holds only for male auditors.[15] In contrast, we find no significant indirect effects through industry specialization. In both alternative path analyses, the direct effects of *EXAMSCORE* on compensation are positive and significant for both men and women, but are significantly larger for men.

[15]We also investigate other indicator variables for an auditor's leadership role, namely, being chief executive officer or a board member of an accounting firm. However, there are almost no females in these positions and we do not find significant results.

5.3.5 | Alternative mediating relations

In another untabulated test, we include all our outcome variables other than compensation (i.e., partner, portfolio size, industry specialization, capital area, client size, client riskiness, and leadership) simultaneously as mediators in the relation between *EXAMSCORE* and compensation. Again, we find that *EXAMSCORE* has a direct positive effect on compensation and that the effect is significantly larger for male auditors (0.033, $p < 0.01$) than for female auditors (0.011, $p < 0.05$). In addition, there is a positive indirect effect through *PARTNER*, *LNPORTF*, *CAPITAL_AREA*, *AVSIZE*, and *LEADERSHIP* for male auditors, but only one positive indirect effect for female auditors (through *CAPITAL_AREA*).

5.4 | Additional analyses

We report several additional analyses to expand our understanding of the relations between exam scores and career outcomes, and to assess the sensitivity of our findings. These analyses include comparing Big 4 and non–Big 4 auditors, adding auditors who have left the profession, and controlling for audit quality.

5.4.1 | Non–Big 4 auditors compared to Big 4 auditors

Although our tests focus on Big 4 auditors, in untabulated tests, we also examine data for non–Big 4 auditors who have passed the exam and compare them with Big 4 auditors. We find that non–Big 4 auditors have lower compensation, lower exam scores, and smaller client portfolios than Big 4 auditors. Regression results show similar overall patterns, but fewer results are significant, and coefficients are smaller than those for the Big 4 auditors. Higher exam scores are associated with higher compensation for men working for non–Big 4 accounting firms but not for women. An untabulated path analysis including data for Big 4 and non–Big 4 auditors, and using *BIG4* as a mediator variable instead of *PARTNER*, shows that auditors with higher exam scores are more likely to be employed by a Big 4 accounting firm. However, we find no gender interaction effect between *EXAMSCORE* and working for the Big 4. Our path analysis results also show that for the sample that includes both Big 4 and non–Big 4 auditors, working for the Big 4 determines some of the effect of *EXAMSCORE* on auditor compensation.

5.4.2 | Auditors who have left the profession

We investigate whether leaving the auditing profession is a more successful career path for those who pass the CPA exam. Specifically, we test whether Big 4 auditors who no longer sign audit reports (excluding those older than 65 years because their leaving the profession is likely to be due to retirement) earn higher compensation. In untabulated correlations, we find that compensation for Big 4 auditors who leave the profession was higher before they exited than after they exited. Moreover, untabulated regression results show that exiting the profession is associated with lower income. In addition, the reduction in income after leaving is somewhat smaller for female auditors. Subsample analyses show that income decreases after leaving the auditing profession for both partners and non-partners. This decline is seen in male auditors across all measures of compensation and in female auditors when looking at the untransformed compensation value (*COMP*), but not when considering its logarithmic form (*LNCOMP*).

5.4.3 | Audit quality

Because the objective of the CPA exam is to ensure that auditors are competent in performing their duties (AICPA, 2018; IAESB, 2019), we test whether CPA exam scores are positively associated with audit quality, as proxied for using discretionary accruals and going-concern opinions. We find no consistent evidence that audit quality increases with exam scores for male or female auditors. There are several possible explanations for this lack of association. For example, it may be that (1) minimum thresholds for certification are sufficient to ensure a reasonable level of audit quality, (2) firms' quality control processes remove much of the variation in individual partners' accounting or auditing practices, or (3) greater exam performance does not lead to more conservative applications of GAAP or assessments of clients' abilities to continue as going concerns. Furthermore, the proxies available for audit quality may contain too much measurement error to detect any effect.

6 | CONCLUSION

This study investigates the intriguing question of whether performance on CPA exams correlates with the career success of auditors. Our findings show a strong connection between the two, albeit with an interesting difference based on gender. Specifically, we find a consistent relation between higher CPA exam scores and career success, but this connection is significant only among male auditors. Our research shows that men who excel on the CPA exam tend to earn higher compensation. Furthermore, they enjoy a higher likelihood of promotion to partner positions within the Big 4 accounting firms and of managing larger client portfolios.

Our study makes a significant contribution by assessing the extent to which professional exams serve as indicators of subsequent career success. By leveraging a unique data set encompassing individual CPAs' exam results and career outcomes, including compensation levels, promotions to partner roles, and client portfolio sizes, we document the correlation between strong exam performance and career success. This correlation manifests in the form of enhanced compensation, larger client portfolios, and an increased chance of working for a Big 4 firm and becoming a Big 4 partner. In addition, we find that the most attractive job opportunities in terms of compensation for certified auditors are in Big 4 accounting firms because we observe that auditors who leave Big 4 accounting firms tend to earn lower income at non–Big 4 accounting firms or elsewhere. This observation holds regardless of gender or CPA exam performance.

Our results also contribute by revealing differences between genders. Women face greater challenges in securing partner roles within the Big 4 accounting firms. Furthermore, the correlation between higher CPA exam scores and increased compensation is markedly more pronounced for male auditors than for female auditors. Our results indicate that differences in CPA exam performance cannot explain disparities in career outcomes between women and men. Instead, other factors, which may include gender discrimination, appear to be at play.

Although this article expands our understanding of the relations between CPA exam scores and future career performance, we acknowledge certain limitations. For example, our single-country setting may limit generalizability. In addition, we do not control for personal or family factors that may influence career aspirations or accomplishments, such as women preferring more flexible work or being more likely to leave the profession. Moreover, although our tests using auditors who left the profession show that they do not earn higher compensation, auditors with high exam scores might have left the profession for careers that are desirable in other ways. Finally, due to data limitations, we do not control for the impacts of continuing education, adherence to ethical standards and professional codes of conduct, or client satisfaction on auditor compensation.

Our study sets the stage for an intriguing debate on the significance of auditor CPA exam scores versus alternative unmeasured factors, such as soft skills or social capital, in shaping career performance. We find that in our sample, exam scores are positively associated with our measures of career success. However, the results also raise questions about the recognition of ability, particularly in the case of female auditors, for whom exam scores do not appear to translate into career success.

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DATA AVAILABILITY STATEMENT

Data sources are described in the article. Requests for data may be directed to the administrators of the databases.

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APPENDIX 1: VARIABLE DEFINITIONS

Variable	Definition
AVRISK	Mean bankruptcy risk, measured by the estimated Altman (1983, 2013) z-score for a private firm, of the firms audited by auditor *a* in year *t*
AVSIZE	Mean total assets (in the natural logarithm form) of the firms audited by auditor *a* in year *t*
BIG4	Indicator variable equal to one if auditor *a* works in Big 4 audit firm in year *t*, and zero otherwise
CAPITAL_AREA	Indicator variable equal to one if auditor *a* works primarily in the Helsinki capital area, and zero otherwise. In addition to the city of Helsinki, the capital area consists of the neighboring cities of Vantaa, Espoo, Kauniainen, Klaukkala, Tuusula, Kerava, Järvenpää, and Sipoo
EXAMSCORE	Standardized score from the professional exam that candidates must pass to become an authorized auditor, for auditor *a*. We use stanines to standardize scores on a 9-point scale with a mean of 5 and a standard deviation of 2. We calculate the score stanines for each year separately
FEMALE	Indicator variable equal to one if auditor *a* is female, and zero otherwise
IND_SPEC	Indicator variable equal to one if auditor *a* audited total assets for industry *k* in fiscal year *t* belonging to the upper quartile of its distribution, and zero otherwise

APPENDIX 1 (Continued)

Variable	Definition
LEADERSHIP	Indicator variable equal to one if auditor *a* audited at least one listed client in year *t*, and zero otherwise
LNCOMP	Natural logarithm of auditor *a*'s total earned income (in euros) in year *t*
LNEXP	Natural logarithm of one plus the number of years since auditor *a* became a certified auditor in year *t*
LNPORTF	Natural logarithm of the sum of the total assets (in euros) of the firms audited by auditor *a* in year *t*
PARTNER	Indicator variable equal to one if auditor *a* is an audit partner in a Big 4 accounting firm in year *t*, and zero otherwise
RETAKE	Indicator variable equal to one if auditor *a* required more than one attempt to pass the CPA exam, and zero otherwise
SWEDISH	Indicator variable equal to one if auditor *a* belongs to the Swedish-speaking minority, and zero otherwise

APPENDIX 2: CPA EXAMS AND CAREERS FOR PROFESSIONAL AUDITORS IN FINLAND

Finland has more than one type of licensed auditor, like many European countries (Margarison & Moizer, 1996). Our study focuses on first-tier KHT auditors who are licensed to audit any kind of business or organization, including listed companies.[16] In this study, we use the terms "CPA" and "auditor" interchangeably, both of which refer to a licensed first-tier KHT auditor.

To pass the exam, a candidate must receive approximately half of the available points for each part. Most candidates do not pass the exam, but candidates may retake the exam as many times as they wish. Those who do not pass the exam after taking it a few times usually leave the auditing profession. After a candidate passes the exam, they are allowed to sign audit reports independently. We use the term "signing auditor" to describe these auditors. Because CPA certification is needed only for auditing practice, there are many other opportunities for those possessing a master's degree in accounting and a few years of practical training and work experience in an accounting firm.

The exam is conducted once a year. It consists of two parts, with one full day allowed to complete each part. The first part includes shorter questions, and the second part contains a company's financial statements. In the second part, the candidate's task is to audit the financial statements and provide the auditor's opinion. The topics included in the exam are accounting and financial statement regulations, auditing regulations, and generally accepted audit practices. Furthermore, the candidate must have a command of regulations related to internal controls, risk management, and corporate forms.

Over the years, the pool of candidates has changed in terms of age, gender, and ethnicity. Before the beginning of this century, candidates were usually 35–40 years old, whereas at the beginning of this century, typical candidates were approximately 30 years old (Horsmanheimo & Tuominen, 2005). In 2000, the Ordinance of the Ministry of Trade and Industry 350/2000 reduced the minimum required audit experience from 5 to 3 years, most

[16]The other two types are HTM and JHTT auditors. They are authorized to audit small- and medium-sized private firms, and companies in the public sector owned by municipalities, respectively. Each type of auditor takes different exams and is subject to different criteria to be eligible to take the exam.

likely contributing to this trend. Another trend is that the number of women increased steadily over time, with females comprising approximately half of the candidates at the end of our sample period.

The majority of those who take the CPA exam work for the Big 4 accounting firms. This may be because of Finland's audit market structure. Virtually all publicly listed firms and most large private companies are audited by Big 4 accounting firms. For example, in 2015, of the total fees from public interest entity clients, 99% were charged by the Big 4 accounting firms, with PwC at 46%, KPMG at 26%, EY at 20%, and Deloitte at 7% (Finnish Patent and Registration Office, 2015).