

# Gender Diversity in Audit Partners and Audit Efforts

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## Abstract

The research uses regression models and panel data related to audit fees, audit hours and corporate governance. The sample of listed firms yields 751 firms-years observations for the period 2010-2018. We study how gender diversity among audit partners, Chief Executive Officers, and Boards of Directors impact on audit fees and audit hours. We focus on the interaction between auditors and management. We find that female audit partners is associated with lower audit fees and audit hours. Next, we find that female audit partner significantly affects the association with the audit efforts in interaction with management, but when the audit partner is male, audit efforts are also determined by the female representation on the Board of Directors. We contribute to literature on the effects of gender diversity in auditing and corporate governance. We also enrich the concept of audit efforts by including audit hours as well as audit fees. Finally, the research answers the call for empirical study on the effects of gender diversity in management-auditor interaction.

**Keywords:** gender diversity, corporate governance, audit fees, audit hours, audit efforts

## 1. Introduction

This paper studies the effects of auditor gender on audit efforts (audit fees and audit hours), which is an interesting topic for five main reasons. 1) From the academic point of view, there is very little research on this kind of association, despite increasing interest in the phenomenon. 2) There is no existing literature on the association between gender diversity in auditing and management and audit hours. 3) There is no clear theoretical explanation of effects identified in previous research, and the literature presents conflicting results (Hay et al., 2006, Hardies et al, 2015, Ittonen et al., 2012). 4) It may be possible for professionals (clients, auditors, and consultants) to improve performance by taking into account the effects of gender diversity on audit efforts. 5) This study enables regulators to evaluate the effect of gender quotas and whether it is useful to extend them to auditors.

We investigate a sample of listed companies from Italy for the period 2010 – 2018. The final sample includes 95 firms and 751 firms-years observations, starting from the year in which the gender quota on boards of directors was first regulated in Italy. The research requires extensive hand collection of data: data from the corporate governance reports of listed firms; data on audit partners, audit hours and audit fees from the shareholder meeting minutes, financial reporting, and databases of Italian auditors. Hand collecting audit hours makes the amount of work involved in audit clearer, and thus strengthens the research.

On the basis of prior literature from the perspectives of demand and supply of audit services (Hay et al., 2006, Hardies et al, 2015, Ittonen et al., 2012), we develop the following hypotheses: Gender diversity in audit partners is associated with audit fees and audit hours (H1); Gender diversity in Chief Executive Officers (CEO)/ Board of Directors (BoD) is associated with audit fees and audit hours (H2); Different genders among auditors and CEO, audit partners and CEOs significantly affect the association with audit fees/audit hours (H3a); Different genders among auditors and BoD, audit partners and BoD significantly affect the association with audit fees/audit hours (H3b).

Results show that female audit partners are associated with lower audit fees and audit hours; female CEO and female representation on BoD are not significantly associated with audit efforts. Female audit partner is a determinant of the association with audit efforts. However, when female representation on BoD goes above the legal requirement and females are the majority on the board, it is associated with higher audit fees and hours. These findings offer a partial response to the call for future research made by Hay et al., (2006) in their meta-analysis of prior literature on audit fees. As a direction for future research, Hay et al., (2006) in fact suggest investigating how

a firm's governance and the regulatory environment affect the market for audit services and the fees that the external auditor charges. In this study we extend the literature on the association between gender diversity in audit partners and audit efforts, adding evidence to prior studies in Belgium (Hardies et al., 2015), and Finland, Denmark, and Sweden (Ittonen et al., 2012). We in fact count audit hours as well as audit fees, which provides a more accurate measure of audit efforts. Next, we improve previous research by focusing on both the supply side and the demand side of auditor services. We find that a female audit partner lowers audit efforts for two main reasons. 1) On the supply side, females lower audit risk and consequently audit efforts thanks to their higher level of competences and better communication and teamwork skills. 2) On the demand side, they can lower demand for audit services and consequently audit fees and hours thanks to their higher quality of earnings (lower earnings management). Thirdly, there is a paucity of empirical evidence on the interaction between management and auditor relating to gender (i.e. CEO - audit partner: male-male; female-male; male-female and female-female). Finally, we contribute to answering the call for future research on this made by Khlif and Achek, (2017).

The remainder of the paper is structured as follows. Section 2 discusses prior literature and develops the hypothesis. Section 3 describes the sample and Section 4 presents the research design. Section 5 analyzes the results and Section 6 concludes with a discussion of the findings, contributions, and limitations.

## 2. Literature Review and Hypothesis Development

The literature has extensively studied the determinants of audit fees (Hay et al., 2006), for example, Big N and the size of audit firm (Simunic, 1980), CEO duality (Muniandy, 2007), and BoD and audit committee characteristics (Krishnan and Visvanathan, 2009). In this study, we analyze differences in gender between audit partner, CEO and BoD as determinants of audit fees, and also examine audit hours, which are a significant variable in audit efforts.

In the literature, there is no consensus on the association between different genders in auditor – manager pairs and audit fees. Previous research tends to focus on positive and negative associations with audit fees and mainly explains them from the perspectives of demand and supply. Audit fees are affected by both the demand for audit services by clients and the supply of audit services from external audit firms. Table 1 briefly summarizes the conflicting results of prior literature used in the development of our hypotheses.

Table 1. Gender diversity in auditing and corporate governance literature

	<b>Demand-side Perspective</b> (Demand for audit Services)	<b>Supply-side Perspective</b> (Supply of audit Services)
Female audit partner	Increase financial reporting quality, constrain earnings management (Hardies et al., 2014, Ittonen et al., 2013), and clients pay an audit fee premium. The tendency for homophily in the hiring process of audit partners may lower the audit fees (Ittonen et al., 2012) Associated with higher quality of financial reporting (Barua et al., 2010, Abbott et al., 2012, Srinidhi et al., 2011). This could lower demand for external audit services.	More risk averse (Hardies et al., 2013, Ittonen, 2012) and charge clients higher audit fees and audit hours. Their better communication and teamwork skills and the gender wage gap reduce audit efforts (Ittonen, 2012)
Female CEO	CEO guarantees financial reporting, and has the incentive to support the selection of high quality auditor. Likely to require higher audit assurance, and influence the audit committee to purchase higher audit services, which lead to higher audit fees (Huang et al., 2014).	When auditors bear less inherent risk for the financial statement they are willing to reduce the scope of the audit leading to lower audit fees (Ittonen et al., 2010)
Female representatives on BoD and audit Committee	Likely to demand higher audit efforts (Lay et al., 2017) Given that they improve the effectiveness of the BoD monitoring, and influence the assessment of the audit risk by auditor, they lower audit fees (Nekhili et al., 2019)	Strengthen the internal controls, so external auditor reduces the assessed level of control risk, and lowers audit fees (Ittonen, 2010)

We develop three hypotheses: an association between female audit partners and audit fees/audit hours (H1); an association between gender in BoD/CEO and audit fees/audit hours (H2); and an association with audit fees/audit hours for different gender combinations female-male between auditor partners and representation on BoD and CEO (H3).

### *2.1 Association between Female Audit Partners and Audit Fees/Audit Hours*

Ittonen et al. (2012), analyzing Finland, Denmark and Sweden from the perspective of supply, find that firms with female audit partners charge higher audit fees, and interpret this as the result of higher risk aversion among females who thus require higher level of audit investment and audit fees. In line with Ittonen et al. (2012), Hardies et al., (2015), analyzing Belgium, find a female audit fee premium, again explained by higher risk aversion, and by gender differences in knowledge, skills, abilities, preferences, and behavior, or by other supply-side factors. However, there is no clear theoretical explanation to support these results, and other literature (Wood et al., 1985, Blau & Kahn, 1992, 2000) finds the opposite: better communication and teamwork skills of women, and the gender wage gap, reduce the audit effort. As prior literature finds mixed results, the interpretation of the association between gender diversity in audit partners and audit fees is an open empirical question.

Given the difficulties in collecting data, few studies analyze audit hours, although Caramanis and Lennox (2008), investigating a sample of 9,738 observations in Greece in the period 1994-2002, demonstrate how a higher number of audit team hours dedicated to auditing services reduces the probability of earnings management. Chun and Rhee (2015), analyzing a sample of South Korean companies in the period 2002-2010, explore the relationship between audit hours and financial analyst coverage. The results show a positive association between analyst coverage and the number of audit hours delivered, which suggests that analyst coverage has a significant influence on auditors, producing an increase in audit hours due to the incremental possibility of reputation damage resulting from an audit failure. Hardies et al, (2015) hypothesize that audit fees may be higher for female auditors due to their greater effort (e.g., more hours), but do not use audit hours to test gender diversity. To the best of our knowledge, no studies exist that test the association between gender and audit hours. We contribute to the literature by clarifying the effect of female audit partners, on both component of audit efforts. The first hypothesis tests whether

#### **H1: Gender diversity in audit partners is associated with audit fees and audit hours**

### *2.2 Association between Gender of BoD/CEO and Audit Fees/Audit Hours*

Corporate governance can be considered as that set of rules, practices and operational procedures which allow people, mainly at the top of the company, to take decisions, define objectives and pursue them (Brogi, 2016). Good corporate governance has positive effects on the economic system in terms of growth, job maintenance and creation, environmental sustainability and investment opportunities, so corporate governance is extremely important for society as a whole.

After the recent series of financial scandals, corporate governance guidelines in many firms and sectors worldwide were revised to strengthen the independence of the board of directors by including a higher number of independent non-executive directors and minorities, including women (Furlotti et al., 2019, Zuraik et al., 2020). These new provisions have overall improved supervision by management bodies, and also have implications for the quality of the service rendered by external auditors. This is because, from a theoretical point of view, acceptance of the assignment requires that the auditor assesses the risk related to the customer by designing an appropriate audit strategy. The auditor interprets solid mechanisms of internal control as a sign of strong internal corporate governance on the part of the client (Zaman et al., 2011). Even though internal audit activities can sometimes replace functions performed by the external auditor, other evidence suggests that companies with large internal audit functions and high quality corporate governance also undertake a higher overall level of external audit. This suggests that audit committees, the internal audit function and external audit are sometimes but not always complementary mechanisms within the governance framework (Goodwin-Stewart and Kent, 2006; Felix et al., 2001). Zhang and Yu (2016) state that these differences in empirical evidence could be related to the context and availability of information. Alfraih, (2017) investigates the association between the composition of boards of directors and the choice of external auditor among companies listed on the Kuwait Stock Exchange in 2013, and finds that independence, female representation on BoD and size increase the likelihood that a company selects a Big 4 audit firm.

A gender-diverse board is more motivated and oriented towards transparency as well as more effective in monitor management activities, a feature that leads to the selection of higher quality external auditors. A gender-diverse board with females in top positions is less likely to bribe (Tuliao and Chen, 2017). It has also been found that cultural values of institutional collectivism and performance orientation strengthen the impact of gender on bribery, while future orientation weakens the gender bribery relationship (Tuliao and Chen, 2017). In addition, Brooks and Zank (2005) suggest that female administrators tend to be more opposed to complexity and require higher levels of monitoring in order to protect the reputational capital of the companies they manage. In term of links between gender diversity and internal compensation, Usman et al. (2018) find that gender-diverse compensation committees limit CEO total cash compensation and strengthen the link between CEO pay and firm performance.

Huang et al., (2015) investigate the association between corporate executive gender and audit fees in U.S. firms for the period 2003 – 2010. From the perspective of demand, they find a positive association between CEO and audit fees: firms with female audit partner pay 8.9 per cent higher audit fees than firms with male CEOs. As the CEO is responsible for the signature on financial reporting, he or she thus has a big incentive to support the selection of high quality auditors, able to assure high audit quality. Lai et al. (2017) examine the effect of gender diversity in the BoD (audit committee) and auditor choice in a sample of U.S. companies in the period 2001-2011. The results, from the demand side, show that companies with female directors on the board, female directors on the audit committee, and a proportion of females on the audit committee increase audit efforts as measured with audit fees and audit specialist. On the other hand, Ittonen et al, 2010, studying U.S. S&P 500 firms, report a negative association between female chair and other components of the audit committee and audit fees. They suggest this may be because female presence reduces the inherent risk of financial misstatement by improving the effectiveness of internal control activities and enhancing the integrity of the financial reporting. The indirect effect is that the audit firm supply lowers audit efforts. Nekhili et al. (2019) study the effect of BoD (audit committee) gender diversity on audit fees in France. From the perspective of demand, they find that the presence of female independent directors and female audit committee members lowers audit fees, given that female presence improves the effectiveness of BoD monitoring, and influences the assessment of the audit risk by the auditor.

Prior literature also suggests that female CEO and female representation on BoD are associated with higher earnings quality and lower earnings management (Baua et al., 2010, Abbott et al., 2012, Srinidhi et al., 2011). This may be because higher earnings quality lower earnings management and lower the demand for audit services and for audit efforts in assessing audit risks, and thus lower the audit fees.

Previous literature in fact provides conflicting evidence on the sign of the association between gender diversity on CEO/BoD and audit fees. There appear moreover to be no previous studies of the effect of gender on audit hours, as a complementary measure of audit efforts. Our second hypothesis tests how female CEO and female representation on the BoD affect audit fees and audit hours.

## **H2: Gender diversity in CEO/BoD is associated with audit fees and audit hours**

While literature has previously investigated differences between gender in Auditors, CEO and BoD, there has been no research on the effects of gender in the combination auditor-manager. A comparison between a pair consisting of female audit partner – male CEO and a pair consisting of male audit partner – male CEO should reveal the main determinant of the effect on audit efforts.

There has in fact been a call for new research on gender diversity in prior literature (Khlif and Achek, 2017). There is a lack of empirical evidence concerning the effect of management-auditor gender pairs (i.e. CEO - audit partner: male–male; female–male; male–female and female–female).

Firstly, we aim to study the effect of gender of audit partners and CEO on audit efforts in terms of audit fees and audit hours. Given findings relating to H1 and H2 on the association between auditor/manager and audit fees/audit hours, the question of whether the positive or negative association is stronger is open to empirical investigation. We investigate whether audit effort is more heavily influenced by difference with CEO gender when the audit partner is male, or by difference with CEO gender when the audit partner is female. We also investigate whether audit efforts can be determined only by audit partner gender, independently of CEO gender.

### **H3a: Comparing gender of auditor and CEO, female or male audit partner and female or male CEO significantly affects the association with audit fees/audit hours.**

Next, we study the effect of different genders of audit partner and BoD on audit fees and audit hours. We investigate whether audit effort is more heavily influenced by females on BoD when the partner is male, or when the partner is female. We also investigate whether audit effort is determined by partner gender alone, independently of gender diversity on BoD.

### **H3b: Comparing gender of auditor and BoD, female or male audit partner and female or male on BoD significantly affects the association with audit fees/audit hours.**

## **3. Methodology**

### *3.1 Sample*

Table 2 shows how the sample was selected. Starting from 308 Italian listed companies we excluded firms in the financial industries, listed outside Italy, with fiscal year end different from 31 December, with a two-tier or one-tier system, and with missing data on corporate governance. The final panel sample includes 95 firms and 751 firms-years observations for the period 2010-2018. The period starts in the year 2010, the year that legislation on

gender quota on BoD came into force in Italy. We analyze 95 listed firms, which voluntarily disclose data on audit hours to measure audit effort. Audit effort represents the effort of the partners together with their teams. Voluntary disclosure in shareholders' annual meeting is given for the total audit hours of the audit for the fiscal year. Italy is one of the few countries in the world with the availability of a direct proxy for audit effort using data on audit hours.

The research is based on extensive hand-collected data: data from the corporate governance report of Italian listed firms; data on audit partners, audit hours and audit fees from minutes of shareholder meetings, financial reporting, and the national database of auditors. Using the name of the audit partner, we identified the location of the audit office from the website or by telephone call to certain non-Big 4 firms where the information was not available online. Where the location is Rome or Milan, the two largest cities in Italy, we indicate this in our database. Financial statement data are taken from Compustat Global.

Table 2. Sample selection

Description	N
Italian companies listed on the Milan Stock Exchange not listed on overseas markets and with fiscal year end 31 December	308
Delete: firms in financial industry	-50
Delete: companies with missing data on corporate governance or with director deaths/retirements or with a two-tier or one-tier system (different from the traditional system)	-145
Delete: companies with missing data on audit opinion and audit hours (We retain only companies which continued to report audit hours after the 2017 CONSOB Resolution making audit hour disclosure non-obligatory)	-18
Number of companies in the sample	95
Number of firms-year observations (unbalanced sample) 2010-2018	751

### 3.2 Research Design

To test our three hypotheses, we used panel data and the following multivariate ordinary least square regression models:

$$\text{Audit fees or audit hours} = \beta_0 + \beta_1 \text{ female partner} + \beta_n \text{ Control variables} + \text{Year fixed effects} + \text{Industry fixed effects} + e \quad (\text{H1})$$

$$\text{Audit fees or audit hours} = \beta_0 + \beta_1 \text{ female CEO/BoD} + \beta_n \text{ Control variables} + \text{Year fixed effects} + \text{Industry fixed effects} + e \quad (\text{H2})$$

$$\text{Audit fees or audit hours} = \beta_0 + \beta_1 \text{ Combination female partner} - \text{female CEO} + \beta_2 \text{ Combination male partner} - \text{female CEO} + \beta_3 \text{ Combination female partner} - \text{male CEO} + \beta_4 \text{ Combination male partner} - \text{male CEO} + \beta_n \text{ Control variables} + \text{Year fixed effects} + \text{Industry fixed effects} + e \quad (\text{H3a})$$

$$\text{Audit fees or audit hours} = \beta_0 + \beta_1 \text{ Combination female partner} - \text{female BoD} + \beta_2 \text{ Combination male partner} - \text{female BoD} + \beta_3 \text{ Combination female partner} - \text{male BoD} + \beta_4 \text{ Combination male partner} - \text{male BoD} + \beta_n \text{ Control variables} + \text{Year fixed effects} + \text{Industry fixed effects} + e \quad (\text{H3b})$$

The definition of variables is described in the Appendix.

We base our regression models for audit fees and audit hours following the literature, using the natural logarithm of the dependent variables to reduce the wide variability and choosing as control variables those found as determinants of audit pricing. We use the total of audit fees and audit hours to investigate partner efforts because the partner has the highest responsibility on the audit opinion and audit quality. Analytical data on audit fees and audit hours for audit partners and other components of the teams are not publicly available.

To test H1 (H2), our independent variable of interest is a dummy variable, female audit partner (CEO), or a continuous variable representing the percentage of females on BoD. We expect  $\beta_1$  to be significant but have no expectations on the sign of the relation.

To test H3a and H3b, we set up pairs creating 4 dummy variables representing each possible combination of female-male (Table 3). Given that the 4 dummies represent all the possibilities in the sample, one combination is used as comparison group for all the others, and the regression model selects the comparison group on the basis of the best fit. For H3a the model selects the combination female partner – male CEO, for H3b with a threshold of 20%, it selects the combination female partner – female BoD, and for H3b with a threshold of 50% it selects the

combination female partner – male BoD.

Table 3. Method H3

H3a			H3b 20%			H3b 50%		
partner	CEO	Regression coefficient	partner	BoD	Regression coefficient	partner	BoD	Regression coefficient
female	female	$\beta_1$	female	female	$\beta_1$ <i>comparison</i>	female	female	$\beta_1$
male	female	$\beta_2$	male	female	$\beta_2$	male	female	$\beta_2$
<i>female</i>	<i>male</i>	$\beta_3$ <i>comparison</i>	female	male	$\beta_3$	female	male	$\beta_3$ <i>comparison</i>
male	male	$\beta_4$	male	male	$\beta_4$	male	male	$\beta_4$

Looking at H3a and H3b where  $\beta_3$  is the comparison group, if gender in CEO or BoD is a determinant of audit efforts independently of the gender of the audit partner, we expect  $\beta_1$  or  $\beta_2$  to be significant. In addition, if CEO or BoD is a determinant of the audit efforts but its effects depend on the gender of the partner, we expect  $\beta_1$  to be significantly different from  $\beta_2$ .

If partner gender is a determinant of audit efforts in case of male CEO or high male representation on BoD, we expect  $\beta_2$  or  $\beta_4$  to be significant. If its effects depend on CEO or BoD gender, we expect  $\beta_2$  to be significantly different from  $\beta_4$ .

To perform the final test, we run a chi square test on the differences between regression coefficients to find the statistical significance of their difference.

A similar procedure is followed when  $\beta_1$  is the comparison group for H3b. We expect  $\beta_3$  and  $\beta_4$  to be significant and different from each other which would show the effect of BoD gender dependent or independent of partner gender, and we expect  $\beta_2$  and  $\beta_4$  to be significant and different from each other which would show the effect of partner gender dependent or independent of BoD gender diversity.

## 4. Results

### 4.1 Descriptive Statistics

This section provides descriptive statistics, trends in audit fees, audit hours and audit fee per hour, and trends in female representation on BoD and among audit partners over time.

Table 4 shows the descriptive statistics. The average audit hours (audit fees) used for a non-financial listed firm in a fiscal year is 4198 hours (301 million euros). This value has a high standard deviation due to big differences in the size of the companies in the sample. The median value represents most closely the majority of Italian firms, showing 1714 hours (128 million euros) spent on audit in a fiscal year. Following the literature on audit fee models, we use the logarithm of audit hours and fees as dependent variable. One hour of audit firm work can cost the client from 6,00 to 333,00 euro, with an average cost of 77,00 euro.

Female partners are responsible for signing 9.3 percent of the financial statements of the sample. Looking at auditor characteristics, 88.4 percent of the market is covered by Big4. Most financial statements are signed by a Milan office (37.4 percent) and some in Rome (13.7 percent). Females account for an average of 21.2 percent, and number from 0 to 7. This reflects Italian legislation on gender quotas, which required some firms to reach 20 percent of women on boards by 2013 and other firms two years later, by 2015. On small boards of 3 members, 1 woman is enough to meet the requirement.

Table 4. Descriptive statistics

Variables	Mean	Std. Dev.	25 Percentile	Median	75 Percentile	Min	Max
AUDIT HOURS	7.604	1.011	6.903	7.447	8.241	5.136	12.189
Number of hours	4198	11884	995	1714	3794	170	196626
AUDIT FEES	11.882	1.027	11.156	11.757	12.529	9.425	16.524
fees in thousand euro	301394	862894	70000	127670	276333	12400	15000000
EP FEMALE	0.093	0.291	0.000	0.000	0.000	0.000	1.000
EP MILAN	0.374	0.484	0.000	0.000	1.000	0.000	1.000
EP ROME	0.137	0.344	0.000	0.000	0.000	0.000	1.000
BIGN	0.884	0.320	1.000	1.000	1.000	0.000	1.000
BoD FEMALE	0.212	0.139	0.100	0.220	0.330	0.000	0.710
Number of female	2	1	1	2	3	0	7
BoD SIZE	2.225	0.325	2.079	2.197	2.485	1.099	3.045
Number of members	10	3	8	9	12	3	21
CEO FEMALE	0.049	0.217	0.000	0.000	0.000	0.000	1.000
SIZE	6.490	1.937	5.140	6.346	7.679	2.842	11.955
LEVERAGE	0.370	0.185	0.252	0.363	0.482	-0.418	0.842
LOSS	0.275	0.447	0.000	0.000	1.000	0.000	1.000
SALES GROWTH	0.040	0.199	-0.035	0.031	0.096	-0.640	1.027
ROA	0.050	0.067	0.018	0.047	0.077	-0.151	0.266
CATA	0.496	0.198	0.335	0.480	0.658	0.103	0.915
ALTMAN	1.478	0.841	0.962	1.380	1.832	-0.818	4.185

Figure 1 shows an irregular trend in audit fees, audit hours and audit fee per hour at audit partner level. Audit fees increase in the first three years, decline in the fourth year and rise again in the fifth year. The trend of average hours spent on audit during the mandate of the individual partner decreases overall from the third year of the partner mandate. The reduction of both audit fees and audit hours from the third year perhaps reflects the risk of dismissal, and the greater difficulty in understanding the mechanisms of the business in the first years of the engagement. It is in fact possible that the first year of assignment for an audit firm coincides with the first year of assignment for a new partner; the partner may have “brought the client with him/her” from a previous employer or the partner may have audited the client in the previous mandate. As the assignment increases in duration, the auditor will work more rapidly thanks to better knowledge of the customer and greater familiarity with the procedures.

Figure 2 shows the trends of audit fees, audit hours and audit fee per hour at female audit partner level. It is firstly noticeable that audit fees are lower. Secondly, the trend is in the same direction as above, but there is no reduction between the third and the fourth years to suggest that any lowballing takes place. Audit hours start to decrease earlier, during the second year.

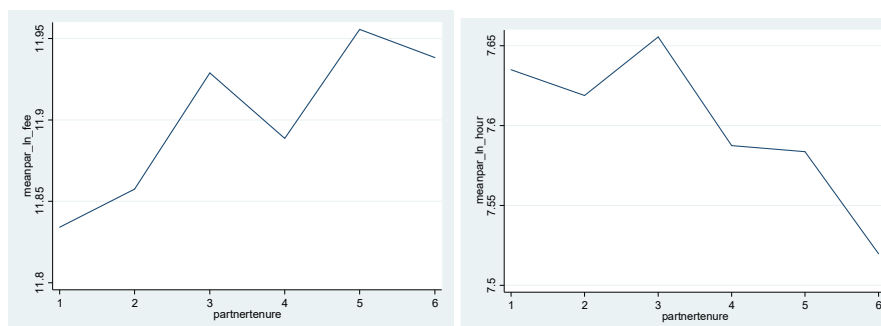


Figure 1. Audit fees, audit hours trend by audit partner tenure

Meanpar\_in\_fee (Meanpar\_in\_hour) is the mean at partner level of the natural logarithm of audit fees (hours) in the year analysed. partnertennure is the number of years the partner has audited the client. The period ranges from 1 to 6 years, the maximum duration permitted by Italian legislation in our sample period).

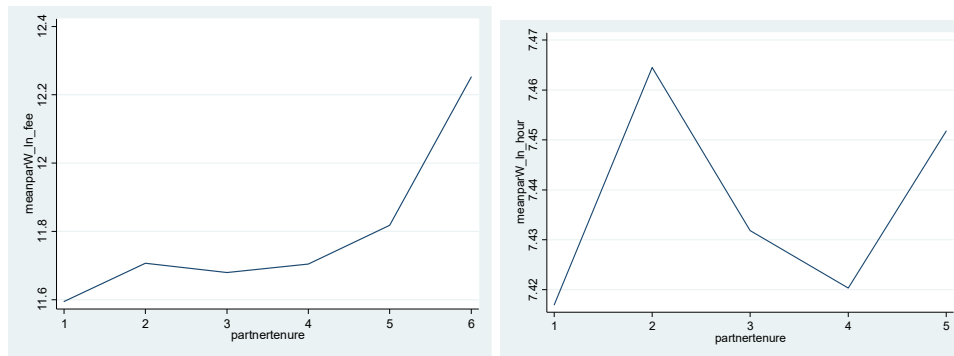


Figure 2. Audit fees, audit hour trends by audit partner tenure for females

MeanparW\_ln\_fee (MeanparW\_ln\_hour) is the mean at partner level, when the partner is a woman, of the natural logarithm of audit fees (hours) in the year analysed. partnertenure is the number of years the partner has audited the client. The period ranges from 1 to 6 years, the maximum duration permitted by Italian legislation in our sample period).

4.2 Regression Results

Table 5 shows results on gender diversity in audit partners associated with audit fees and audit hours (H1). Coefficients for both audit fees (-0.198) and audit hours (-0.124) are negative and statistically significant (p-value < 0.10). Female audit partners are associated with lower audit fees and audit hours. This means that female audit partners, perhaps thanks to their competencies, positively affect the earnings quality of the financial reporting and, through their better communication and teamwork skills are associated with lower audit fees and use lower audit hours than male audit partners. Hardies et al., (2015) reason that audit fees are higher for female audit partners because they work longer audit hours. We find consistent results: both audit fees and audit hours are lower for female audit partners. Among the control variables, Big N, audit partner in Milan, size, and loss have positive and significant coefficients, while leverage has a negative and significant coefficient. These coefficients support our main result: female audit partners are associated with lower audit fees and audit hours in a context where Big N, larger offices (Milan), bigger clients, and clients with loss pay higher audit fees and require higher audit hours.

None of the coefficients of female CEO or female percentage on BoD (H2) are statistically significantly related to audit fees or audit hours (untabulated). Our study does not confirm prior literature results that find significant evidence of positive and negative association with audit fees.

Table 5. H1 – Gender diversity in Audit Partner

	AUDIT FEES		AUDIT HOURS	
	Estimate	p-value	Estimate	p-value
EP FEMALE	<b>-0.198</b>	<b>0.043</b>	<b>-0.124</b>	<b>0.098</b>
EP MILAN	0.136	0.030	0.124	0.005
EP ROME	0.130	0.229	0.039	0.566
BIGN	0.198	0.023	0.177	0.001
SIZE	0.389	0.000	0.303	0.000
LEVERAGE	-0.531	0.022	-0.779	0.000
LOSS	0.167	0.011	0.127	0.005
SALES GROWTH	0.029	0.858	0.024	0.844
ROA	-1.033	0.099	-0.437	0.274
CATA	0.086	0.674	-0.230	0.112
ALTMAN	0.054	0.456	0.088	0.039
Industry fixed effects	Included		Included	
Year fixed effects	Included		Included	
Adjusted R2	0.482		0.559	
N	751		751	

Table 6a Panel A reports the association of audit fees and audit hours with different gender in audit partner and



CEO (H3a). There is no combination female audit partner – female CEO in our sample. The pairs female audit partner – male CEO are associated with lower audit efforts than the pairs male audit partner – male CEO (positive regression coefficient 0.128 for audit fees and 0.202 for audit hours, p-value <0.10). On the other hand, the combination female audit partner – male CEO has no different and significant effect compared with male audit partner – female CEO. Our expectation that  $\beta_4$  would be significant is the only expectation to be confirmed. When CEO is a male, the gender of the audit partner is a determinant of audit effort.

Table 6b Panel B shows the results on the association of audit fees and audit hours with gender diversity in audit partner and BoD (H3b). We classify high female representation on the BoD in two bands: over 20 per cent (Table 6, Columns 2, 3, 4 and 5) and over 50 per cent (Columns 6, 7, 8 and 9).

The first criterion (Table 6, over 20 per cent) is met by all BoDs (Note 1), in compliance with the law on gender quotas in force in Italy from 2010. In this case, female audit partner combined with high female representation on BoD is associated with lower audit fees compared with the combination male audit partner – low female representation in the BoD (0.231). In the same direction, female audit partner combined with high female representation on BoD is associated with lower audit fees compared with male audit partner – high female representation on BoD (0.284). Conversely, female audit partner combined with high female representation on BoD is not significantly different from the combination female audit partner – low female representation on the BoD. Only the expectation that  $\beta_2$  and  $\beta_4$  would be significant in showing the effect of partner gender is confirmed, but the difference between coefficients (0.284-0.231) is not statistically significant when regression coefficients are compared. It is not possible to conclude that the effect of partner gender is dependent on the threshold of BoD gender diversity required by the law. Taken together, these results mean that female audit partner is the significant determinant of the effects on audit fees.

Our sample contains no examples of BoD with over 50% female representation so it is not possible to assess the combination female audit partner – high female representation on BoD at this level. Comparison between the other combinations however yields significant results for both audit fees and audit hours. Female audit partner – low female representation (under 50 per cent) on BoD is associated with lower audit fees and audit hours compared with two combinations: 1) male audit partner – high female representation on BoD (0.529 for audit hours and 0.569 for audit fees) and 2) male audit partner – low female representation on BoD (0.120 for audit hours and 0.195 for audit fees). All coefficients  $\beta_2$  and  $\beta_4$  are significant, showing that when the BoD gender diversity is low, the gender of the partner is a determinant of audit effort. Moreover, the combination male audit partner – high female representation on BoD is associated with higher audit fees and hours than the combination male audit partners – low female representation (0.529 > 0.120; 0.569 > 0.195). Female presence on BoD has an impact when the audit partner is a male. We also find that the effect is not independent of BoD gender diversity, as  $\beta_2$  is significantly different from  $\beta_4$  (Chi square test of difference on coefficients untabulated). Thus, when female representation on BoD is higher than the legal requirement and accounts for the majority of the board, the partner gender effect on audit efforts depends on BoD gender diversity, and specifically, a larger female representation is associated with higher audit fees and hours.

Table 6a. Panel A– H3a – different gender auditor - CEO

	<i>AUDIT HOURS</i>		<i>AUDIT FEES</i>	
	<b>Estimate</b>	<b>p-value</b>	<b>Estimate</b>	<b>p-value</b>
<i>EP FEMALE_</i> <i>CEO FEMALE</i>	group not appearing in the sample		group not appearing in the sample	
<i>EP MALE_</i> <i>CEO FEMALE</i>	0.080	0.412	0.163	0.122
<i>EP FEMALE_</i> <i>CEO MALE</i>	comparison group		comparison group	
<i>EP MALE_</i> <i>CEO MALE</i>	<b>0.128</b>	<b>0.092</b>	<b>0.202</b>	<b>0.043</b>
<i>EP MILAN</i>	0.124	0.005	0.136	0.029
<i>EP ROME</i>	0.043	0.536	0.133	0.225
<i>BIGN</i>	0.182	0.001	0.202	0.022
<i>SIZE</i>	0.302	0.000	0.388	0.000
<i>LEVERAGE</i>	-0.764	0.000	-0.519	0.031
<i>LOSS</i>	0.127	0.005	0.167	0.011

<i>SALES GROWTH</i>	0.024	0.840	0.030	0.856
<i>ROA</i>	-0.440	0.272	-1.035	0.099
<i>CATA</i>	-0.226	0.118	0.089	0.665
<i>ALTMAN</i>	0.085	0.050	0.051	0.481
<i>Industry fixed effects</i>	Included		Included	
<i>Year fixed effects</i>	Included		Included	
<i>Adjusted R2</i>	0.559		0.482	
<i>N</i>	751		751	

Table 6b. Panel B– H3b – gender diversity auditor - BoD

	<i>AUDIT HOURS</i>		<i>AUDIT FEES</i>		<i>AUDIT HOURS</i>		<i>AUDIT FEES</i>	
	Estimate	P-value	Estimate	P-value	Estimate	P-value	Estimate	P-value
<i>EP FEMALE_</i> <i>BoD</i> <i>FEMALE&gt;=20%</i>	comparison group		comparison group					
<i>EP MALE_</i> <i>BoD</i> <i>FEMALE&gt;=20%</i>	0.112	0.188	<b>0.231</b>	<b>0.035</b>				
<i>EP FEMALE_</i> <i>BoD</i> <i>FEMALE&lt;20%</i>	-0.045	0.776	0.203	0.337				
<i>EP MALE_</i> <i>BoD</i> <i>FEMALE&lt;20%</i>	0.114	0.197	<b>0.284</b>	<b>0.011</b>				
<i>EP FEMALE_</i> <i>BoD</i> <i>FEMALE&gt;=50%</i>					group not in the sample		group not in the sample	
<i>EP MALE_</i> <i>BoD</i> <i>FEMALE&gt;=50%</i>					<b>0.529</b>	<b>0.007</b>	<b>0.569</b>	<b>0.074</b>
<i>EP FEMALE_</i> <i>BoD</i> <i>FEMALE&lt;50%</i>					comparison group		comparison group	
<i>EP MALE_</i> <i>BoD</i> <i>FEMALE&lt;50%</i>					<b>0.120</b>	<b>0.10</b>	<b>0.195</b>	<b>0.047</b>
<i>EP MILAN</i>	0.124	0.005	0.132	0.035	0.125	0.005	0.137	0.028
<i>EP ROME</i>	0.040	0.562	0.131	0.226	0.040	0.555	0.131	0.226
<i>BIGN</i>	0.179	0.001	0.193	0.026	0.177	0.001	0.198	0.023
<i>SIZE</i>	0.302	0.000	0.389	0.000	0.300	0.000	0.387	0.000
<i>LEVERAGE</i>	-0.779	0.000	-0.515	0.028	-0.799	0.000	-0.549	0.019
<i>LOSS</i>	0.126	0.005	0.164	0.013	0.115	0.009	0.157	0.018
<i>SALES GROWTH</i>	0.023	0.848	0.025	0.880	0.032	0.788	0.037	0.821
<i>ROA</i>	-0.436	0.277	-1.005	0.109	-0.437	0.272	-1.033	0.099
<i>CATA</i>	-0.231	0.111	0.095	0.644	-0.252	0.085	0.067	0.748
<i>ALTMAN</i>	0.088	0.041	0.048	0.499	0.089	0.036	0.055	0.447
<i>Industry fixed effects</i>	Included		Included		Included		Included	
<i>Year fixed effects</i>	Included		Included		Included		Included	
<i>Adjusted R2</i>	0.558		0.482		0.561		0.483	
<i>N</i>	751		751		751		751	

4.3 Additional Analysis

Figure 3 shows the trend of female representation on BoD (X axis) and of female audit partner (X axis) over time

(Y axis). There is a significant linear increase over time in the total female representation on the BoD. The number of female directors is significantly higher than the number of female partners, and the trend in female audit partners is not a linear increase.

Figure 4 shows a univariate relation between females on BoD (X axis) and female audit partners (Y axis). The best-fitting model is a quadratic model, where for high female representation on BoD, the number of female audit partners is lower.

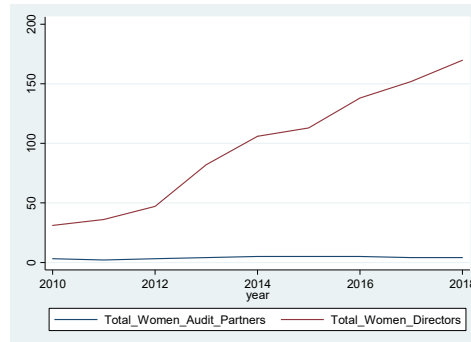


Figure 3. Trend over time of female audit partner and female representation on BoD

Figure 3 shows the trend in total number of female audit partners and total number of females represented on BoD.

The Y axis shows the number of females in the period 2010 - 2018.

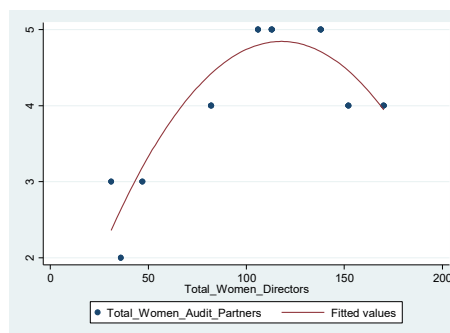


Figure 4. Relationship between numbers of female audit partners and females on BoD

Here the Y axis shows the total number of female audit partners. The X axis shows the total number of females on BoD for purposes of comparison. The dots represent the real value, and the continuous line the fitted values of a interpolated non-linear relation.

Table 8 shows the determinants of female and male audit partners at univariate level. We used a Wilcoxon test, useful to compare the mean differences of dummy variables, to find whether the differences appear only in the observations in the sample, or whether they are also significant and generalizable. Table 7 shows the mean of audit office, Big4, type of industry for female and male audit partner, the value of the test and its p-value. The mean value provides an indication of the statistics in the sample, and the p-value provides indications on the significance of these mean differences. Looking at the size of audit offices, in Milan there are more female audit partners (0.117 > 0.079), and in Rome there are fewer (0.049 < 0.100). The industries involved with higher numbers of women audit partners are Mining and Construction and Food (0.212), and Textile, Paper, Plastic Manufacturing (0.173), while no women audit partners worked with Services industries. Trade involved fewer women audit partners than other industries (0.021). The results are statistically significant (p-value < 0.10), and are thus not driven by the sample selection. However, there are no significant differences between Big4 and non Big4.

Table 7. Additional analysis: Wilcoxon Test of mean difference between male and female audit partners

Variables	Mean	Mean	Wilcoxon	p-value
	Female partner	audit partner		
	<b>Variable = 1</b>	<b>Variable = 0</b>		
<i>EP MILAN</i>	0.117	0.079	-1.765	<b>0.0776</b>
<i>EP ROME</i>	0.049	0.100	1.677	<b>0.0935</b>
<i>BIG4</i>	0.093	0.092	-0.043	0.9659
<i>INDUSTRY Mining and Construction</i>	0.212	0.877	-2.401	<b>0.0163</b>
<i>INDUSTRY Food, Textile, Paper, Plastic Manufacturing</i>	0.173	0.071	-3.934	<b>0.0001</b>
<i>INDUSTRY Leather, Glass, Stone, Metal, Electronic Manufacturing</i>	0.084	0.098	0.589	0.5561
<i>INDUSTRY Transportation, Communication, Electric and Gas</i>	0.095	0.093	-0.054	0.9566
<i>INDUSTRY Trade</i>	0.021	0.104	2.587	<b>0.0097</b>
<i>INDUSTRY Hotel, Game Services</i>	0.000	0.101	2.516	<b>0.0119</b>
<i>INDUSTRY Health, Consulting, Education Services</i>	0.000	0.097	1.728	<b>0.0840</b>

Table 8 shows the determinants of female audit partner at multivariate level. Because the dependent variable is a dummy variable, we run a logistic regression:

$$\text{Prob}(EP \text{ FEMALE}) = \beta_0 + \beta \text{ Female BoD} + \beta \text{ Female CEO} + \beta \text{ Audit office fixed effects} + \beta \text{ BigN} + \beta_n \text{ Controls} + \beta \text{ Industry fixed effects} + \text{Year fixed effects} + e$$

This regression analyses the relation between the probability of a female audit partner and female on BoD or as CEO. We included in the regression audit office, BigN, and the type of industry as used in the Wilcoxon test. We add controls at BoD level (BoD size) and at firm level.

We find significant results (0.175, p-value <0.05) for female representation on BoD (BOD FEMALE) with a positive association between female directors and female audit partner. We find significant results (-1.131, p-value <0.05) for audit partner in Rome as shown above by the Wilcoxon univariate test. There is a negative relation between the Rome audit office and female audit partner. These results hold in a multivariate test. In addition, we also find that Big 4 is significant in a multivariate analysis. The positive coefficient for Big 4 means that Big 4 is a good context to become a female audit partner. Moreover, industry fixed effects are also significant determinants, as shown above by the univariate analysis.

Table 8. Additional regression analysis

<i>EP FEMALE</i>		
	Estimate	p-value
<i>BoD FEMALE</i>	<b>0.175</b>	<b>0.049</b>
<i>BoD SIZE</i>	-0.842	0.102
<i>CEO FEMALE</i>	predict failure perfectly	
<i>EP MILAN</i>	0.156	0.614
<i>EP ROME</i>	<b>-1.131</b>	<b>0.037</b>
<i>BIGN</i>	<b>0.691</b>	<b>0.098</b>
<i>SIZE</i>	0.057	0.591
<i>LEVERAGE</i>	1.079	0.362
<i>LOSS</i>	0.113	0.727
<i>SALES GROWTH</i>	0.272	0.731
<i>ROA</i>	-4.843	0.087
<i>CATA</i>	-1.594	0.159
<i>ALTMAN</i>	-0.594	0.076
<i>Industry fixed effects</i>	<b>Included</b>	
<i>Year fixed effects</i>	Included	
<i>Adjusted R2</i>	0.058	
<i>N</i>	751	

## 5. Discussion and Conclusions

This research investigates the association between gender and gender diversity in audit partners and its effect on audit efforts including audit fees and audit hours. Prior literature on gender diversity in auditing and corporate governance: 1) mainly uses models based on audit fees rather than audit hours; 2) mostly focuses on female CEO and female representation on BoD rather than female audit partners; 3) offers conflicting findings (positive and negative associations); 4) focuses on perspectives of demand and supply.

Using data on audit efforts and corporate governance from Italian listed companies in the period 2010 – 2018, we study: 1) the effect of a female audit partner on audit fees and audit hours (H1); 2) the effect of different gender combinations CEO/BoD on audit fees and audit hours (H2); 3) the association between different genders among CEO/audit partners and audit fees/audit hours (H3a); the association between different genders among BoD/audit partners and audit fees/audit hours (H3b).

Results show that: 1) Female audit partners are associated with lower audit fees and audit hours; 2) Female representation on CEO/BoD is not significantly associated with audit efforts; 3) Female audit partner is a significant determinant of the association with audit efforts, but when female representation on BoD is above the legal requirement and accounts for the majority of the board, a larger female representation on BoD is associated with higher audit fees and hours.

We contribute to the literature in several ways. First, the study complements the previous model based on audit fees with audit hours, as an important measure of audit efforts. Very few studies exist on audit hours because it is difficult to collect data, but in Italy it is possible to hand-collect data from the minutes of the shareholder assembly. Previous literature has noted that the use of audit effort, rather than simply audit fees, is likely to make empirical findings more robust. Second, we contribute to the literature on gender diversity in auditing. In the light of mixed findings of prior studies, we clarify the effect of female audit partners from the perspective of both demand and supply. On the demand side, females are associated with higher earnings quality (lower earnings management) and their presence implies that the demand for audit services (and thus audit fees and audit hours) can be lower. On the supply side, their higher levels of competences, communication and teamwork skills mean that female presence can reduce audit risks and thus audit efforts. Third, we respond to the call for research on the effects of the interaction between auditor and manager by focusing on differences in gender between CEO, BoD, and auditor partner.

Our findings have implications for both academics, professionals, and regulators. Academics are aware that the use of audit fees is a second best compared with audit efforts. There is also the need to study gender diversity taking into account that audit quality (DeAngelo, 1981) need to be evaluated from both demand and supply side. We also provide preliminary evidence of the effects of auditor and manager interaction on audit effort which is expected to encourage future research. Professionals and regulators will find our results of interest for several reasons: 1) Clients, auditors, and consultants will be enabled to verify the effects of gender diversity at audit partners level on audit efforts; 2) Given the effects of gender quota legislation on CEO and BoD, regulators may be interested in evaluating whether quotas should be extended to audit firms.

Results, contributions and implications are subject to limitations. Our sample has a limited representation of female audit partners, and includes data from Italian listed companies only. It is uncertain how far our results can be extended to other settings or to other types of firm. The same is true of the period, 2010 – 2018, and results may not be generalizable to other periods. Lastly, our data lacks information on variables such as auditor experience and auditor specialization, which may also have an impact on audit fees and audit hours. Details on the division of total audit hours and fees for audit partners and other components of the teams are not publicly available. These are private data that future research could investigate with the cooperation of the audit firms.

Future research could also investigate the financial industry that uses mainly the two-tier system and the implementation of the gender quota regulation in this system. Moreover, future research could also investigate the financial industry implementing different regression models that use industry-specific control variables using banks and insurance-specific financial statement ratios and data. Finally, interesting future studies could focus on the association between gender and auditors' career paths.

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## Note

Note 1. The mean female representation in our sample is 21.2 per cent (Table 2 - Descriptive statistics)

## Appendix I - Variable Definitions

<i>AUDIT HOURS</i>	=	The natural logarithm of number of audit hours worked by an audit firm in a fiscal year for the audit of a given client. Data from the shareholder annual meeting minutes
<i>AUDIT FEES</i>	=	The natural logarithm of audit fees paid by the client to the audit firm in a fiscal year
<i>EP FEMALE</i>	=	1 if the engagement partner is a female, and 0 otherwise. Partner gender is identified from the name on the audit report.
<i>EP MILAN</i>	=	1 if the engagement partner works in the office in Milan, and 0 otherwise.
<i>EP ROME</i>	=	1 if the engagement partner works in the office in Rome, and 0 otherwise.
<i>BIGN</i>	=	The data source is the same as for <i>MILAN</i> . 1 if audited by a Big4 audit firm (KPMG; PWC; DELOITTE; EY), and 0 otherwise;
<i>INDUSTRY</i>	=	1 - Mining and Construction, 2 - Food, Textile, Paper, Plastic Manufacturing, 3 - Leather, Glass, Stone, Metal, Electronic Manufacturing, 4 - Transportation, Communication, Electric and Gas, 5 - Trade, 7 if Hotel, Game Services, 8 - Health, Consulting, Education Services; United States Standard Industry Classification code.
<i>BoD SIZE</i>	=	The natural logarithm of number of members of Board of Directors
<i>BoD FEMALE</i>	=	Number of female directors / Number of members of Board of Directors
<i>CEO FEMALE</i>	=	1 if the CEO is a female; 0 otherwise
<i>SIZE</i>	=	The natural logarithm of total assets
<i>LEVERAGE</i>	=	Equity / total assets
<i>LOSS</i>	=	Loss of t-1
<i>SALES GROWTH</i>	=	(Sales t – sales t-1) / sales t-1
<i>ROA</i>	=	Operating income / total assets
<i>CATA</i>	=	Current assets /total assets
<i>ALTMAN</i>	=	Altman index

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