Audit fee premium for national and local level of industry expertise in Italy

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Abstract

Purpose – This study aims to examine whether national industry expertise in Italy is more dominant than local expertise. Prior studies from Australia, USA and UK show that audit fees for industry experts are priced at a higher premium at the local level than the national level. These countries have voluntary audit firm rotation, while Italy has mandatory audit firm rotation (MAFR). The authors predict that Italy has a stronger national than local level of industry expertise, to better retain and transfer industry expertise.

Design/methodology/approach – The authors compare audit fee premiums of national industry experts to local levels, using quantitative (multivariate tests) and qualitative (interviews) methodology.

Findings – Using hand-collected audit fees, the authors find that the audit fee premium for industry expertise is greater at the national level than the local level. The authors find corroborating results with audit hours. To provide further support, the authors conduct analysis for a neighboring country that does not have audit firm rotation. Using hand-collected data from Germany, the authors find that audit fee premiums from national industry expertise are no different from local industry expertise.

Originality/value – The present study study has theoretical and practical implications, for European Union countries, which recently adopted MAFR and for countries considering adoption in the future.

Keywords Industry specialist auditors, Audit fees, Audit hours, Mandatory audit firm rotation, Audit quality

Paper type Research paper

1. Introduction

This study examines whether the national level of auditor industry expertise is more dominant than the local level of expertise in Italy. Prior studies (Basioudis and Francis, 2007; Ferguson *et al.*, 2003; Francis *et al.*, 2005) find that local industry experts charge a higher audit fee premium,

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suggesting that local expertise dominates in the USA, Australia and the UK. However, in other contexts, audit expertise may be distributed differently, perhaps because mandatory audit firm rotation (MAFR) is in place, as it is in the Republic of Italy (1975), or perhaps because the local market for audits of publicly traded companies is smaller. To the best of the authors' knowledge, no previous studies have investigated whether these differences involve the organization of audit industry expertise at national or local level. We predict that Italy should have a stronger national level of industry expertise, because higher client turnover under MAFR (Bandyopadhyay *et al.*, 2014) reduces the stability of client portfolios at local level, so more expertise remains at national than local level. The smaller local market size also generates fewer industry experts at local than national level. In turn, the national level of expertise means that expertise is more efficiently transferred to offices in the national network on a just-in-time basis as new clients are accepted. The study may supply indications useful for European Union countries which have recently adopted MAFR in achieving a balance between audit independence and competencies.

We find that Italian auditors focus on national industry expertise rather than local industry expertise to offer differentiated audit quality, as shown by higher industry audit fee premiums at national level than local level. We corroborate this finding with audit hour premiums. We show that industry specialists, a high-quality type of auditor, adapt to the challenges of MAFR by focusing their expertise at national instead of local level.

The research contributes to the literature in several ways. Firstly, it shows that industry expertise is differently organized in countries with small audit markets, and audit fee premiums are at national rather than city level, which is widely found by prior literature. Secondly, it shows how MAFR affects industry expertise. MAFR has been the subject of debate for several decades, and reemerged following the 2007–09 financial crisis (European Commission, 2010; PriceWaterhouseCoopers LLP, 2013; Public Company Accounting Oversight Board (PCAOB), 2011; The Conference Board, 2003). While Italy has had a MAFR requirement in place for more than four decades, the EU recently promulgated MAFR effective for the 2016 fiscal year (European Parliament, 2014). Opponents argue that MAFR impairs industry expertise because a shorter tenure impairs auditor acquisition of knowledge (Jamal, 2012). Recent US-based studies suggest that industry expertise requires sufficient time and in-depth learning (Francis *et al.*, 2017; Gaver and Utke, 2019). Consequently, MAFR can deteriorate office industry expertise when clients mandatorily change audit firms, causing personnel to either change industry specializations or relocate (Daugherty *et al.*, 2012). We contribute to the literature by showing how results differ in a MAFR regime compared to a voluntary rotation regime, where prior studies find the local level is dominant (Basioudis and Francis, 2007; Ferguson *et al.*, 2003; Francis *et al.*, 2005; Numan and Willekens, 2012). The dominance of the local level, shown in prior studies, does not apply to all countries. We corroborate our audit fee premium results by conducting the same analysis for Germany, a neighboring country with a similar legal system (code law) but without MAFR in our sample period, and a closer audit market (Abbott *et al.*, 2018) size than the USA. We find that the audit fee premium for national-level industry leaders is no different for local-level industry leaders, providing further support that MAFR contributes to a stronger national level of industry expertise. We infer causality by using a difference in differences design and using Germany as a control group; we find robust results. Our research design also controls for country-level and local audit market effects.

Thirdly, the study contributes to literature by analyzing whether audit fee premiums of industry experts reflect additional audit effort or are simply economic rents for holding more dominant client market shares. On the one hand, prior studies show that clients of industry experts have higher audit quality (Balsam *et al.*, 2003; Dunn and Mayhew, 2004; Krishnan, 2003; Reichelt and Wang, 2010), suggesting that audit fee premiums reflect additional audit effort. On the other hand, there is also evidence that audit fee premiums reflect economic

rents (Numan and Willekens, 2012). If audit fee premiums reflect effort, rather than economic rents, we should expect to find higher audit hours, as we in fact find in this study. A study by Bae, Choi, and Rho (2016) provides evidence from South Korea that audit fee premiums reflect greater audit hours and thus greater audit effort. However, their study only examines national industry expertise and the sample covers a time period beginning with voluntary audit firm rotation followed by mandatory audit firm rotation. We extend the findings of Bae *et al.* (2016) by showing not only that national industry experts expend more audit hours than non-experts in a MAFR regime, but also that local industry experts expend more audit hours.

Our paper is organized as follows. Section 2 discusses the background literature, and predictions. Section 3 discusses the empirical design, including the sample and descriptive statistics. Section 4 reports the results, including robustness tests. Section 5 concludes.

2. Literature and hypotheses

2.1 National and office level industry expertise

Industry expertise stems from the investment in human capital in accounting professionals and the experience they gain from servicing clients (Ferguson *et al.*, 2003; Francis *et al.*, 2005; Solomon *et al.*, 1999). National industry expertise and local industry expertise (hereafter, office industry expertise) are distinct levels of auditor industry expertise. National industry expertise is characterized by a firm-wide reputation for industry expertise, organization of expertise by industry, and various knowledge-sharing practices (Francis *et al.*, 2005; Hogan and Jeter, 1999; Solomon *et al.*, 1999). Knowledge-sharing practices include internal benchmarking of best practices, standardized audit programs, industry-specific databases, training programs, and the transfer of expert personnel to other offices through travel and consulting arrangements (Francis *et al.*, 2005; Zerni, 2012) [1]. Office-level industry expertise consists of deep industry and client knowledge possessed by audit personnel within a particular office (Francis *et al.*, 2005). Human capital attributes are important to develop audit firm performance (Samagaio and Rodrigues, 2016). Audit personnel gain their expertise from the direct experience of working exclusively on industry-specific engagements (Solomon *et al.*, 1999).

The two levels of industry expertise transfer knowledge in different ways. National industry expertise is transferred from the national headquarters (or through an office expert) to offices within the national network through standardized firm policies and procedures and knowledge-sharing practices. Office industry expertise is transferred within the office by quality control procedures (supervision/coaching) and individual on-the-job experience.

National industry expertise ensures expertise is retained within the audit firm, and is transferred to offices that are in need of it. Mandatory audit firm rotation increases the importance of the national level, because if a sufficiently large number of clients in a particular industry rotate to another firm, the office will lose the knowledge and it will eventually be forgotten (Causholli, 2016). To retain the industry expertise in the audit firm, distinct knowledge-sharing practices and firm-wide policies and procedures are needed at the national level. As new industry-specific clients are accepted, offices will require industry-specific knowledge to be transferred at the national level. While there are distinct differences in national and office-level expertise, more germane to our study is understanding which level dominates by audit fee premium.

Prior studies provide evidence that the office level of industry expertise dominates in audit fee premium over national level (Ferguson *et al.*, 2003; Francis *et al.*, 2005; Basioudis and Francis, 2007; Cahan *et al.*, 2011; Numan and Willekens, 2012; Fung *et al.*, 2012; Bae *et al.*, 2016): audit fee premiums for national industry experts range between statistically insignificant amounts to 8%, and between 13% and 16% for office industry experts. All of these studies are based on data from countries where audit firm rotation is voluntary.

Thus, it is unclear whether audit fee premiums differ between national industry expertise and office industry expertise under MAFR. To explore this matter further, we discuss the nature of audit fee premiums and industry expertise.

2.2 Audit fee premiums and industry expertise

Audit fee premiums consist of additional audit effort and economic rents (Okeefe *et al.*, 1994; Simunic, 2014). Audit firms charge a fee premium when they adopt a differentiation strategy (Cahan *et al.*, 2011; Francis *et al.*, 2005; Foster and Shastri, 2016; Scott and Gist, 2013). Arguably, they deliver higher audit quality by expending greater direct labor hours and make greater investments in knowledge sharing. It is well documented that industry expert auditors are associated with higher audit quality, as evident from studies comparing earnings quality, disclosure quality and going concern opinion frequency (Almutairi *et al.*, 2009; Balsam *et al.*, 2003; Carcello and Nagy, 2004; Dunn and Mayhew, 2004; Krishnan, 2003; Reichelt and Wang, 2010). Kamarudin *et al.* (2022) find that switching to specialist auditors will result in increased conditional conservatism, while switching from specialist auditors to non-specialist auditors will result in reduced conditional conservatism in Asian countries.

Higher audit quality also indicates that auditors expend greater audit hours (Palmrose, 1986, 108), as evident from audit production theory (Okeefe *et al.*, 1994; Simunic, 2014). Audit effort lowers the likelihood of audit failure and improves accounting information quality, indirectly increasing clients' future equity return performance (Lee *et al.*, 2021). Greater audit hours are expended on more effectively constraining management's attempts to manipulate earnings with discretionary accruals in both magnitude and income-increasing types (Caramanis and Lennox, 2008). In their study using South Korean data, Bae *et al.* (2016) report that national industry expert auditors expend greater audit fees (and earn higher audit hours) than non-experts. They argue that industry expert auditors will expend more hours because they require additional evidence, and they protect their reputation in a competitive market (Bae *et al.*, 2016).

However, their results may not generalize to our setting because 1) South Korea has weaker investor protection (Wingate, 1997), including lower audit quality and weaker enforcement of accounting standards (Brown *et al.*, 2014), 2) their sample period includes a mandatory audit firm rotation regime followed by a voluntary firm rotation regime, and 3) they do not examine the local level of auditor expertise. Thus, our results are more generalizable to other EU countries which recently adopted MAFR reforms effective from 2016 (European Parliament, 2014). To better understand our setting, we turn our discussion to Italy's regulatory environment.

2.3 Mandatory auditor rotation and regulatory developments in Italy

Italy adopted mandatory audit firm rotation in 1975 under Presidential Decree D.P.R. No. 136 (Republic of Italy, 1975). Under this law, publicly listed companies must mandatorily rotate their audit firm every nine years. The European Parliament passed Regulation No. 537 in 2014, requiring a ten-year MAFR term, with an additional ten-year term if the audit engagement is put out for public bid (European Parliament, 2014).

Studies examining audit fees and audit hours within MAFR regimes are limited, and do not examine audit fee premiums of industry specialists. Cameran *et al.* (2015) find in Italy that after a client rotates to another audit firm, audit fees are lower and audit hours are higher in the first year. Kwon *et al.* (2014) show in South Korea when the country changed from a voluntary audit firm rotation regime to a mandatory rotation regime, audit fees and audit hours increased. Kwon *et al.* (2014) compare national industry market shares in South Korea during the time of change to MAFR and find a decline in national industry market

shares after MAFR was implemented. Practitioners from other countries express considerable pushback against the potential efficacy of MAFR to improve audit quality because of various switching costs, notably the loss of client-specific knowledge and expertise upon rotation (Harber and Maroun, 2020).

2.4 Hypothesis

Prior literature finds that in the USA, UK and Australia, industry specialization is a joint effect of a national level and a local office level, and that the local level dominates over the national level in audit fee premium (Basioudis and Francis, 2007; Ferguson *et al.*, 2003; Francis *et al.*, 2005). However, the institutional and audit market characteristics of Italy differ from the countries in these studies, in that the national level is arguably dominant over the local level. We argue that Italy's higher client turnover and its smaller publicly listed audit market exacerbate the loss of *tacit* industry-specific knowledge at the local level, and consequently the seriousness of lost industry expertise. To retain industry expertise in the audit firm, a stronger national level of industry expertise is needed.

Italy's nine-year mandatory audit firm rotation term shortens audit firm tenure and increases the turnover of publicly traded clients. Compared to the USA, Italy's client turnover is higher. In the USA, audit firm tenure averages 12 years (Davis *et al.*, 2009), while in Italy, audit firm tenure averages 4.5 years. Higher client turnover leads to a greater risk that industry-specific knowledge is forgotten in the office, when there are insufficient industry clients to maintain the learning experience (Causholli, 2016). Weakened industry expertise is echoed by opponents of MAFR who claim that the accretion of industry expertise is impaired by a shorter client–auditor engagement term (Jamal, 2012). To retain industry-specific knowledge in the firm and transfer it to offices in need of the expertise, the national level should be more dominant than in countries with voluntary audit firm rotation.

In Italy, higher client turnover from MAFR and a smaller audit market for publicly traded clients arguably make the national level of industry expertise more important for retaining and transferring industry-specific knowledge to offices within the audit firm.

Turning the discussion to audit fee premiums of industry experts, prior studies report that industry experts incur an audit fee premium to compensate for their industry expertise (Basioudis and Francis, 2007; Ferguson *et al.*, 2003; Francis *et al.*, 2005; Reichelt and Wang, 2010). A consequence of stronger national industry expertise is that audit fee premiums are higher than local industry expertise. These studies have defined industry experts as the industry market leaders. Our first hypothesis follows.

H1. Audit fee premiums are higher for national-level industry leaders than for local-level industry leaders.

3. Empirical design

3.1 Industry specialization measures

We use two levels of industry expertise: a national level and a local level. For the national level, we define a national industry specialist as the audit firm that is the leader in market share of client sales for a particular industry and year (Bae *et al.*, 2016). Use of sales, rather than audit fees, mitigates the mechanical relation between audit fee premiums and auditor market share, identified by Minutti-Meza (2013). We also use client sales, rather than audit fees, because the sample is larger, which yields a more accurate market leadership measure. In our robustness tests, we find support for this choice. Industries are classified by the

Global Industry Classification Standard (GICS). GICS is superior to the Standard Industrial Classification (SIC) in capital market research applications (Bhojraj *et al.*, 2003).

In Italy, the Big 4 local level is organized by area (4.2.1 Big 4 Partner interviews). The majority of audit fee revenues (untabulated, 56%) are from the two area head offices (Milan – 44% and Rome – 12%). Rather than using the Metropolitan Statistical Area (MSA), used in the USA (Reichelt and Wang, 2010), or the geographical city as in the UK (Basioudis and Francis, 2007), we use area, which is similar to the MSA. Studies that use US data specify auditor local specialization in terms of the MSA in which the audit office is located. The US Census Bureau defines an MSA as the core of the city and the surrounding areas that have commuter relations with the core. The MSA represents a geographic-economic unit within which individuals have frequent and close contact by commuter relations with the core. The frequent and close contact facilitates the transfer of tacit knowledge. The European Commission (2014) statistics division (EUROSTAT) defines European areas based on the Nomenclature of Territorial Units for Statistics (NUTS). The NUTS area is similar to the US MSA because people who reside in an area typically have close family contacts, and travel by car or train is convenient, inexpensive and does not require an overnight stay.

We choose the two major industrial areas of Italy: The North and the Center-South. The two areas are representative of Italy's industrial activity [2]. At least two other studies concur that many countries have one or two major cities were publicly listed clients are located (Lim and Tan, 2009). Industries tend to cluster geographically (Porter, 1990, p. 154) with the greatest number in the North area (National Observatory of Italian Districts, 2009). Italy's economy is largely driven by the manufacture of high-quality consumer goods, and consists of a developed industrial north and a less developed agricultural south (U.S. Central Intelligence Agency, 2017). We also provide an analysis using the city level, based on the 20 government regions, to support our conjecture that the area level is the most appropriate for this study. Following prior literature (Basioudis and Francis, 2007; Francis *et al.*, 2005; Reichelt and Wang, 2010), a Big 4 audit firm is considered an industry leader if there is at least one other audit firm in the same area, industry and year. This restriction ensures that a single audit firm in a particular area and industry is not classified as an industry expert because of an uncompetitive market (Francis *et al.*, 2005).

3.2 Multivariate tests

To test our prediction, we estimate equation (1):

$$\begin{aligned} LAF = {} & \beta_0 + \beta_1 INDUSTRY\ LEADER + \beta_2 SIZE + \beta_3 CATA + \beta_4 QUICK + \beta_5 LEV \\ & + \beta_6 ROA + \beta_7 LOSS + \beta_8 \sigma(CFO) + \beta_9 SALES\ GROWTH + \beta_{10} TENURE \\ & + \beta_{11} |ACCR\_1| + \beta_{12} BIGN + \beta_{13} UNCLEAN\_OPINION + \beta_{14} LABOR\_COST \\ & + INDUSTRY\ AND\ YEAR\ FIXED\ EFFECTS + e \end{aligned} \tag{1}$$

Equation (1) is estimated with industry- and year-fixed effects to control for systematic differences in audit fees across industries and across time. We cluster robust standard errors by client firm to control for heteroskedasticity and the lack of temporal independence of residuals within client firms (Petersen, 2009), and to avoid firm-fixed effects estimation when it is not feasible (Wooldridge, 2016, p. 450) [3]. Variable definitions are described in Appendix.

LAF is the log of total audit fees. Total audit fees include the audit of the financial statements of the consolidated entity, and the audit of the individual financial statements of the parent and the subsidiaries (group accounts). We include not just the audit of the consolidated entity but also of the group accounts to better measure complexity (size, international presence and dominance of the parent company) and related audit effort [4]. These audit fees do not include non-audit fees for non-audit services because Italy restricts auditors from providing non-audit services. *LAH* is the log of audit hours for the total audit fees. Equation (1) estimates audit hours using the same model as audit fees, following prior studies (Bae *et al.*, 2016; Cameran *et al.*, 2015).

INDUSTRY LEADER is the variable of interest and denotes three indicator variables for industry specialization: a national industry leader, an area industry leader and a city industry leader [5]. To test our hypothesis, we expect the coefficient on the *INDUSTRY LEADER* variables to be positive, and we expect that the coefficient on the national leader is greater than that of the area industry leader.

Control variables for estimating audit fees are based on prior studies examining audit fees and earnings quality (Basioudis and Francis, 2007; Francis *et al.*, 2005; Reichelt and Wang, 2010). [6] Client size (*SIZE*) is the log of total assets. Several prior studies measure client risk by *CATA*, *QUICK*, *ROA*, *LEV* and *UNCLEAN OPINION*. We also control for volatility of operating cash flows ($\sigma(CFO)$) (Graham *et al.*, 2005), *SALES GROWTH* for economic life cycle (Dickinson, 2011), *TENURE* for growth in audit fees with audit firm tenure (Cameran *et al.*, 2015) and total accruals magnitude ($|ACCR\_1|$) for earnings quality (Hribar *et al.*, 2014). *BIGN* controls for audit firm size and Big 4 brand-name. Specific setting characteristics such as state or family ownership or affiliation to business group can influence the direction of the relation. A chief executive officer succession with gender change (Gul *et al.*, 2021) and female directors on audit committees (Alkebsee *et al.*, 2021) lower audit fees in China less pronouncedly or only in specific setting such as in state-owned enterprises and in firms located in more developed regions. Family involvement in management and the supervisory board are negatively related to audit fees (Schierstedt and Corten, 2021). Longer auditor tenure generally enhanced audit quality among Indian firms prior to mandatory rotations, but it changes the direction of the relation for abnormal high fees, particularly if the firm is affiliated with a business group or has chief executive officer duality (Jadiyappa *et al.*, 2021). Thus, we add LABOR_COST specifically for our context.

3.3 Sample

Our sample selection starts with all Italian companies listed on the Milan Stock Exchange that are available on Compustat Global. We create a separate sample of audit hours for additional analysis. Our sample period is from 2005 to 2013. This period is chosen because few observations are available before 2005, and also because IFRS was adopted in 2005 (European Parliament, 2002), which allows a cleaner estimation of the audit fee and audit hour models.

Table 1 details the selection process for the sample. The sample starts with 2,096 non-financial and non-telecommunication firm-year observations from Compustat Global. We hand-collect the names of the audit firms directly from the auditor's report in the consolidated annual report to ensure accurate identification. We delete 126 firm-year observations without an identified audit firm and other variables required to compute industry market share. We require a minimum of two audit firms per area-industry-year combination to identify an auditor industry market leader (Francis *et al.*, 2005). The sub-total is 1,970 firm-year observations.

Sample for computing auditor expertise	*N*
Italian non-financial and non-telecommunication companies from Compustat Global with GICS codes for the period 2005–2013	2,096
Delete observations with missing values necessary to compute auditor expertise	−126
Observations for further analysis using market share based on sales	1,970
Sample for audit fee analysis	
Number of observations from Panel A	1,970
Delete observations with missing values for audit fees and control variables	−920
Final sample for audit fees analysis	1,050
Sample for audit hours analysis	
Number of observations from Panel A	1,970
Delete observations with missing values for audit hours and control variables	−847
Final sample for audit hours analysis	1,123

Table 1. Sample selection: Italy sample

Next, we hand-collect audit fees and audit hours from publicly available annual shareholder meeting minutes of Italian-listed companies. Two of the authors (who are Faculty members at an Italian university) organized a team of seven research assistants to download the annual shareholder meeting minutes from the client firm's websites. From March to June, 2015, the team manually downloaded the minutes and extracted the audit fees and hours into a spreadsheet, which was checked for accuracy in July, 2015 by different research assistants. The faculty members met with the team every two weeks to plan and control the quantity and quality of the data. After deducting observations with missing audit fees, hours and control variable values, the final sample consists of 1,050 firm-year observations for audit fees and 1,123 firm-year observations for audit hours [7]. Based on the nine-year audit fee (audit hour) sample, there are 58 (62) clients per area per year. At the office level, among the approximately 20 cities in Italy, there are an average of 5.8 (6.2) clients per city per year. At the area level, there are an average of seven clients per area–industry–year combination. Compared to the area level, the office level has fewer industry–year combinations available to compute an auditor industry leader.

3.4 Descriptive statistics and correlation matrix

Table 2 reports descriptive statistics for the Italy sample. The mean client fundamental variables (*LAH*, *LAF*, *SIZE*, *LEV*, *ROA*, *LOSS* and *TENURE*) are comparable to those used by Cameran *et al.* (2015), except that mean *SIZE* is lower in our sample because Cameran *et al.* (2015) excludes non-Big 4 clients. Other client fundamental variables (*CATA*, *QUICK*, σ(*CFO*), *SALES GROWTH* and *BIGN*) are comparable to other related studies (Basioudis and Francis, 2007; Carson, 2009; Reichelt and Wang, 2010). The mean *National Leader* (35.2%) is comparable to Basioudis and Francis (2007) who report 33.6% in the UK. The mean *Area Leader* (39.7%) and mean *City Leader* (37.9%) are comparable to the same study's mean city leader variable (46.8%).

Table 3 reports descriptive statistics with the number of observations at city level. It shows the small number of observations in several regions (Trentino, Alto Adige and Umbria), which in turn shows that the decision to use the two main areas instead of city level is robust.

Tables 4 and 5 show the sample distribution by year and industry. The sample is unbalanced by year, but fairly stable over the period. Sample distribution by industry shows large industries such as industrial, consumer discretionary, IT and utilities. We checked that

	Mean	SD	25th Percentile	Median	75th Percentile
LAH	7.217	0.815	6.617	7.159	7.758
LAF	11.601	0.827	11.015	11.579	12.086
SIZE	6.272	1.755	5.051	6.022	7.459
CATA	0.500	0.212	0.339	0.488	0.665
QUICK	1.151	0.931	0.699	0.941	1.316
LEV	0.642	0.192	0.538	0.661	0.772
ROA	0.010	0.080	−0.009	0.020	0.046
LOSS	0.297	0.457	0.000	0.000	1.000
σ (CFO)	0.461	0.274	0.279	0.415	0.587
SALES GROWTH	0.621	12.575	−0.047	0.044	0.140
TENURE	3.923	2.313	2.000	4.000	6.000
|ACCR_1|	−3.754	1.332	−4.440	−3.599	−2.847
BIGN	0.886	0.318	1.000	1.000	1.000
UNCLEAN OPINION	0.682	0.466	0.000	1.000	1.000
LABOR COST	42.301	0.769	42.573	42.573	42.573
National Leader	0.352	0.478	0.000	0.000	1.000
Area Leader	0.397	0.490	0.000	0.000	1.000
City Leader	0.379	0.485	0.000	0.000	1.000

Note: See Appendix for variable definitions

Table 2. Descriptive statistics of variables in multivariate analysis: Italy sample

Audit fee analysis		Audit hours analysis	
City	Firm-years	City	Firm-years
Abruzzo	5	Abruzzo	5
Campania	16	Campania	14
Emilia-Romagna	169	Emilia-Romagna	161
Friuli-Venezia Giulia	17	Friuli-Venezia Giulia	17
Lazio	134	Lazio	133
Liguria	25	Liguria	26
Lombardia	519	Lombardia	518
Marche	32	Marche	23
Piemonte	86	Piemonte	77
Toscana	58	Toscana	58
Trentino-Alto Adige	8	Trentino-Alto Adige	1
Umbria	81	Umbria	7
Veneto	5	Veneto	83
All cities	*1,050*	*All cities*	*1,123*

Table 3. Number of observations at city level

there were sufficient observations in each sample group to compute the industry specialization variable before calculating it. We exclude the financial sector from our analysis because of its dissimilar nature, and we exclude the telecommunications sector because there are too few observations to compute auditor industry specialization variables. At the area level, there are an average of seven clients per area–industry–year combination.

Tables 6 and 7 show the correlation analysis for the Italian and German samples. The analysis appears to have no multicollinearity issues for either sample. The highest correlation between independent variables is between the total long-term debt scaled by total assets (LEV) and the ratio of current assets (less inventories) to current liabilities (QUICK) −0.572.

Table 4. Sample distribution by year

Audit fee analysis		Audit hours analysis	
Year	Unique firms	Year	Unique firms
2005	84	2005	112
2006	104	2006	122
2007	119	2007	137
2008	120	2008	122
2009	122	2009	124
2010	117	2010	118
2011	129	2011	130
2012	125	2012	126
2013	130	2013	132
2005–2013	*1,050*	*2005–2013*	*1,123*

Table 5. Sample distribution by industry

Audit fee analysis		Audit hours analysis	
Industry	Firm-years	Industry	Firm-years
GICS 10 – Energy	43	GICS 10 – Energy	38
GICS 15 – Materials	78	GICS 15 – Materials	86
GICS 20 – Industrials	276	GICS 20 – Industrials	273
GICS 25 – Consumer Discretionary	356	GICS 25 – Consumer Discretionary	324
GICS 30 – Consumer Staples	66	GICS 30 – Consumer Staples	64
GICS 35 – Health Care	70	GICS 35 – Health Care	71
GICS 45 – Information Technology	155	GICS 45 – Information Technology	162
GICS 55 – Utilities	106	GICS 55 – Utilities	105
All industries	*1,050*	*All industries*	*1,123*

4. Multivariate results

4.1 Main results

The results of estimating equation (1) are reported in Table 8 for testing the relation between national and area levels of auditor industry expertise and audit fees. Table 8, Panel A, reports that the national level of industry leadership has a 20.5% audit fee premium (over non-leaders) ($p < 0.01$), which is greater than the area-level audit fee premium of 11.4% ($p < 0.10$, one-tailed) [8]. The city level of industry leadership is not significantly different from zero, suggesting that city-level leadership is virtually non-existent. This result also suggests that the area level is a more appropriate unit of industry leadership than the city level. Panel B reports that the difference between the audit fee premium of the national industry leader and the area industry leader is statistically significant ($p < 0.05$, one-tailed), which supports *H1*. It is also economically significant – national industry leaders have a 10.7% greater fee premium for national industry leaders than area industry leaders over non-leaders. Audit fee premiums are comparable to prior studies (Francis *et al.*, 2005), except that Italy's national level is greater. In short, national industry experts have a higher audit fee premium over area industry experts. We do not observe an audit fee premium for the city level of industry expertise, likely because each area is dominated by a major city – Milan in the North, and Rome in the Center-South. In a country where the audit regulatory environment is characterized by mandatory audit firm rotation versus other countries that have voluntary audit firm rotation (Australia, UK, USA and NZ), and a smaller audit market, we observe a more centralized organization of industry expertise at the national level.

Table 6.
Correlation analysis: Italy sample

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 *LAH*	*1.000*																	
2 *LAF*	*0.916*	*1.000*																
3 *SIZE*	*0.558*	*0.544*	*1.000*															
4 *CA TA*	*−0.134*	*−0.142*	*−0.438*	*1.000*														
5 *QUICK*	*−0.275*	*−0.233*	*−0.130*	*0.206*	*1.000*													
6 *LEV*	*0.194*	*0.152*	*0.165*	−0.014	*−0.572*	*1.000*												
7 *ROA*	*0.074*	*0.061*	*0.182*	*0.111*	*0.128*	*−0.400*	*1.000*											
8 *LOSS*	*−0.073*	*−0.076*	*−0.250*	−0.029	*−0.085*	*0.250*	*−0.666*	*1.000*										
9 *σ (CFO)*	*−0.188*	*−0.207*	*−0.374*	*0.215*	−0.044	*0.118*	*−0.183*	*0.173*	*1.000*									
10 *SALES GROWTH*	*−0.096*	*−0.104*	−0.046	−0.027	−0.027	0.057	−0.005	0.028	*0.107*	*1.000*								
11 *TENURE*	*0.079*	*0.095*	*0.091*	*−0.088*	−0.033	*−0.076*	0.011	0.021	−0.054	−0.049	*1.000*							
12 *|ACCR_1|*	*−0.107*	*−0.078*	*−0.260*	*0.168*	−0.017	*0.091*	*−0.146*	*0.093*	*0.250*	*0.090*	−0.051	*1.000*						
13 *BIGN*	*0.207*	*0.254*	*0.309*	*−0.134*	0.051	*−0.080*	*0.146*	*−0.153*	*−0.167*	*−0.109*	*0.115*	*−0.098*	*1.000*					
14 *UNCLEAN OPINION*	0.014	−0.035	−0.046	0.022	−0.003	0.035	*−0.126*	*0.110*	0.057	−0.008	0.029	0.003	−0.016	*1.000*				
15 *LABOR COST*	−0.018	0.003	0.036	0.020	−0.016	0.002	*0.084*	−0.051	0.033	0.015	0.056	−0.013	*−0.107*	−0.013	*1.000*			
16 *National Leader*	*0.256*	*0.267*	*0.265*	−0.030	0.024	0.010	*0.133*	*−0.149*	*−0.129*	−0.031	*0.123*	*−0.104*	*0.264*	*0.070*	−0.041	*1.000*		
17 *Area Leader*	*0.228*	*0.230*	*0.321*	*−0.079*	*0.063*	0.014	*0.120*	*−0.154*	*−0.105*	−0.034	*0.152*	*−0.089*	*0.291*	0.050	*−0.122*	*0.702*	*1.000*	
18 *City Leader*	*0.208*	*0.209*	*0.387*	*−0.082*	*0.067*	0.026	*0.165*	*−0.188*	*−0.099*	−0.033	*0.075*	*−0.111*	*0.228*	−0.002	*0.094*	*0.466*	*0.577*	*1.000*

Notes: See Appendix for variable definitions. Correlation coefficients in italic are significant at 5%

Table 7
Correlation analysis
Germany sample

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	*LAF*	*1.00*																
2	*SIZE*	*0.89*	*1.00*															
3	*CA TA*	*−0.26*	*−0.27*	*1.00*														
4	*QUICK*	*−0.23*	*−0.20*	*0.37*	*1.00*													
5	*LEV*	*0.21*	*0.18*	*−0.44*	*−0.24*	*1.00*												
6	*ROA*	*0.16*	*0.26*	0.00	0.02	*−0.09*	*1.00*											
7	*LOSS*	*−0.13*	*−0.22*	−0.01	*−0.04*	*0.10*	*−0.57*	*1.00*										
8	*σ (CFO)*	0.004	*0.04*	−0.04	−0.01	0.03	*−0.05*	0.01	*1.00*									
9	*SALES GROWTH*	*−0.04*	−0.02	0.02	−0.01	0.02	*0.05*	*−0.05*	*0.01*	*1.00*								
10	*TENURE*	*0.21*	*0.18*	*−0.04*	*−0.05*	0.03	*0.12*	*−0.11*	*−0.04*	*−0.04*	*1.00*							
11	*|ACCR_1|*	*−0.12*	*−0.16*	0.01	−0.02	*0.10*	*−0.17*	*0.16*	*0.05*	*−0.04*	*−0.05*	*1.00*						
12	*BIGN*	*0.39*	*0.39*	*−0.09*	*−0.04*	0.02	*0.11*	*−0.05*	−0.01	0.003	*0.05*	−0.03	*1.00*					
13	*UNCLEAN OPINION*	*−0.08*	*−0.14*	0.02	*−0.06*	*0.10*	*−0.27*	*0.23*	−0.01	0.02	*−0.08*	*0.11*	*−0.09*	*1.00*				
14	*LABOR COST*	*0.06*	*0.09*	*−0.08*	−0.01	0.03	*0.10*	−0.03	*0.05*	−0.02	*0.09*	*−0.04*	*−0.05*	−0.01	*1.00*			
15	*National Leader*	*0.32*	*0.30*	*−0.06*	−0.03	0.00	*0.10*	*−0.06*	−0.01	−0.03	*0.09*	*−0.04*	*0.30*	*−0.08*	*−0.04*	*1.00*		
16	*Area Leader*	*0.31*	*0.31*	*−0.10*	−0.02	0.02	*0.07*	*−0.05*	*0.06*	−0.03	*0.11*	*−0.04*	*0.33*	*−0.08*	*−0.04*	*0.56*	*1.00*	
17	*City Leader*	*0.38*	*0.39*	*−0.09*	−0.03	*0.05*	*0.08*	*−0.09*	0.01	−0.03	*0.10*	−0.04	*0.30*	−0.02	−0.03	*0.29*	*0.44*	*1.00*

Notes: See Appendix for variable definitions. Correlation coefficients in Italic are significant at 5%

Table 8. Multivariate analysis of audit fees and auditor industry leadership: Italy sample

	Dependent variable is the natural logarithm of audit fees (N = 1,050)					
	Model (1)		Model (2)		Model (3)	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
Panel A						
Intercept	10.470	<0.001	10.266	<0.001	10.521	<0.001
SIZE	0.268	<0.001	0.272	<0.001	0.282	<0.001
CATA	0.628	0.015	0.647	0.014	0.653	0.013
QUICK	−0.216	<0.001	−0.219	<0.001	−0.212	<0.001
LEV	−0.489	0.118	−0.489	0.121	−0.469	0.138
ROA	−0.669	0.165	−0.667	0.178	−0.643	0.199
LOSS	0.108	0.178	0.102	0.205	0.097	0.228
σ (CFO)	−0.054	0.771	−0.066	0.718	−0.053	0.774
SALES GROWTH	−0.004	<0.001	−0.004	<0.001	−0.004	<0.001
TENURE	0.005	0.678	0.005	0.658	0.008	0.474
ACCR_1	0.037	0.051	0.035	0.070	0.035	0.069
BIGN	0.197	0.050	0.224	0.027	0.255	0.012
UNCLEAN OPINION	0.000	0.993	0.010	0.846	0.018	0.736
LABOR COST	−0.013	0.776	−0.009	0.858	−0.016	0.729
National Leader	*0.205*	*0.002*				
Area Leader			*0.114*	*0.079*		
City Leader					*0.006*	*0.929*
Industry and Year fixed effects	Included		Included		Included	
Adj. R^2	0.406		0.397		0.407	
Panel B: test of difference in coefficients			Difference in coefficients	F-test (p-value)		
National Leader = Area Leader			0.091	5.09 (0.024)		

Notes: Coefficient p-values in Panel A are two-tailed and robust standard errors are clustered by firm, following Peterson (2009). F-test p-values in Panel B are one-tailed. Refer to Appendix for variable definitions

4.2 Additional analysis

To strengthen our results, we add the following further qualitative and quantitative analysis:

- Big 4 partner interviews;
- audit hours analysis;
- audit industry leadership in Germany;
- auditor industry leadership based on client lagged total assets;
- audit fees for the audit of parent companies;
- complexity;
- hourly rate;
- distance between client and auditor office;
- endogeneity;
- both national and local leader; and
- auditor change.

4.2.1 Big 4 partners interviews. We interviewed Big 4 audit partners with two main purposes:

(1) to assess the organization of industry expertise in Italy to confirm our choice of local level of audit expertise; and

(2) to find out about the effect of the mandatory audit firm rotation, compared with EU countries where rotation is not mandatory.

We interviewed a total of 11 partners from Big 4 audit firm offices in Italy. Four partners were from Milan (the main office of the Northern region), four were from Rome (the main office of the Center-South region) and three were from Parma (a smaller office in the Northern region). The sample size is comparable to other studies (Hoang *et al.*, 2019). The proportion of female partners (10%) and the mean partner age (55 years) are comparable to Cameran *et al.* (2018) (16.9% and 55 years, respectively). Mean partner experience (>10 years) is similar to Mazza *et al.* (2018) (13 years). All the partners are industry experts and have publicly listed and non-listed clients. Each audit partner was interviewed separately for an average of 30 min [9] by the two Italian-speaking authors. In performing the interviews, we drew heavily on the approaches followed by Hirst and Koonce (1996), Cohen *et al.* (2002), and Beasley *et al.* (2009). The interviews were tape-recorded, and the Italian-speaking authors prepared typed transcripts from the tape recordings. We provided the partners with the definition of an industry expert to avoid misinterpretation, and informed the participants that their responses would be kept confidential. After the interviews, the two Italian-speaking authors separately interpreted all typed transcripts and then compared their interpretations. The initial agreement level was 85%, indicating a high level of reliability (Beasley *et al.*, 2009). Next, an English-speaking academic did the same, but from the English-translated transcripts. Any disagreements were resolved by relistening to the recordings and by recontacting the audit partner when necessary.

For our first aim, we asked the following question:

Q1. How does your audit firm organize industry expertise at national and local level?"

Big 4 partner answers revealed that industry expertise is frequently transferred, and provided insight into another level of expertise, the area level. The area level complements

the national level, allowing for the transfer of tacit and codified knowledge between offices, and the city level is nonexistent. For instance, one partner said, "We tend to have competencies in-house at the area level of the North (Milan) and the Center-South (Rome)." Offices obtain industry experts by transferring partners from other offices, most often within the same area and country. Industry experts are more frequently requested by energy and media and telecommunications industries than by utilities, consumer industrial, health care and pharmaceutical, construction, information technology, mechanical and retail. Partners transfer expertise to other offices by traveling to and working in multiple offices. Given the small size of the audit market in Italy, it is impossible organize the audit industry expertise at city level, with the exceptions of Rome (for the Center-South area) and Milan (for the Northern area). Rome and Milan are similar to the Metropolitan Statistical Area, described in the USA.

For our second purpose, we asked the following question:

Q2. How does MAFR affect industry expertise in Italy and compared to other countries?

All partners interviewed have experience working with overseas clients or in overseas offices (subsidiaries of Italian parent companies). They have attended two- to three-day industry-based meetings or annual and bi-annual International-European general meetings and courses in other countries to be up-to-date on the "hottest" topics. They also read audit firm industry studies and have performed quality reviews outside Italy. In Italy, industry expertise is similar to that of other continental European countries and at a lower level than in the US and the UK. One partner said, "In the U.S., expertise is greater. In Italy, the listed firms are in a smaller market, and are comparable with Germany and France." All partners in Rome and Milan believe that MAFR brings higher costs. The reasons for this include learning about a new client (time spent in meetings and reading documentation), learning about a new industry and its differences from the old one, as indicated in the following responses: "I also see a risk due to the learning effect in the first year and a half, mainly for a complex client":

> When I lose a client and acquire a new one, there is a moment in which I have to consider how not to lose the competence in that industry because maybe after nine years the client will come back, and I will also have to consider how to gain competence in the new industry.

However, a minority of Milan and Rome partners believe that MAFR is beneficial, because it encourages greater auditor independence, and its costs are sustainable. Interviews revealed that Italy's requirement to identify the name of the partner on the audit report incentivizes partner independence. As one partner said:

> The strongest incentive for independence in Italy is from the name on the signature of the audit opinion. The individual partner suffers this risk, and the incentive for independence is higher than the incentive that could come from [an alternative] regulation.

When an audit firm accepts a new client from a new industry, the firm may have to move staff with industry expertise from other offices or hire from other audit firms, implying greater costs and lower quality. The interviews and subsequent discussions confirm that Italian people typically have a close connection to a particular region and are less likely to relocate. Moreover, audit firms typically do not hire staff from other audit firms when they need industry expertise and tend to train existing office staff to meet the need.

4.2.2 Audit hours analysis. Audit fees reflect audit hours expected by audit personnel (Cameran *et al.*, 2015; Simunic, 1980; Azzali *et al.*, 2021), so we expect that audit hour premiums should be higher for national industry experts than local industry experts. A

related paper by Bae *et al.* (2016) finds that audit hours are, in fact, higher for national industry experts.

We substitute audit hours for audit fees in equation (1) and estimate the equation. Table 9, Panel A, reports that audit hours are higher for national industry leaders (than non-leaders) by 18.3% ($p < 0.01$) compared to 10.1% ($p < 0.10$, one-tailed) by area industry leaders, and the difference is statistically significant (Panel B) and economically significant. National industry leaders have 9.5% greater hours than area industry leaders compared to non-leaders. These results corroborate our main results with audit fees, and suggest that national industry experts expend greater hours than area-level industry experts. These results imply that industry expert auditors use a differentiation strategy to distinguish higher quality in audit hours in a setting that is characterized by mandatory audit firm rotation, a smaller audit market and more centralized industry expertise. National industry experts appear to be stronger differentiators than area industry experts.

4.2.3 Auditor industry leadership in Germany. For comparison purposes, we perform analysis of audit fees of a neighboring country – Germany (audit hours are not publicly available). We choose Germany because it is similar with all respects except that it does not have mandatory audit firm rotation. Its population (83 million) is similar to that of Italy (61 million). It did not have MAFR during the sample period (2005–2013) (Lennox, 2014). Untabulated results show that our sample of German listed firms has a maximum audit tenure of 20 years and a high frequency of firms audited by the same audit firms for 12 years. As a European Union member (European Parliament, 2002), it follows the same audit standards (IAASB) and accounting standards (IFRS). It has a code law requirement (Brown *et al.*, 2014; La Porta *et al.*, 1998). It has similar accounting and auditing quality. Brown *et al.* (2014) assign Germany and Italy a similar accounting enforcement rating (44 and 46, respectively), and a similar audit quality rating (23 and 27, respectively) [10]. The next most similar country, France, was not suitable for the comparison because it has a joint audit requirement, which affects industry expertise (Francis *et al.*, 2009). We divide Germany into two areas, East and West, based on the 16 NUTS subdivisions.

Our sample includes all German companies that are available from the EUR business database and Compustat Global. As for the sample of companies from Italy, we exclude the financial and telecommunications sectors from our analysis. The sample of companies from Germany includes publicly listed companies over the sample period 2005–2013.

Table 10 details the selection process for the Germany sample. We use the EUR business database to obtain audit fees, and we integrate it with the Compustat Global database for financial statement and audit variables (tenure and opinion). The final sample has 2,910 firm-year observations, after deducting 1,028 observations with missing values necessary to compute auditor expertise, and 1,307 observations with missing audit fees and control variable data. There are an average of 161 clients per area per year. Among the 16 subdivisions in Germany, there are an average of 20.2 companies per subdivision per year. The Germany sample is larger (2,910) than the Italian sample (1,050) and has more observations per area.

Table 11 reports descriptive statistics for the Germany sample. Many of the variables are comparable to Italy, with a few exceptions. The Germany sample has lower financial leverage, a smaller Big N audit market share and less frequent auditor industry leadership. Prior cross-country studies (Kwon *et al.*, 2007; Lim and Tan, 2009) show a similar pattern for these exceptions. Audit firm tenure is greater for the Germany sample because Germany does not have mandatory audit firm rotation.

For the Germany sample, the results of estimating equation (1) for *H1* are reported in Table 12. We compare whether audit fee premiums differ between the national and local levels

Table 9. Multivariate analysis of audit hours and auditor industry leadership Italy sample

	Dependent variable is the natural logarithm of audit hours (N = 1,123)					
	Model (1)		Model (2)		Model (3)	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Panel A						
Intercept	7.249	<0.001	7.028	<0.001	7.252	<0.001
SIZE	0.280	<0.001	0.284	<0.001	0.290	<0.001
CATA	0.753	0.002	0.766	0.003	0.771	0.002
QUICK	−0.235	<0.001	−0.236	<0.001	−0.231	<0.001
LEV	−0.281	0.333	−0.274	0.349	−0.254	0.385
ROA	−0.037	0.925	−0.017	0.966	0.000	0.999
LOSS	0.161	0.012	0.157	0.015	0.152	0.019
σ (CFO)	−0.012	0.940	−0.023	0.884	−0.017	0.915
SALES GROWTH	−0.004	<0.001	−0.004	<0.001	−0.004	<0.001
TENURE	0.000	0.969	0.001	0.927	0.004	0.743
ACCR_1	0.017	0.336	0.015	0.400	0.015	0.398
BIGN	0.059	0.521	0.082	0.379	0.109	0.241
UNCLEAN OPINION	0.065	0.174	0.076	0.121	0.083	0.090
LABOR COST	−0.027	0.364	−0.023	0.460	−0.030	0.322
National Leader	*0.183*	*0.005*				
Area Leader			*0.101*	*0.094*		
City Leader					*0.014*	*0.832*
Industry- and year-fixed effects	Included		Included		Included	
Adj. R^2	0.432		0.425		0.436	
Panel B: test of difference in coefficients			Difference in coefficients	F-test (*p*-value)		
National Leader = Area Leader			0.082	3.97 (0.046)		

Notes: Coefficient *p*-values in Panel A are two-tailed and robust standard errors are clustered by firm, following Peterson (2009). *F*-test *p*-values in Panel B are one-tailed. Refer to Appendix for variable definitions

for Germany which does not have mandatory audit firm rotation. Table 7 reports that the national industry leader has an audit fee premium of 14.5% ($p < 0.01$), and the area industry leader has an audit fee premium of 12.2% ($p < 0.05$), but these premiums are not statistically different ($p = 0.373$). In short, we conclude that the audit fee premium is no different between the national level and the local level. Given that Germany does not have MAFR, and Italy does, MAFR appears to contribute to a higher national level of industry expertise. It may also be the case that the larger size of Germany contributes to the difference.

4.2.4 Auditor industry leadership based on client lagged total assets. We repeat the analysis for the Italy sample by changing the industry leader definition using client lagged total assets (Francis *et al.*, 2005, p. 130), for the purpose of computing auditor industry market share. Using lagged client assets mitigates any potential mechanical relation between market share and audit fee premium (Minutti-Meza, 2013) [11]. The coefficient (untabulated) on the national industry leader is greater than the area industry leader for both audit fees (20.1% vs 8.7%), and the difference is statistically significant for audit fees ($p < 0.05$) [12]. These results suggest that the main results are robust to an alternative measure of industry leadership.

4.2.5 Audit fees for the audit of parent companies. The main analysis uses audit fees reported in the minutes of the annual shareholder meeting. They include the review of the

Table 10. Sample selection (cont.): Germany sample

Sample for computing auditor expertise	*N*
German non-financial and non-telecommunication companies from Compustat Global with GICS codes for the period 2005–2013	5,245
Delete observations with missing values necessary to compute auditor expertise (auditor data)	−1,028
Observations for further analysis using market share based on sales	4,217
Delete observations with missing values for audit fees and control variables	−1,307
Final sample for audit fees analysis	2,910

Table 11. Descriptive statistics of variables in multivariate analysis (cont.): Germany sample

	Mean	SD	25th Percentile	Median	75th Percentile
LAF	5.407	1.210	4.553	5.242	6.054
SIZE	5.485	2.167	3.985	5.173	6.797
CATA	0.533	0.202	0.391	0.539	0.674
QUICK	1.567	1.722	0.784	1.123	1.762
LEV	0.126	0.145	0.004	0.082	0.193
ROA	0.040	0.140	0.013	0.056	0.099
LOSS	0.245	0.430	0.000	0.000	0.000
σ (CFO)	0.293	0.690	0.053	0.095	0.218
SALES GROWTH	0.119	0.918	−0.036	0.055	0.154
TENURE	4.778	3.184	2.000	4.000	7.000
ACCR_1	−3.065	1.188	−3.679	−2.920	−2.318
BIGN	0.711	0.454	0.000	1.000	1.000
UNCLEAN OPINION	0.095	0.293	0.000	0.000	0.000
LABOR COST	51.241	4.767	49.421	51.388	54.219
National Leader	0.186	0.389	0.000	0.000	0.000
Area Leader	0.213	0.410	0.000	0.000	0.000
City Leader	0.287	0.453	0.000	0.000	1.000

Note: See Appendix for variable definitions

Table 12. Multivariate analysis of audit fees and auditor industry leadership: Germany sample

	Dependent variable is the natural logarithm of audit fees (N = 2,910)					
	Model (1)		Model (2)		Model (3)	
	Estimate	p-value	Estimate	p-value	Estimate	p-value
Panel A						
Intercept	2.162	0.000	2.134	0.000	2.213	0.000
SIZE	0.492	0.000	0.493	0.000	0.493	0.000
CATA	0.023	0.852	0.027	0.825	0.022	0.857
QUICK	−0.036	0.001	−0.037	0.000	−0.036	0.001
LEV	0.262	0.079	0.253	0.088	0.244	0.104
ROA	−0.485	0.000	−0.473	0.001	−0.467	0.001
LOSS	0.082	0.019	0.082	0.020	0.087	0.014
σ (CFO)	−0.047	0.183	−0.051	0.146	−0.049	0.171
SALES GROWTH	−0.028	0.000	−0.028	0.000	−0.029	0.000
TENURE	0.018	0.001	0.018	0.001	0.019	0.001
ACCR_1	0.005	0.606	0.006	0.581	0.005	0.608
BIGN	0.113	0.021	0.113	0.021	0.130	0.007
UNCLEAN OPINION	0.110	0.016	0.109	0.019	0.101	0.028
LABOR COST	−0.003	0.482	−0.003	0.469	−0.003	0.433
National Leader	*0.145*	*0.002*				
Area Leader			*0.122*	*0.027*		
City Leader					*0.057*	*0.227*
Industry- and year-fixed effects	Included		Included		Included	
Adj. R^2	0.819		0.819		0.818	
Panel B : test of difference in coefficients			Difference in coefficients	F-test (p-value)		
National Leader = Area Leader			0.023	0.79 0.373		

Notes: Coefficient p-values in Panel A are two-tailed and robust standard errors are clustered by firm, following Peterson (2009). F-test p-values in Panel B are one-tailed. Refer to Appendix for variable definitions

interim financial statements and accounting procedures, the statutory audit of the consolidated financial statements and the statutory audit of the group accounts. Most of the companies in our sample report a total amount for these three items. For robustness, we restrict our analysis to a subsample of firms that report separate audit fees and audit hours for the consolidated financial statement audit (n = 664) and a subsample of firms that separately report the statutory audit of the group accounts (n = 564). For the consolidated financial statement audit subsample, we find that there is an audit fee premium for the national industry leader (37.4%, p = 0.004), which is higher than the area industry leader (10.8%, p = 0.34), and the difference is statistically significant ($p < 0.01$) (untabulated). We find for the group accounts sub-sample that there is an audit fee premium for the national industry leader (26.9%, p = 0.01), which is higher than the area industry leader (9.4%, p = 0.344), and the difference is statistically significant (p = 0.02) (untabulated). In short, our results are robust to separating audit fees between the consolidated financial statement audit and the group accounts audit [13].

4.2.6 Complexity. To rule out the possibility that complexity is an omitted variable, we add to equation (1) the number of business segments, the number of subsidiaries and foreign revenue. We hand-collected these variables for the period 2008–2011 for a subsample of 414 observations with available data, following the Cameran *et al.* (2015) model. We find that the coefficient on the national industry leader variable remains positive and statistically significant (0.260, $p < 0.01$), the coefficient on the area industry leader variable remains positive and statistically significant (0.145, p = 0.05, one-tailed) and the national leader has a higher fee premium than the area leader (p = 0.04) (untabulated) [14]. In short, our results are robust to controlling for complexity.

4.2.7 Hourly rate. Unlike Bae *et al.* (2016), we argue that higher audit hours by industry specialists are not driven by a lower hourly rate. We compute the fees per hours for a subsample of firms for which we have both audit fees and audit hours, and use the natural logarithm of the hourly rate as the dependent variable. The coefficients on the industry leader variables are positive and insignificant, confirming that higher audit hours by industry specialists are not driven by a lower hourly rate.

4.2.8 Distance between client and auditor office. Because the audit fee premium may be caused by factors such as the distance between client and auditor office which are omitted in the regression, we downloaded the auditor office location for the audit firms in our sample from their website. We merged the office location with the client location and computed the distance in kilometres from the nearest office. The greatest distance is Pievesestina di Cesena at 297 km from Milan for the non-Big 4 firm Baker, and for the Big 4, Rimini at 118 km from Bologna for Ernst &Young. However, 55.25% of the sample have an office in the same city as the client (Milan and Rome). The average distance in the sample is 18 km. Regression results (un-tabulated) show that distance between client and auditor office is not significant in explaining audit hours and fee premium, and the variable for industry leader remains significant, as in the main analysis including distance as control variable.

4.2.9 Endogeneity. Endogeneity is very difficult to address. Given the difficulty in finding a variable related to industry specialization which is not related to audit fees and audit hours, we use propensity-score matching for this. We used propensity-score matching models developed by Rosenbaum and Rubin (1983), which match observations on the basis of probability of undergoing a treatment, which in this case is the probability of being industry leader. We used logit models, the most frequently used approach (Guo and Fraser, 2010), and also used in previous accounting research (Lawrence *et al.*, 2011; Lennox *et al.*, 2012; DeFond *et al.*, 2016 for a description of matching models). This approached involved

estimating a logit regression to predict the probability of being industry leader. Propensity scores were matched for all the independent variables, using the propensity scores that are predicted from the logit regression from the previous step to obtain a propensity-score matched sample with neighbor (1) caliper (0.1). Observations which could not be paired were eliminated from the sample and the regressions were run on subsamples. Results (Table 13, Panels A and B) show a significant reduction of mean bias from 23–26 to 3–5. Our initial multivariate results hold (Table 13, Panels A and B).

4.2.10 Both national and area leaders. We follow prior literature (Francis *et al.*, 2005; Basioudis and Francis, 2007; Carson, 2009), to ascertain whether the auditors are a nationally top-ranked auditor and city-level industry leader at the same time. Our sample includes auditors which were top-ranked for both nation and area (about 31% observations) and for both nation and city (about 24%). Results (un-tabulated) show that the coefficient of national and area level and the coefficient of national and city level are both positive and statistically significant. We conclude that a necessary and sufficient condition to gain an audit fee premium is audit partner leadership at national and area level.

4.2.11 Auditor change. Italy has a stronger national than local level of industry expertise because auditors aim to retain and transfer industry expertise. We control for auditor change in the regression using the variable Tenure. The variable Industry specialization is also time-variant, and changes when the auditors change if the auditors lose the largest market share. In addition, we perform a robustness analysis (un-tabulated) removing Tenure and adding First year of auditor change. Auditor change is negatively and significantly associated with audit fees but not significantly associated with Audit hours. Using Auditor change and controlling for the difference in the First year of the audit engagement, rather than using Tenure, our results for industry leader are confirmed.

5. Conclusion

Our paper examines how auditor national industry expertise and local industry expertise is organized in Italy, where mandatory audit firm rotation has been in force since 1975. Industry expertise is a conduit for the transfer of auditors' industry specific knowledge. Italy has higher client turnover than the USA, because of a nine-year MAFR requirement, and it also has a smaller publicly listed client audit market. We predict that national industry expertise is stronger than area industry expertise because higher client turnover, and a small audit market, increases the sensitivity of industry-specific knowledge being lost at the local area level. We find that audit fees of industry specialists at the national level and the area level are greater than fees of non-specialists. We do not find the same evidence for city industry specialists. However, unlike prior studies restricted to countries with voluntary audit firm rotation (Ferguson *et al.*, 2003; Francis *et al.*, 2005; Basioudis and Francis, 2007), we find that national industry specialization dominates over area industry specialization in audit fee premiums and audit hours, suggesting there is greater centralization of industry specialization in Italy. We conduct the same analysis for companies located in Germany, which has a similar legal and regulatory system, but does not have MAFR. We find no difference between the audit fee premiums of national industry specialists and area industry specialists. However, the sample size for Germany is larger. We conclude that the higher client rotation of MAFR is a contributing factor, as well as a smaller audit market size. Our study has a number of implications for academics, regulators and legislators considering adopting MAFR.

	Dependent variable is the natural logarithm of audit fees					
	Model (1)		Model (2)		Model (3)	
	Estimate	*p*-value	Estimate	*p*-value	Estimate	*p*-value
Panel A						
Intercept	10.656	0.000	10.516	0.000	12.696	0.075
SIZE	0.295	0.000	0.292	0.000	0.295	0.000
CATA	0.842	0.011	0.873	0.012	1.019	0.004
QUICK	−0.187	0.000	−0.214	0.001	−0.249	0.000
LEV	−0.480	0.247	−0.546	0.171	−0.956	0.028
ROA	−1.179	0.082	−1.330	0.033	−2.032	0.014
LOSS	0.043	0.670	0.015	0.877	−0.017	0.850
σ (CFO)	−0.314	0.265	0.075	0.791	−0.272	0.375
SALES GROWTH	−0.051	0.541	−0.075	0.447	−0.006	0.944
TENURE	0.004	0.758	0.000	0.995	0.003	0.825
ACCR_1	0.019	0.460	0.000	0.993	0.030	0.274
BIGN	Omitted		Omitted		0.474	0.004
UNCLEAN OPINION	0.038	0.520	0.039	0.567	−0.002	0.981
LABOR COST	−0.018	0.743	−0.016	0.804	−0.047	0.780
National Leader	0.237	0.002				
Area Leader			0.138	0.063		
City Leader					−0.047	0.549
Industry- and year-fixed effects	Included		Included		Included	
Mean bias	From 23.5 to 2.9		From 26.2 to 5.2		From 26.1 to 3.1	
N	583		593		610	
Adj. R^2	0.357		0.340		0.402	
Panel B						
Intercept	7.479	0.000	6.684	0.000	9.651	0.118
SIZE	0.299	0.000	0.287	0.000	0.298	0.000
CATA	1.037	0.003	0.982	0.006	1.138	0.001
QUICK	−0.251	0.000	−0.262	0.001	−0.270	0.000
LEV	−0.332	0.373	−0.412	0.291	−0.644	0.108
ROA	−0.077	0.907	0.224	0.741	−0.659	0.441
LOSS	0.159	0.064	0.158	0.058	0.146	0.081
σ (CFO)	0.087	0.717	0.012	0.963	−0.171	0.512
SALES GROWTH	−0.075	0.072	−0.005	0.958	0.010	0.913
TENURE	−0.001	0.940	0.003	0.832	0.004	0.771
ACCR_1	−0.001	0.981	−0.007	0.781	0.010	0.696
BIGN	Omitted		Omitted		0.121	0.258
UNCLEAN OPINION	0.100	0.068	0.043	0.484	0.007	0.909
LABOR COST	−0.039	0.260	−0.017	0.659	−0.081	0.577
National Leader	0.195	0.009				
Area Leader			0.082	0.268		
City Leader					0.028	0.704
Industry- and year-fixed effects	Included		Included		Included	
Mean bias	From 23.5 to 3.2		From 26.2 to 5.4		From 26.1 to 5.6	
N	617		645		648	
Adj. R^2	0.412		0.342		0.431	

Table 13.
PSM for audit fees (Panel A) and hours (Panel B) – Italy sample

Notes: Coefficient *p*-values in Panels A and B are two-tailed and robust standard errors are clustered by firm, following Peterson (2009). *F*-test *p*-values in Panels A and B are one-tailed. Refer to Appendix for variable definitions

Theoretical implications involve both method of research and the debate on costs and benefits of national and local industry specialization of audit partners. Previous research based on audit fees displays limitations and conflicting results, but the present research suggests that the use of audit hours strengthens results and that audit efforts can be used as a measure of audit quality. Our results also show that the distribution of audit expertise depends partly on the size of the audit market and MAFR. Where the audit market is small and MAFR is in place, it is likely that audit firm industry expertise will be mainly organized at national and area level, rather than city level. The organization of audit expertise at national and area level assures a higher level of audit quality in these contexts. MAFR, which is now in force in all countries of the European Union, together with the mandatory rotation of audit partners, was introduced to assure auditor independence. It is, however, costly because it lowers the levels of competency and industry specialization of audit partners. MAFR thus appears to weaken the city level of industry expertise, which can affect audit quality as a whole. More frequent turnover of clients requires industry expert audit personnel to either adopt another industry, or else relocate, when a significant number of clients depart from an industry and are not replaced. This can create a "brain drain" of client and industry-specific knowledge, and shift a greater burden onto national headquarters to nationalize industry expertise, such as through national industry-specific training programs and consulting industry experts. Our results show that audit fee premiums and audit hour premiums are greater for national industry experts than for area industry experts, and the differences are statistically and economically significant. A potential consequence is that with more frequent turnover of clients, auditor quality is weakened at the office level where engagement partners and staff have a more intimate knowledge of the client. However, their industry knowledge has a shorter useful life and can depreciate quickly with the loss of expert personnel to other offices or other industries. Combined national and local levels of audit quality could be lower than in countries without MAFR, if national industry expertise cannot sufficiently compensate for the loss of local level expertise.

This study has certain limitations, which may be overcome by future research. First, the introduction of the "area level" as the local level of industry expertise could be questioned. Following the Big 4 partner interviews, we here divide Italy in two main areas, North and Center-South, but the literature suggests the city could be more suitable as the local level of organization of industry expertise. The coefficient of city level in our regression model is not significant, confirming the dominance of national level of expertise. Comparing our results with Germany, we investigated the area level in that country, but future research is required to confirm the effectiveness of the area level of organization of audit industry expertise in other countries. Second, we interview Big 4 partners to corroborate the effects of area level and the effects of MAFR on industry expertise, but our sample may not be completely representative of the Italian population. A different approach including more extensive interviews and/or surveys would provide better insights on this. Future research will also need to use both quantitative and qualitative methods of research. Third, given the controversial results of audit fees as a measure of audit effort and audit quality, we complement our model with audit hours. But a promising next step for future research might be to investigate how audit industry expertise, and specifically the national and local level of industry expertise, influences audit quality using different measures, for example, the level of discretionary accruals and/or the going concern opinions. Fourth, we compute audit fees without taking into account possible omitted variables such as political donations.

Notes

1. Information technology used for knowledge sharing include KPMG's KWorld™, PriceWaterhouseCooper's TeamAsset™ and KnowledgeCurve™ and Ernst and Young's KnowledgeWeb™ (Zerni, 2012). See Vera-Munoz, Ho, and Chow (2006) for further discussion of factors affecting knowledge sharing in international accounting firms.
2. Italy is organized into three *geographic* areas (North, Center and South) as defined by the European Commission's statistics division (EUROSTAT) and by the Italian National Institute for Statistics [Instituto Nationale di Statistica (ISTAT), 2014] using standard territorial definitions from the NUTS. However, because there is so little industrial activity in the South, only one industry leader appears in the South for the entire sample period (2005–2013); consequently, we combine the Center and South areas into one industrial area.
3. Firm-fixed effects are not feasible when sufficient degrees of freedom are lost and Type II errors are more likely.
4. Audit fees also include interim financial reviews and accounting procedure audits.
5. For the purpose of the city leader variable, we base the city on the 20 Italian government-based regions. They are North (Valle d'Aosta, Veneto, Trentino Alto Adige, Friuli Venezia Giulia, Emilia Romagna, Lombardia, Liguria, Piemonte), Center (Lazio, Toscana, Umbria, Marche) and South (Abruzzo, Molise, Campania, Basilicata, Puglia, Calabria, Sicilia, Sardegna). The Big 4 audit firms have approximately one office in each region.
6. Given that we have a small sample size compared to previous studies, we are careful to select control variables to avoid problems related to the degree of freedoms from adding too many independent variables. We do not include client firm age because the Italian listed firms are on average very old (some are hundreds of years). We do not include years of listing because Italian firms often use loan financing before the firm is listed on a stock exchange. We do not include the fiscal year-end because a very large proportion of our sample (95%) has a December 31 year-end. We do not include the Herfindahl–Hirschman index of auditor area industry concentration (Numan and Willekens, 2012) because the coefficient was not significant ($p > 0.10$), and there is too little variation over time to be reliable for fixed-effects estimation. We do not include the number of business segments because Compustat does not report it, and we use size to control for complexity. In our robustness tests, we use a hand-collected business segments variable from a smaller sample, and our main results still hold.
7. Some companies disclose only audit hours and no audit fees.
8. Following Craswell, Francis, and Taylor (1995), the audit fee premium in percentage points is $(e^z - 1) \times 100$, where z is the coefficient on the industry leader variable.
9. The interviews include several questions, but for this study, we use only answers to the two questions quoted below.
10. Brown *et al.* (2014) survey 51 countries, and report for 2008 that the audit quality index has a mean of 18.25 and a standard deviation of 8.27, and the accounting enforcement index as a mean of 12.59 and a standard deviation of 6.65.
11. We repeat the analysis computing industry leadership of the national industry leader and the area industry leader by market share of audit fees and by market share of audit hours. We find that our results are not consistent when compared to using market share of client assets or client sales. We conclude that client sales and client assets are more reliable, likely because there are more observations to accurately compute the auditor's industry market share.
12. We find robust results with audit hours (14.6% vs 4.6%), and the difference is statistically significant ($p < 0.05$).
13. For audit hours, the results are robust. There is a premium for the national industry leader for the consolidated financial statements audit subsample (33.1%, $p<0.01$) which is greater than the area

industry leader (8.2%, $p = 0.43$), and the difference is statistically significant ($p < 0.01$). There is also an audit hour premium for the group accounts subsample for the national industry leader (24.8%, $p = 0.03$), which is greater than the area industry leader (7.3%, $p = 0.49$), and the difference is statistically significant ($p = 0.03$) (untabulated).

14. For audit hours, we find that the coefficient on the national industry leader variable is positive and statistically significant (0.202, p=0.04), and the coefficient on the area industry leader variable is positive (0.139, p=0.06, one-tailed) even though the difference is less evident (p=0.28) (untabulated). The less significant results are likely because of the reduced sample size from 1,123 to 414 firm-year observations.

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Appendix

Dependent variables used in audit fees and hours analysis (*Source: annual shareholder meeting minutes*)	
LAF	= natural logarithm of total audit fees for the audit of consolidated financial statements and separate audits of the financial statements of the parent and the subsidiaries (winsorized at the 1st and 99th percentiles)
LAH	= natural logarithm of audit hours for the audit of consolidated financial statements (winsorized at the 1st and 99th percentiles)
Expertise variables [*source: Compustat Global (total sales and GICS), Eurostat (area), and annual shareholder meeting minutes (audit firm and location)*]	
National industry specialist	The audit firm with the largest market share (client total sales) by two-digit GICS and year
Area industry specialist	The audit firm with the largest market share (client total sales) by two-digit GICS, area and year. There are two areas: North and Center-South
City industry specialist	The audit firm with the largest market share (client total sales) by two-digit GICS, city and year. There are 20 cities, based on the 20 regions, in Italy: North (Valle d'Aosta, Veneto, Trentino Alto Adige, Friuli Venezia Giulia, Emilia Romagna, Lombardia, Liguria, Piemonte), Center (Lazio, Toscana, Umbria, Marche) and South (Abruzzo, Molise, Campania, Basilicata, Puglia, Calabria, Sicilia, Sardegna).
Control variables (winsorized at the 1st and 99th percentiles) (*source: Compustat Global, except as indicated*)	
SIZE	= the natural logarithm of total assets at the end of the fiscal year
σ (CFO)	= the standard deviation of operating cash flow scaled by total assets at the beginning of the fiscal year
LEV	= total long-term debt scaled by total assets at the end of the fiscal year
LOSS	= 1 if net income < 0, and 0 otherwise
SALES GROWTH	= $(\text{revenue}_t - \text{revenue}_{t-1})/\text{revenue}_{t-1}$ for the fiscal year ended
TENURE	= tenure of the audit firm (minimum of one year and maximum of nine years) (*source: annual shareholder meeting minutes*)
ACCR 1	= signed value of total accrual in year $t-1$ scaled by total assets at the end of $t-1$ (in logarithm in the audit fees and hours models)
BIGN	= 1 if audited by a Big N auditor, and 0 otherwise (*source: annual shareholder meeting minutes*)
CATA	= ratio of current assets to total assets;
LABOR_COST	= cost of labor from Italian Statistical Institution (ISTAT) database
QUICK	= ratio of current assets (less inventories) to current liabilities
ROA	= ratio of earnings before interest and tax to total assets
UNCLEAN OPINION	= 1 if the audit opinion in not unqualified (additional language, qualified, adverse, or no opinion) and 0 if unqualified

Table A1.
Variable definitions

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