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The Pricing of IPO Audit Expertise and Subsequent Issuer Underpricing

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DEDICATION

I dedicate this dissertation to my family and friends who have supported me throughout this

journey.

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TABLE OF CONTENTS

ABSTRACT

I examine the costs and benefits to the issuer of hiring an IPO auditor specialist in the U.S. Initial Public Offerings market. I quantify IPO auditor expertise at the market share level and the market concentration level and then I investigate the audit fees of IPO audit expertise and the issuer underpricing in the U.S. IPO market. I find that there are significant fee premiums when an audit firm is a national IPO audit specialist and when an audit office is a city IPO audit specialist. I also find that IPO specialist auditors reduce first-day issuer underpricing. These results are robust to controlling for extant endogeneity with respect to choice of auditor. This paper contributes to both the auditor specialization literature and the IPO literature by investigating IPO audit specialization. This study also provides useful information to IPO market participants, such as issuers, investors, auditors, and regulators.

CHAPTER 1

INTRODUCTION

I investigate the IPO expertise of audit firms and audit offices in the U.S. Initial Public Offerings (IPO) market when audit firms and audit offices gain experience in the U.S. IPO audit market as measured by their IPO market share level and IPO market concentration level. I then examine the costs and benefits to the issuer of hiring an IPO auditor specialist. Specifically, I investigate whether IPO specialist auditors earn higher fees and whether issuers that use an IPO specialist auditor exhibit lower first-day underpricing.

In the IPO market, the auditor's role as an information intermediary is of paramount importance because a high degree of information asymmetry exists between managers and potential investors in the IPO setting (Leland and Pyle 1977). On the one hand, management has an incentive to manage financial information to demonstrate stronger financial performance in order to increase offering prices (Teoh, Wong, and Rao 1998) . On the other hand, potential investors mainly obtain information about the firm from the offering prospectus because there is often little publically available information about private entities. As the degree of information asymmetry increases, the demand for high quality audits significantly increases because high quality audits provide independent assurance of the credibility of accounting information, improving resource allocation and contracting efficiency (DeFond and Zhang 2014).

For auditors, IPO audits are unique engagements which differ drastically from subsequent regular audits. Auditors are required to make sure that financial statements are audited for up to three years prior to the IPO, issue a comfort letter for underwriters, and aid first time registrants in applying rules and interpretations. In addition, firms raising capital in the equity markets for the

1

first time are less likely to have well-developed accounting systems and procedures in place necessary to comply with SEC requirements. Thus, through more experience conducting IPO audits, IPO specialized auditors should be able to develop a deeper understanding of how to successfully conduct IPO audits, and become experts in the unique set of requirements and expectations required of private companies transforming into public companies.

Accordingly, investigating whether IPO specialized auditors earn higher audit fees should be of interest to client firms and potential investors because higher audit fees indicate a combination of audit effort and expected losses from litigation (Simunic 1980). The Simunic (1980) framework suggests that if IPO specialized auditors earn a fee premium, it means that IPO specialized auditors exert more effort and/or IPO specialized auditors incorporate expected future litigation losses into audit fees.

To extend Simunic's framework to IPO specialist fee premiums, I argue that IPO clients may value IPO specialized auditor expertise because this expertise should help to mitigate the high degree of information asymmetry between issuers and investors in the IPO market. As such, auditors' IPO expertise should help to reduce first-day underpricing which increases IPO proceeds to the firm. Given that a successful IPO can yield substantial proceeds for an issuer, IPO issuers should be willing to pay higher audit fees to IPO specialist auditors.

A better understanding of auditor specialization in the IPO market should also be of interest to governing bodies including the United States Congress and the Public Company Accounting Oversight Board (PCAOB). In response to burdensome regulations for the IPO process leading to IPO activities being well below historical levels, the United States House of Representatives passed the Jumpstart Our Business Startups Act (JOBS Act) on March 8, 2012 (Dambra, Field, and Gustafson 2015). The JOBS Act makes it easier for smaller firms to go public by reducing the

regulatory burden of these firms seeking to raise equity capital. For example, emerging growth companies (EGCs; firms with less than $1 billion in annual revenues) are exempt under the JOBS Act from the requirement of an auditor to attest to the effectiveness of the company's internal controls over financial reporting. While this exemption should have the effect of increasing the number of small firms that go public, it may also increase the number of risky small firms that go public, as well as increase the risk of audit failure because the effectiveness of internal controls is a part of an integrated audit.

As a result of this internal control exemption, auditors will likely have to spend more time performing substantive tests. Evidence that IPO specialized auditors earn higher audit fees due to increased audit effort, increased risk premium, and/or increased IPO expertise would be consistent with internal control exemptions being less of a concern for clients with IPO specialized auditors. This will be beneficial information to regulators attempting to set the appropriate level of IPO regulatory requirements to promote IPO activities while protecting investors from risky firms going public. Additionally, in order to further improve financial reporting quality and protect investors in smaller IPO firms, the PCAOB, as an oversight body of auditors, could choose to focus more of their attention on clients with non-IPO specialist auditors in the course of their inspections.

As a result of smaller firms having access to the capital markets through reduced regulatory burden, smaller audit firms may play a larger future role in the IPO market and choose to specialize in this market.[1] In the U.S. IPO market, there is an increasing trend in the percentage of IPOs

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[1] Prior literature suggests smaller auditors are increasing their services in a variety of ways. Louis (2005) provides evidence that Non-Big N firms deliver better M&A advisory services. Boone, Khurana, and Raman (2010) document that audit quality is no different between Big N and second tier auditors after SOX. Chang, Cheng, and Reichelt (2010) find a relatively more positive market

audited by both mid-size and small audit firms (Treasury 2008). Additionally, Marcum LLP, stated in response to having conducted the most IPO audits through the first three quarters of 2015 by a non-Big 4 auditor that 34 percent of IPOs in 2015 were audited by non-Big 4 firms which "highlights the growing notion that a company need not engage a Big 4 firm to complete an IPO" (Marcum LLP 2015). This trend indicates that mid-size and small size auditors may also be able to become IPO audit specialists by auditing a large number of IPO clients and obtaining experience and knowledge of accounting rules specific to IPO audits. As a result of this changing perception of non-Big 4 auditors in the IPO market, I argue that it is important to examine audit specialization, regardless of auditor size, in the IPO market and the costs and the benefits of IPO specialist auditors.

I define IPO specialization in terms of the audit firm and the audit offices' IPO market share level (definition 1) based on audit fees following the framework in Francis, Reichelt, and Wang (2005). I also use IPO market concentration levels (definition 2) based on the proportion of IPO audit fees over total audit fees following the framework in Gramling and Stone (2001). I then examine the association between audit fees and auditor IPO specialization to investigate whether IPO specialist auditors differentiate themselves from other auditors and earn a fee premium. I also examine whether the use of an IPO audit specialist leads to lower levels of first-day issuer underpricing. To address the endogeneity issue in client's choice of an auditor, I use the propensity score matching method in addition to my multivariate analysis.

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reaction to clients switching from a Big4 to a smaller third tier auditor after SOX. Bills and Stephens (2016) argue that small audit firms play a significant role in audit competition because the market share distance from small audit firm competitors has a greater effect on the Big 4's audit fees than distances from other Big 4 competitors.

I find that Ernst & Young LLP is the national IPO specialist for eight out of 14 years and that Big 4 audit offices are 93% of the city IPO specialists when using IPO market share level based measure on audit fees. In contrast, when I use IPO market concentration level based on the proportion of IPO audit fees over total audit fees, I find that the national IPO specialist audit firms for each year are mostly non-Big 4 audit firms and that Big 4 audit offices are 87% of the city IPO specialists.

I find a significant fee premium of 78% with national IPO specialist audit firms and 141% with city IPO specialist audit offices using the IPO market share level measure. There is an even higher fee premium of 272% with national IPO specialist audit firms and of 173% with city IPO specialist audit offices using the IPO market concentration level.[2] I also find evidence that the use of an IPO specialist auditor is associated with lower subsequent first-day issuer underpricing; the coefficients on IPO specialist auditor are negative and significant and result in, on average, reduced underpricing worth $5.3 million (national IPO specialists definition 1), $3.8 million (city IPO specialists definition 1), $6.2 million (national IPO specialists definition 2), and $6.7 million (city IPO specialists definition 2). These results are robust to the propensity score matching method.

Thus, my results suggest that while there are costs to an issuer that engages an IPO specialist auditor (higher audit fees), there are also benefits to the issuer (lower subsequent first-

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[2] Using my first measure of specialization, this fee premium at the national IPO specialist level equates to, on average, a $477,515 audit fee premium above non-national IPO specialists, while for city IPO specialists the fee is $787,623 higher than for non-city IPO specialists. Using my second measure of specialization, this fee premium at the national IPO specialist level equates to, on average, a $948,537 audit fee premium above non-national IPO specialists, while for city IPO specialists the fee is $871,864 higher than for non-city IPO specialists. These fees compare to IPO proceeds, which average $173 million in my sample. While these audit fee premiums may seem high compared to post-IPO audit fee premium studies, the average audit fees charged in my IPO sample are less than 0.5% of proceeds raised, while average underwriter fees are much larger at 8.79% of proceeds (Griffin, Harris, and Topaloglu 2007)

day issuer underpricing). In other words, national IPO specialists (definition 1) earn, on average, a $477,515 audit fee premium while reducing underpricing by $5.3 million. City IPO specialists (definition 1) earn, on average, a $787,623 audit fee premium while reducing underpricing by $3.8 million. National IPO specialists (definition 2) earn, on average, a $948,537 audit fee premium while reducing underpricing by $6.2 million. City IPO specialists (definition 2) earn, on average, an $871,864 audit fee premium while reducing underpricing by $6.7 million.

My study contributes to both the auditor specialization literature and the IPO audit literature. First, while a vast stream of literature exists on auditor specialization, these studies mainly focus on industry wide auditor specialization (Bills, Jeter, and Stein 2015; Fung and Krishnan 2012; Cahan, Jeter, and Naiker 2011; Reichelt and Wang 2010; Carson and Fargher 2007; Francis et al. 2005; Casterella, Francis, Lewis, and Walker 2004). Additionally, Mayhew and Wilkins (2003) use IPO clients' audit fees to examine industry specialization and find that industry specialist audit firms earn fee premiums. While the setting for their study is IPO clients, they only investigate industry specialist auditors and do not investigate IPO specialist auditors. My investigation on auditor specialization in the IPO market contributes to the auditor specialization literature by focusing on a unique, highly complex audit engagement not yet examined in the auditor specialization literature.

Second, prior IPO audit literature focuses either on only Big 4 audit firms for IPO audits (Hogan 1997) or on the effect of additional auditor legal liability under the 1933 Securities Act (1933 Act) on audit quality (Venkataraman, Weber, and Willenborg 2008). My study provides evidence on whether audit firms and audit offices, regardless of size, specialize in IPO audits. My analysis helps better understand differences of audit fees in the IPO market between IPO specialized audit firms and offices, and non-specialized audit firms and offices. My paper also

extends our understanding of how legal liability under the 1933 Act affects auditors as I demonstrate that within this increased legal liability regime, IPO audit specialization occurs, affecting audit pricing and reducing underpricing.

A better understanding of audit pricing in the IPO market should also provide audit firms with practical information for when they develop business strategies to differentiate themselves from other audit firms and offices in the course of becoming an IPO specialist auditor. In particular, my study provides evidence that smaller auditors identified by market concentration levels can also earn a fee premium in the IPO audit market. This study also provides useful information to IPO market participants, such as issuers and investors, as the results demonstrate that certain auditors specialize in the IPO audit market and that these specialized auditors reduce underpricing. Private companies considering an IPO will likely benefit from knowing the costs and benefits of hiring a particular auditor, and which of these auditors differentiate themselves within the IPO market.

The rest of my paper is organized as follows. Section two provides the background and hypotheses development. Section three describes my sample and data. Section four presents research methodology. Section five discusses results. Section six provides additional analysis. The last section concludes my paper.

CHAPTER 2

BACKGROUND AND HYPOTHESES DEVELOPMENT

BACKGROUND

Auditor liability under the Securities Act of 1933.

The role of auditors as an information intermediary in the IPO setting is critical in reducing information asymmetry between issuers of the security and potential investors (Weber and Willenborg 2003). As such, regulators impose higher litigation risk to auditors in order to protect capital providers investing in initial public offerings. The increased litigation risk to the auditor in the IPO process is a result of additional liability that the Securities Act of 1933 (1933 Act) imposes on auditors when auditing financial statements of IPO firms (Venkataraman et al. 2008). The 1933 Act was enacted by the United States Congress for the primary purpose of increasing disclosure to prospective investors and was drafted as a "Truth in Securities Act" which emphasized "public disclosure of material information as the primary mechanism for federal regulation of the securities markets" (Ruder 1988).

Venkataraman et al. (2008) detail differences between the 1933 Act and the 1934 Securities Exchange Act (1934 Act) with respect to the auditor's litigation risk. For example, in accordance with the 1933 Act, firms going public must provide a registration statement which includes a detailed prospectus and audited financial statements for up to three years of financial statements. The auditor is also required to issue a "comfort letter" to the underwriter which provides assurance concerning the information in the registration statement that the auditor's report does not cover and for subsequent events after the audit report date (Venkataraman et al. 2008).

Legal exposure to the auditor is also higher under the 1933 Act because the auditor is required to demonstrate that they exercised due diligence as opposed to the lower threshold of good faith for post-IPO audits which are conducted in accordance with the 1934 Act. In other words, in the course of litigation brought under the 1933 Act, the auditor is liable for ordinary negligence. Investors, as plaintiffs, can sue auditors without proving their reliance on the financial statements. In contrast, litigants must demonstrate that the auditor demonstrated grossly negligent behavior when bringing suit under the 1934 Act.

Venkataraman et al. (2008) exploit the heightened level of legal liability imposed to auditors in the IPO setting by investigating the relation between auditor exposure to legal liability and audit quality. They conclude that audit quality is higher for IPO audits based on their finding that audit fees for IPO audits are higher and signed discretionary accruals are more negative in the IPO period. They argue that higher IPO audit fees compensate auditors for litigation risk and long audit hours required for IPO audits. They also posit that the increased threat of litigation to the auditor in the IPO audit leads the auditor to cede less discretion to managers.

However, another line of prior studies argues that management's incentive to report strong performance in financial statements leading up to the IPO to increase offering price outweighs the auditor's demand for conservatism. Friedlan (1994) provides evidence that IPO issuers make income increasing discretionary accruals in their financial statements because reporting strong financial performance leads to a better IPO offering price. Friedlan (1994) points out that the limited sources of publicly available information leading up to the IPO (compared to seasoned equity offerings) allows management higher discretion in reporting earnings.

Teoh et al. (1998) argue along similar lines that the incentive to manage earnings is strong when the firm is planning to sell shares in the market as an IPO because reporting better financial

performance may lead to a higher offering price. Furthermore, the opportunity to manage earnings also exists because of the high degree of information asymmetry present in the IPO market. Efendi, Srivastava, and Swanson (2007) find that among firms that raised new equity capital, those that subsequently restate their financials raised more new equity capital than firms without a restatement. They argue that a firm's ability to raise equity capital and the cost of new capital is largely dependent on the firms' financial performance (i.e. accounting numbers). Managers are incentivized to report strong financial performance to increase offer price, but if they report aggressively, they take a risk of a subsequent financial restatement (Efendi et al. 2007).

The unique nature of the IPO setting, a combination of managerial incentives for aggressive financial reporting and the auditor's opposite incentives to constrain this behavior gives rise to several questions. How do managers of IPO firms choose an auditor? Do certain audit firms (and/or offices) specialize in the audit of IPO firms? If so, how are IPO specialized auditors priced? And, if IPO specialized auditors earn fee premiums, do they provide a benefit to issuers in the way of reducing first-day underpricing? Providing evidence as to whether auditors differentiate themselves from other auditors in the audit of IPO firms should be of great interest to audit firms, issuers, investors, and regulators.

IPO specialists

A wealth of research has focused on auditor industry specialization within the audit market. However, prior literature on the subject of auditor industry specialization typically considers the audit market as a whole (Casterella et al. 2004; Mayhew and Wilkins 2003; Dunn and Mayhew 2004; Low 2004; Huang et al. 2007; Kwon et al. 2007; Cenker and Nagy 2008; Li et al. 2010; Reichelt and Wang 2010; Fung et al. 2012; Ferguson et al. 2014; Cairney and Stewart 2015; Bills

et al. 2015; Balsam et al. 2003). What prior research on industry specialization has not done is distinguish between first time public registrants and existing public registrants.

Prior research tends to agree that positive network synergies are created as a result of industry expertise in both national audit firms and local offices of audit firms (Bental and Spiegel 1995; Katz and Shapiro 1985). At the firm-wide level, audit firms gain industry expertise by sharing industry focused knowledge and experience, such as the usage of standardized industry-tailored audit programs, internal benchmarking of best practices, and the exchange of industry specialized personnel among different offices within an audit firm (Reichelt and Wang 2010).

At the office level, auditors obtain "deep personal knowledge of clients" and local business conditions that cannot be easily transferable and distributable to other offices (Reichelt and Wang 2010). Auditor's individual knowledge at the local office level plays an essential role in determining audit quality because audit firms are formed "with partnerships where key audit decisions are made at local offices" (Reichelt and Wang 2010). For example, auditors contract with clients, administer audit engagements, and issue audit reports signed on the letterhead of the *local office* of the audit firm (Francis, Stokes, and Anderson 1999).

I extend prior literature on the subject of auditor specialization by examining auditor specialization for first time public issuers. I expect that through more experience with IPO audits, IPO specialized auditors should be able to gain a deep knowledge of complex legal and technical requirements for first time filings, and become experts in the idiosyncratic set of requirements and expectations that private companies transforming into public companies must comply with.

An IPO audit is different from a post-IPO audit for several reasons. First, IPO auditors are required to certify that IPO clients have audited financial statements for up to three years prior to

the IPO.[3] If the current auditor at the time of the IPO has not audited the prior year financials, the auditor therefore may be responsible for auditing up to three years of financials in one year. I argue that auditing a private company's financials for multiple years is different from auditing one year of a public companies financial information, leading IPO auditors to develop special skills and to gain unique experience in order to provide reasonable assurance for this unique engagement.

Additionally, IPO auditors should develop specialized knowledge about how to aid in applying rules and interpretations for first time registrants including Rule 3-05 of regulation S-X, *Financial Statements of Businesses Acquired or to be Acquired*, Accounting Standards Codification (ASC) 718, *Compensation-Stock Compensation*, and SAB Topic 14, *Share-Based Payment*, ASC 480-10-S99, *Classification and Measurement of Redeemable Securities.* In addition, IPO auditors should be better able to help applying complicated provisions of the JOBS Act to their clients. Those rules can change the required number of years of audited financial statements according to the significance of clients.[4]

Furthermore, IPO auditors are required to issue a comfort letter for underwriters and other requesting parties in connection with the registration statement and financial statement schedules contained in registration statements filed with the Securities and Exchange Commission under the

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[3] "Registrants must present the summarized balance sheet information for the most recent two fiscal years and the summarized income statement information for the most recent three years, unless the entity qualifies as a smaller reporting company or as an EGC in the IPO, in which case summarized income statement information is only required for the most recent two years" (Ernst &Young LLP 2015).

[4] An example from EY (2015): "a calendar-year company initially files an IPO registration statement on 1 April 2015. Registrant acquired Company A, a non-accelerated filer, on 1 August 2014. Company A has a calendar year end. Registrant meets the conditions and applies SAB Topic 1.J, which results in Company A being significant at the 25% level using 2014 pro forma financial information. Under the regular significance test based on 2013 financial information, Company A was significant at the 35% level. This registrant must provide a combination of pre-acquisition and post-acquisition periods that result in a continuous audited period of at least 21 months".

1933 Act.[5] IPO auditors are requested to provide assurance regarding information in the registration statement that the auditor's report does not cover and for subsequent events following the audit report date (Venkataraman et al. 2008). In many cases, IPO auditors are also required to issue consent multiple times for revisions to the S-1 filing because the SEC occasionally issues comments back to IPO clients leading to revisions to the S-1. IPO auditors thus have to issue consent, and likely under time pressure because the markets for IPO are extremely time-sensitive.[6] All of these requirements unique to IPO audits should lead to the development of IPO audit expertise.

Furthermore, prior IPO audit experience of the auditor should signal to managers and investors that the auditor possesses an expertise with the distinct SEC filing requirements for IPO firms. This expertise should provide the auditor with the ability to skillfully lead the IPO firm through the complex filing requirements. I expect that clients value auditors with experience in the audit of IPO firms, leading to IPO specialist auditors garnering even more IPO audit engagements. Such a phenomenon should lead to some auditors developing IPO specialization.

At the firm level, audit firms may develop IPO expertise by sharing IPO focused knowledge and experience. For example, audit firms may develop standardized IPO audit

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[5] A comfort letter typically includes "a statement as to the accountants' independence from the issuer, the compliance of the issuer's audited financial statements with applicable SEC requirements, statements regarding the accountants' review of interim unaudited financial statements, negative assurance statements relating to the unaudited comparative stub period financial statements included in the registration statement, recital of any changes in selected key line items during the period after the date of the lasts financial statements in the registration statement, and comments on the results of additional procedures performed on the miscellaneous financial information in the registration statement."(Morrison & Foerster LLP 2016)

[6] For example, Facebook, Inc revised the S-1 filing eight times from February 8, 2012 to May 16, 2012. Groupon, Inc revised the S-1 filing eight times from July 14, 2011 to November 02, 2011. Linkedin Corp revised the S-1 filing eight times from March 11, 2011 to November 16, 2011.

programs and then utilize IPO specialized personnel whom are exchanged among different offices.[7] At the office level, audit offices may gain more experience than other offices if the locations of offices are in an area where more young, start-up and growth companies incorporate their business. This deep personal knowledge of IPO audits developed in the audit office may not be readily transferable and distributable to other offices in the audit firm. Therefore, IPO audit expertise may develop both at the audit firm level and at the audit office level.

Many audit firms, both Big4 and non-Big 4, advertise their IPO services on their websites. Table 1 provides a summary of how annually inspected audit firms from the PCAOB discuss their role in IPO audits on their websites.[8] Among Big4 audit firms, Ernst & Young LLP and PWC LLP provide more detailed information about their IPO services through annual and quarterly publications. In contrast, KPMG LLP does not have any publication about IPO service.

Among non-Big 4 firms, BDO USA, Crowe Horwath, and RSM US discuss IPO audit service. Other annually inspected non-Big 4 audit firms do not have any IPO services discussed in their website. Based on the variation of the claims made by audit firms on their website, I expect certain audit firms regardless of their size (Big 4 firms versus non-Big 4 firms) to gain expertise within the IPO audit market and to specialize in IPO audits.

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[7] BDO Seidman LLP on its website states "BDO's flat structure and partner-led service model ensures that you have access to senior-level professionals throughout the process. Unlike many other large firms, our national SEC office is part of the engagement team, and is heavily involved in the planning stages of your IPO and can help you understand the nuances of registration and reporting process." (BDO USA LLP 2016b). An interview with a PriceWaterhouseCoopers director by a member of dissertation committee, Dr. Kenneth Reichelt, at Chicago, IL on August 7th 2015 further supports this argument. This director stated that they bring in IPO specialized personnel with extensive experience in IPO audits from different offices for complex IPO audits.
[8] Audit firms providing audit reports for more than 100 public registrants are annually inspected by the PCAOB, while audit firms providing audit reports for less than 100 public registrants are triennially inspected by the PCAOB.

Table 1: IPO Auditor Role from Websites-Annual filers

Audit firms	Class	Roles in IPO audits from websites	Publication	IPO leaders
Deloitte & Touche	Big 4	Our IPO Advisory Services team provides the end-to-end, "turn-key" solutions and strategies your organization needs through the IPO process. Our tools and methodologies help companies mitigate transaction risk and compress execution timelines so you can stay focused on your company and investors.	Strategies for going public Fourth edition in 2014	Director, Accounting & Reporting Transformation
Ernst & Young	Big 4	We've been guiding high-growth companies and business leaders safely through the IPO process and beyond for decades. Many of the emerging entrepreneurial companies we have worked with have gone on to become major global organizations. We can help you get through the three phases of a successful IPO:	1Q 2016 Global IPO Trends Report(every quarter), IPO and Strategic WEOY 2016 – IPO and Strategic Transactions Summit Brochure 2016, Taking it to heart 2015, Technical Line 2015, The JOBS Act:2015 mid-year update 2015, IPO readiness 2013, EY's Guide to going public 2013, IPO destination guide 2013, Life after an IPO 2013, and Risk management after an IPO 2013	Americas IPO Leader Asia-Pacific IPO Leader EMEIA IPO Leader Japan IPO Leader
KPMG	Big 4	KPMG in conjunction with the NYSE and additional contributors have developed the 2013 NYSE IPO Guide which is designed to help companies considering an IPO better navigate through the process and gain an understanding of both the benefits and challenges.	N/A	National Leader, IPO Readiness

15

(Table 1 continued)

Audit firms	Class	Roles in IPO audits from websites	Publication	IPO leaders
PWC	Big 4	We advise clients throughout the life cycle of the IPO process, from pre-IPO readiness preparation to the offering process and beyond.	IPO Market Watch Q1 2016, Executing a successful IPO 2015, 2015 Annual US Capital Markets Watch 2016, Material weaknesses: Why disclosing them before your IPO may make sense 2015, and Considering an IPO? An insight into the costs post-JOBS Act 2015	IPO specialists:1 leader, 11 Partners and 6 Directors
BDO USA	Second-tier	BDO has guided numerous companies in going public, from the initial planning stage through to the final filing of the registration statement and initial reporting. BDO's flat structure and partner-led service model ensures that you have access to senior-level professionals throughout the process. Unlike many other large firms, our national SEC office is part of the engagement team, and is heavily involved in the planning stages of your IPO and can help you understand the nuances of registration and reporting process. Our many years of experience have allowed us to build a relationship–and credibility–with both the SEC and investment banks.	Capital Markets Practice Newsbytes 2016, 2015 BDO IPO Outlook, 2015 BDO IPO Halftime Report, and Access to Capital Markets 2013	Partner BDO New YorkPartner BDO New YorkPartner BDO Dallas Office
Grant Thornton	Second-tier	N/A	N/A	N/A

(Table 1 continued)

Audit firms	Class	Roles in IPO audits from websites	Publication	IPO leaders
Crowe Horwath	Third-tier	Crowe Horwath LLP can help you prepare for and manage a timely exit strategy. We can help guide you through the IPO registration process and help you address the critical steps that are needed throughout the IPO – and beyond.	Reaching the Pinnacle - A Guide to Going Public and Living as a Public Company 2015	Managing Partner, Private Equity Services
MaloneBailey	Third-tier	N/A	N/A	N/A
Marcum	Third-tier	N/A	N/A	N/A
RSM US	Third-tier	We assist you with an industry experienced team to get through the process in a timely and effective manner.	Successful IPO execution requires a multidisciplined approach 2015, RSM helps biopharmaceutical company save IPO price 2015	N/A

This table provides the described roles for IPO clients of all 10 annually inspected registrants of the PCAOB. Audit firms providing audit reports for more than 100 public registrants are annually inspected by the PCAOB, while audit firms providing audit reports for less than 100 public registrants are triennially inspected by the PCAOB. Roles in IPO audits are how annual filers discuss their role in IPO audits on the World Wide Web.

17

HYPOTHESES DEVELOPMENT

IPO expertise and audit fees

A large number of studies document a positive association between audit fees and auditor industry specialization (Craswell et al. 1995; Ferguson et al. 2003; Francis et al. 2005; Mayhew and Wilkins 2003; Numan and Willekens 2012). Craswell et al. (1995) find evidence of an industry-specific premium which is distinct from the Big 8 general brand name premium. They quantify the industry specialist Big 8 premium over non-specialist Big 8 auditors as being approximately 34%. Bae, Choi, and Rho (2016) provides an alternative explanation for the higher audit fee premium for industry specialists with evidence that industry specialists expend significantly greater audit hours than non-industry specialists. They argue that the greater audit hours associated with industry specialization may suggest higher audit quality or may simply indicate additional audit work performed by relatively cheaper junior auditors.

Auditor reputation at both the national level and office level is priced by the audit market and leads to the expertise of the auditor being recognized by clients (Francis et al. 2005). Francis et al. (2005) document that there is a significant fee premium of 19 percent if auditors are both national-level and city-level industry leaders. There is a fee premium of eight percent if auditors are city-level industry leaders alone. They find no evidence of a premium for auditors who are national industry leaders alone. This finding suggests that an auditor's reputation for industry expertise is priced when the auditor is both the national industry leader and the city-specific industry leader. This result can be interpreted as evidence that industry expertise transfers across offices because national industry leadership affects the audit fee premium.

However, there is another line of studies discussing auditor fees, industry specialization and economics of scale (Cahan et al. 2011; Fung et al. 2012). Cahan et al. (2011) find that audit fees and audit quality are higher (lower) when the specialist audits a lower (higher) proportion of clients in an industry. They argue that specialists auditing a smaller proportion of clients in an industry are likely to charge fee premiums to recover their investments and provide high quality audits to differentiate themselves as project specialists. In contrast, specialists auditing a larger proportion of clients in an industry are likely to develop economies of scale which reduces costs but also leads to lower quality audits.

Fung et al. (2012) document that industry specialist auditors earn 14.8 percent fee premiums but an economy of scale discount of 1.7 percent for a one-decile increase in percentile rankings of the number of audit clients at the city-industry level. More recent research finds that industry specialists charge lower audit fees in industries with homogenous operations and in industries with both homogenous operations and complex accounting practices without sacrificing audit quality (Bills et al. 2015). Further analysis shows that industry specialists charge significantly lower fees in homogenous as well as both homogenous and complex industries only when the client's bargaining power is relatively high.

Based on the findings from prior studies about audit fee premiums, I posit that IPO specialists will exhibit audit fee premiums that outweigh fee discounts due to economies of scale because IPO clients do not have homogenous operations and the number of IPO clients is smaller than the number of clients in the post-IPO audit market. Therefore, economies of scale arising from homogenous operations and audit investment cost being spread over a large client base will be relatively small for the IPO market.

Furthermore, in the IPO setting, Hogan (1997) argues that IPO firms will choose a higher quality auditor if the benefit of hiring a higher quality auditor outweighs the cost. She uses audit fees as the cost of hiring a higher quality auditor and lower underpricing as the benefit of hiring a higher quality auditor. Chang, Gygax, Oon, and Zhang (2008) finds that Big4 auditors earn significantly higher fees than non-Big4 auditors in the Australian IPO market. This result suggests that clients are willing to pay Big4 auditors higher fees because they expect these auditors to deliver higher audit quality. If IPO specialist auditors are able to provide higher quality audits to IPO firms, differentiated from other auditors, then I expect these auditors to also receive higher fees from their clients. These arguments lead to my first hypothesis:

Hypothesis 1: IPO clients with an IPO specialist auditor pay higher audit fees compared to clients with non-IPO specialists.

IPO expertise and first-day underpricing

Issuer underpricing occurs when the offer price of IPO shares is lower than the closing price of the shares on the first day of the IPO. It is well documented that significant underpricing occurs in the IPO market.[9] One explanation for issuer underpricing is because of the high level of information asymmetry which exists between insiders and investors. Weber and Willenborg (2003) argue that the problems which arise due to information asymmetry in the capital markets are most severe in the IPO of equity due to "the absence of a track record to aid in security valuation" (Weber and Willenborg 2003). Relative to issuers of the security, potential investors in the IPO setting possess significantly inferior knowledge about the firm's prospects and future cash flows (Carter and Manaster 1990; Leland and Pyle 1977; Ross 1977).

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[9] Li, Lin, and Robinson (2016) document underpricing over the years 1987-2010 of 20.66%.

While issuers of the firm have access to extensive knowledge regarding the firm's economic potential and the internal operation (Leland and Pyle 1977), the amount of information potential investors have about IPO firms is often limited because there are only a few sources of publicly available information for private firms. Moreover, the current owners of the firm have incentives to opportunistically misrepresent the performance of the firm to potential investors (Downes and Heinkel 1982). This incentive, combined with the high degree of information asymmetry in the IPO market further increases the possibility of opportunistic behavior by sellers of the security (Cohen and Dean 2005).

Furthermore, unlike informed investors, uninformed investors are often unable to distinguish between "good" IPO issues and "bad" IPO issues, which can lead to the uninformed investors performing poorly and ultimately deciding not to participate in the IPO market (Rock 1986). Informed investors are discussed in Ritter (1984) as incurring a cost to determine the firm's true value. If the cost is too high, investors will remain uninformed. Despite being uninformed, these investors can still be encouraged to continue participating in the IPO market (at the expense of the firm) despite their informational disadvantage if the IPO is priced low by the underwriters (Rock 1986).

Accounting information plays an important role in mitigating information asymmetry in market-based economies by allowing investors to better evaluate the return potential of investment opportunities (Beyer, Cohen, Lys, and Walther 2010). However, potential investors may choose to ignore or place less weight on information released by IPO firms because of the combination of the issuers' incentive (to achieve a high offer price) and opportunity (high information asymmetry) to misrepresent or omit financial information. These combined information asymmetries and agency conflicts increase the demand for credible financial disclosure (Healy and Palepu 2001).

The credibility of financial disclosure is enhanced by regulators, standard setters, auditors and other capital market intermediaries (Healy and Palepu 2001). In particular, high quality audits provide independent assurance of the credibility of accounting information, improving resource allocation and contracting efficiency (DeFond and Zhang 2014). Previous studies argue that the nature of the IPO market should give rise to a demand for high quality auditors in the IPO market to uncover information about firm value to investors (Simunic and Stein 1987; Datar et al. 1991). Once private entities decide to go public, they select an auditor to audit the financial information contained in the registration statement. Datar, Feltham, and Hughes (1991) argue that the demand for a high quality audit increases as the issuing firm specific risk increases because issuers can signal firm value by hiring high quality auditors who deliver more precise information about the issuers' firm value. The assurance provided by auditors should help to reduce, to some extent, the information asymmetry between issuers of the security and potential investors (Hogan 1997).

Because of the expertise IPO specialist auditors should possess as a result of their experience in previous IPO audits, I expect they will be able to provide higher quality IPO audits which then reduce information asymmetry between issuers and investors. As such, I expect issuers with IPO specialist auditors to exhibit lower levels of first-day underpricing.

Hypothesis 2: IPO clients with an IPO specialist auditor will be associated with lower levels of first-day underpricing.

CHAPTER 3

SAMPLE AND DATA

I use a sample of companies going public from January 1, 2002 to December 31, 2015. I use data from SDC, Audit Analytics, COMPUSTAT and CRSP databases. I start my IPO sample period from the IPO issue year in 2002, of which the pre-period is 2001, because the Audit Analytics database fully includes all auditor information beginning in 2001. I examine the fiscal year immediately prior to the IPO issue date. Auditor information, such as auditor names, audit offices, audit fees, and total fees are identified using the Audit Analytics opinion database.[10] Financial statement information is obtained from COMPUSTAT. Stock price information is obtained from CRSP.

To create the audit fees sample, I start with 2,695 firm-commitment IPOs on the SDC database with valid CUSIPs from January 1, 2002 to December 31, 2015. I drop 206 American Depository Receipts (ADRs) IPOs, 423 firms with missing Audit Analytics data, 420 firms with missing MSAs, 102 firms with missing COMPUSTAT data, and 318 firms in the finance industry. This sample selection criteria yields 1,226 unique IPO firms. For my underpricing tests, I further drop 204 firms with missing CRSP data which yields 1,022 unique IPO firms for my underpricing

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[10] I use audit fee data from Audit Analytics because they provide this data over my sample period of January 1, 2002 to December 31, 2015. Audit Analytics states that audit fees "consist in all fees necessary to perform the audit or review in accordance with GAAS. This category also may include services that generally only the independent accountant reasonably can provide, such as comfort letters, statutory audits, attest services, consents and assistance with and review of documents filed with the SEC". To gain a level of assurance about the accuracy of Audit Analytics audit fee data, I randomly select 10 IPOs and compare audit fees in the proxy disclosure to audit fees in Audit Analytics database. I did not find any difference in audit fees from the proxy to the database.

tests. Table 2, Panel A presents details of the sample selection criteria for my audit fees tests and my underpricing tests.

Table 2, Panel B tabulates the distribution of the 1,226 firm-commitment IPOs by issue year for the period from 2002 to 2015. This distribution highlights that fewer companies went public after the Dot-Com bust (2000-2002). In contrast, there was a large increase in the number of companies that went public from 2004 to 2007 followed by a sharp decline in 2008 due to the financial crisis. The number of IPO's then gradually increases from 2008 to 2012. There is also a large increase in IPO activity beginning in 2012 after the passage of the JOBS Act on March 8, 2012.

Table 2, Panel C presents the industry distribution for my audit fees sample. There are more than 23 industries represented in my sample. The three largest industries are: chemicals and allied products (23%), business services (21%), and instruments and related products (8%).

Table 2, Panel D demonstrates the city distribution for my sample. City is defined as a Metropolitan Statistical Area following the 2005 U.S. Census Bureau metropolitan statistical areas (MSA) definitions. There are 71 MSAs in which IPO auditors are located. The top five MSAs for IPO activity are New York-Newark-Jersey City, San Jose-Sunnyvale-Santa Clara, Boston-Cambridge-Newton, Los Angeles-Long Beach-Santa Ana, and San Francisco-Oakland-Hayward. These five MSAs compose 45% of my sample, suggesting that 45% of IPO clients hire auditors located in these five MSAs.

Table 3, Panel A shows the definition of IPO specialist auditors and national and city IPO specialist auditors by year. I first define IPO specialist auditors as a national (city) IPO specialist if the auditor has the largest annual market share in the IPO market at the U.S. national (city) level and has more than 10% greater market share than the closest competitor. City is defined as a

Metropolitan Statistical Area following the 2005 U.S. Census Bureau metropolitan statistical areas

(MSA) definitions. I also define IPO specialist auditors as a national (city) IPO specialist if the

auditor has the largest ratio of market share of IPO clients over market share of total clients at the

U.S. national (city) level, and has more than 10% greater market share than the closest competitor

for a given fiscal year, and 0 otherwise.[11] I use this additional portfolio measure to identify IPO

specialists in addition to the market share measure to address the concern that the market share

measure may be more likely to identify specialist auditors if the auditor charges audit fees that are

systematically higher.

Table 2. Sample Selection Criteria and Sample Characteristics

Panel A. Sample Selection for audit fees tests and underpricing tests

Number of firm-commitment IPOs on the SDC database with valid CUSIPs for 2002-2015	2,695
Less: American Depository Receipts (ADRs) and Units IPOs	206
Less: Firms with missing Audit Analytics database	423
Less: Auditors not located in MSAs	420
Less: Firms with missing Compustat data	102
Less: Firms in finance industry	318
Final Sample in audit fees analysis	1,226
Less: Firms with missing CRSP data	204
Final Sample in underpricing tests	1,022

[11] In the second definition of IPO specialist auditors, I use the ratio of the top five largest auditors for a national IPO specialist in order to have enough observations. Compared to the first specialist definition using IPO market share level, smaller auditors have a large proportion of IPO clients over total clients using the IPO market concentration level, thus their number of clients does not lead to enough observations.

Panel B: Distribution of IPO firms by year

Year	No. of firms	% of sample
2002	17	1.39
2003	40	3.26
2004	117	9.54
2005	109	8.89
2006	124	10.11
2007	127	10.36
2008	18	1.47
2009	40	3.26
2010	67	5.46
2011	66	5.38
2012	91	7.42
2013	125	10.2
2014	173	14.11
2015	112	9.14
Total	1,226	100.00

Panel C: Distribution of IPO firms by SIC industry (Table 2 Continued)

SIC	Industry	Total	% of sample
13	Oil And Gas Extraction	52	4.24
15	General Building Contractors	9	0.73
20	Food And Kindred Products	17	1.39
28	**Chemicals And Allied Products**	**285**	**23.25**
33	Primary Metal Industries	14	1.14
35	Industrial Machinery And Equipment	39	3.18
36	Electronic & Other Electric Equipment	84	6.85
37	Transportation Equipment	20	1.63
38	**Instruments And Related Products**	**95**	**7.75**
44	Water Transportation	12	0.98
48	Communications	28	2.28
49	Electric, Gas, And Sanitary Services	28	2.28
50	Wholesale Trade-Durable Goods	20	1.63
51	Wholesale Trade-Nondurable Goods	12	0.98
54	Food Stores	9	0.73
56	Apparel And Accessory Stores	9	0.73
58	Eating And Drinking Places	31	2.53
59	Miscellaneous Retail	19	1.55
73	**Business Services**	**256**	**20.88**
78	Motion Pictures	26	2.12
80	Health Services	9	0.73
82	Educational Services	24	1.96
87	Engineering & Management Services	52	4.24
	Other	128	10.41
		1,226	100.0

Panel D: Distribution of IPO Auditors by Metropolitan Statistical Areas (MSAs) (Table 2 Continued)

Metropolitan Statistical Areas	Total	% of sample
New York-Newark-Jersey City, NY-NJ-PA	**153**	**12.48**
San Jose-Sunnyvale-Santa Clara, CA	**142**	**11.58**
Boston-Cambridge-Newton, MA-NH	**110**	**8.97**
Los Angeles-Long Beach-Santa Ana, CA	**78**	**6.36**
San Francisco-Oakland-Hayward, CA	**72**	**5.87**
Houston-The Woodlands-Sugar Land, TX	51	4.16
San Diego-Carlsbad, CA	49	4.00
Chicago-Naperville-Elgin, IL-IN-WI	42	3.43
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	41	3.34
Washington-Arlington-Alexandria, DC-VA-MD-WV	39	3.18
Dallas-Fort Worth-Arlington, TX	38	3.10
Denver-Aurora-Lakewood, CO	35	2.85
Minneapolis-St. Paul-Bloomington, MN-WI	25	2.04
Atlanta-Sandy Springs-Roswell, GA	19	1.55
Seattle-Tacoma-Bellevue, WA	18	1.47
Durham-Chapel Hill, NC	17	1.39
Austin-Round Rock, TX	16	1.31
Indianapolis-Carmel-Anderson, IN	15	1.22
Tampa-St. Petersburg-Clearwater, FL	15	1.22
Other	52	20.42
Total	1,226	100.0

City is defined as a Metropolitan Statistical Area following the 2005 U.S. Census Bureau metropolitan statistical areas (MSA) definitions. There are 71 MSAs. The sample is 1,226 firm-commitment IPOs from January 1, 2002 to December 31, 2015

Table 3, Panel A-1 presents national IPO specialist auditors by year under my first definition of IPO specialization. PWC LLP is the national IPO specialist for eight out of 14 years followed by PricewaterhouseCoopers LLP (three out of 14 years) and Deloitte & Touche LLP (two out of 14 years). There is no national IPO specialist in 2010 because the auditor with the largest market share does not have more than 10% greater market share than the closest competitor.

Table 3, Panel A-2 presents city IPO specialist auditors by year under my first definition of IPO specialization. There are 10 audit firms identified as audit firms with city IPO specialist audit offices. The majority of city IPO specialist auditors are Big 4 auditors because my first definition uses market share to define city IPO specialist auditors. City IPO specialists are distributed as follows: Ernst & Young LLP is the city IPO specialist in 68 cities over 14 years; PricewaterhouseCoopers LLP is the city IPO specialist in 33 cities over 14 years; Deloitte & Touche LLP is the city IPO specialist in 23 cities over 14 years; and KPMG is the city IPO specialist in 11 cities over 14 years.

Table 3, Panel A-3 shows the top five national IPO specialists by year under my second definition of IPO specialization. Using this measure of IPO specialization results in a greater variety of audit firms being designated as IPO specialists. Big 4 audit firms are in the top five of national IPO specialists only in years 2001, 2002, 2003 and 2007. For the other ten years, non-Big 4 audit firms are in the top five of national IPO specialists. This composition is very different from the national IPO specialist list using my first definition in Table 3, Panel A-1.

Table 3, Panel A-4 shows the city IPO specialists by year under my second definition of IPO specialization. There are 17 audit firms defined as audit firms with city IPO specialist auditors under my second definition. The majority of city IPO specialist auditors are still Big 4 auditors. However, an interesting trend emerges in more recent years: smaller audit firms are more often identified as a city IPO specialist auditor.

CHAPTER 4

RESEARCH METHOD

I use the dependent variable *LNAFEES*, measured as the natural log of a firm's annual audit fees of an IPO audit (the fiscal year immediately prior to the IPO issue date). The test variable *IPOSPEC* is an indicator variable that takes a value of 1 if an auditor is an IPO specialist auditor, and 0 otherwise. To test whether audit fees are positively associated with IPO specialist auditors, I regress *LNAFEES* on *IPOSPEC*. The regression model combining control variables used by Mayhew and Wilkins (2003), Francis et al. (2005), Venkataraman et al. (2008), and Minutti-Meza (2013) is as follows:

$$
\begin{aligned}
LNAFEES = {} & \beta_0 + \beta_1 IPOSPEC + \beta_2 INDUSTRYSPEC + \beta_3 EGC + \beta_4 SIZE + \beta_5 LNSALES \\
& + \beta_6 SEGBUS + \beta_7 INVAR + \beta_8 FOREIGN + \beta_9 CATA + \beta_{10} QUICK + \beta_{11} ROA \\
& + \beta_{12} LEV + \beta_{13} LOSS + \beta_{14} ICW + \beta_{15} GCONCERN + \beta_{16} NONDEC \\
& + \beta_{17} BIG4 + \beta_{18} SECTIER + \beta_{19} LIT + \beta_{20} LNPROCEEDS + YEARFE \\
& + INDUSTRYFE + \varepsilon_{i,t,} \ (1),
\end{aligned}
$$

A significant positive coefficient on *IPOSPEC* would support my first hypothesis that IPO clients with an IPO specialist auditor pay higher audit fees compared to clients with non-IPO specialists. *INDUSTRYSPEC* is 1 if auditors have the largest annual market share in a given industry at the U.S. national level (city level) and have more than 10% greater market share than the closest competitor, and 0 otherwise.[12] Prior studies show a positive association between audit fees and auditor industry specialization (Craswell et al. 1995; Ferguson et al. 2003; Francis et al. 2005; Mayhew and Wilkins 2003; Numan and Willekens 2012). I expect *INDUSTRYSPEC* to have a positive coefficient.

---

[12] To identify industry specialists, I use the entire audit analytics sample, not only IPO sample.

EGC is an indicator variable which takes the value one if the client files as an emerging growth company whose annual revenues are less than $1 billion, and zero otherwise. The JOBS Act, which streamlined the IPO process for EGC should have a negative effect on audit fees. *SIZE* is the natural log of a client's total assets. *LNSALES* is the natural log of total sales. Higher fees are expected for larger clients (DeAngelo 1981). *SEGBUS* is the natural log of the number of unique business segments. *FOREIGN* is calculated by foreign income divided by total income. This variable is set to zero if there is no income from foreign operations. *INVAR* is sum of inventory and receivables scaled by total assets. *SEGBUS, INVAR,* and *FOREIGN* variables are included to control for complexity which should increase auditor effort and result in higher audit fees (Francis et al. 2005).

To control for the client's inherent risk, I include the ratio of current assets to total assets (*CATA*), the ratio of current assets (less inventories) to current liabilities (*QUICK*), net income before extraordinary items divided by lagged total assets (*ROA*), total long-term debt scaled by average total assets (*LEV*), *LOSS*, internal control weaknesses (*ICW*) and *GCONCERN*. *LOSS* is 1 if net income is negative, and otherwise 0. *ICW* is 1 if the client firm has internal control weaknesses in year *t-1*, and 0 otherwise. *GCONCERN* is 1 if the auditor gave a going-concern opinion to a client in the fiscal year, and 0 otherwise. Variables for the client's inherent risk are expected to have positive coefficients (Ferguson et al. 2003).

NONDEC is 1 if the client's fiscal year-end is not December 31st, and 0 otherwise. It is expected to have a negative coefficient because fees are usually lower if the client has a year-end that is not December 31. *BIG4* is 1 if a clients' auditor is one of the Big 4 auditors, and 0 otherwise

(Minutti-Meza 2013).[13] *SECTIER* is 1 if a client's auditor is either BDO Seidman LLP or Grant Thornton LLP, 0 otherwise. Big4 and second tier auditors have a higher reputation which is positively associated with audit fees (DeAngelo 1981; Basioudis and Francis 2007). *LIT* controls for high litigation industry. *LIT* is an indicator variable which takes the value one if the company operates in a high litigation industry (SIC codes of 2833–2836, 3570–3577, 3600–3674, 5200–5961,and 7370–7374), and zero otherwise (Francis et al. 1994). *LNPROCEEDS* is the natural log of IPO client's proceeds to measure the auditor's maximum litigation risk exposure for IPOs. *LIT* and *LNPROCEEDS* are expected to have positive coefficients because audit fees are higher for IPOs with higher litigation exposure (Venkataraman et al. 2008). Lastly, year and industry fixed effects control for the systematic effects of time period and industry characteristics on audit fees.

To examine the relation between auditor IPO specialization and IPO underpricing, I utilize a multivariate regression model of underpricing used by Li, Lin, and Robinson et al. (2016) as follows:

$$
\begin{aligned}
UNDERPRICING &= \beta_0 + \beta_1 IPOSPEC + \beta_2 INDUSTRYSPEC + \beta_3 BIG4 + \beta_4 EGC + \beta_5 VC \\
&+ \beta_6 RANK + \beta_7 REVISION + \beta_8 SPREAD + \beta_9 TECH + \beta_{10} VWTOT \\
&+ \beta_{11} IPORET + \beta_{12} IPOTOT + \beta_{13} LNAGE + \beta_{14} PROCEEDS + \varepsilon_{i,t,} \ (2),
\end{aligned}
$$

where the dependent variable, *UNDERPRICING*, is defined as first-day closing price minus offer price scaled by offer price. The test variable *IPOSPEC* is an indicator variable that takes a value of 1 if an auditor is an IPO specialist auditor, and 0 otherwise. A significant negative coefficient on *IPOSPEC* would support my second hypothesis that IPO clients with an IPO specialist auditor have lower underpricing compared to clients with non-IPO specialist auditors.

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[13] At the beginning of my sample time period (i.e. January 1, 2002), Arthur Andersen still existed and the Big 4 at that time was the Big 5.

I include *INDUSTRYSPEC* and *BIG4* variables to control for Big 4 audit firm and industry specialist auditor effects on underpricing. High quality auditors are expected to reduce underpricing because they mitigate the level of information asymmetry by providing credible financial information to the public. However, recent prior literature does not find a significant effect of Big 4 audit firms on underpricing (Chang et al. 2008; Li et al. 2016).

EGC indicates the IPO client files as an emerging growth company. I expect *EGC* to have a positive effect on underpricing because a higher degree of information asymmetry likely exists for emerging growth companies due to the decrease in the regulatory requirements imposed by the JOBS Act. *VC* is an indicator variable which equals 1 if the IPO is backed by venture capital, and otherwise 0. Gompers (1996) and Lee and Wahal (2004) argue that venture capitalists grandstand when taking their investments public. As such, I expect *VC* to have a positive effect on underpricing.

RANK is the underwriter ranking from Carter and Manaster's (1990). Li et al. (2016) find a positive association between underwriter ranking and underpricing using the time period 1987-2010. Because my sample covers 2002-2015, I also expect a positive effect on underpricing. *REVISION* is the price change during the IPO book-building process measured by the percentage price revision from the midpoint of the initial filing range to the offer price. Hanley (1993) document a positive association between the initial return and the price revision during the book building process. I expect *REVISION* to have a positive effect on underpricing. *SPREAD* is the underwriters fee calculated as the total underwriting, management and selling fees as a percentage of the amount offered in the IPO. Li et al. (2016) find a positive association between the level of underwriter fees and underpricing. I use *TECH* which identifies firms in the technology industry

based on four-digit SIC codes (Cliff and Denis 2004). I expect *TECH* firms to exhibit higher underpricing.

Lowry (2003) finds that IPO first-day returns are associated with recent past market returns and recent IPO activity. I control for the market returns for the two months prior to the IPO (*VWTOT*), calculated as the sum of the value weighted daily market return for the two months preceding the IPO. I expect *VWTOT* to have a positive association with underpricing. To control for hot IPO cycles, I use *IPORET* and *IPOTOT*. *IPORET* is the average first-day returns for other IPO firms during the two months prior to the specific IPO firm's month. *IPOTOT* is the total number of IPOs over the two months prior to the specific IPO firm's month. I expect *IPOTOT* and *IPORET* to have a positive effect on underpricing.

I also control for company age (*LNAGE*) and the issue size (*PROCEEDS*). Field and Karpoff (2002) find a negative relation between firm age and underpricing. *PROCEEDS* is the log of IPO proceeds in millions divided by the Consumer Price Index (CPI) for the issue year. I expect *PROCEEDS* to be negatively associated with underpricing. Following, Li et al. (2016), I use a two-way clustering approach in which standard errors are clustered by year and 2-digit industry code (Fama-French industry category) to address correlations among standard errors.

To address endogeneity concerns raised by non-random treatment assignment (Shipman et al. 2017), I use the propensity score matching (PSM) method to mitigate a self-selection bias issue in my research as a robustness test. Lawrence, Minutti-Meza, and Zhang (2011) use PSM models to control for differences in client characteristics between Big 4 clients and non-Big4. Minutti-Meza (2013) uses PSM methods to match clients of industry specialist and non-industry specialist auditors on a number of dimensions.

PSM techniques can decrease reliance on functional form misspecification between variables on observable characteristics.[14] I match clients of an IPO specialist auditor with clients of non-IPO specialist auditors in terms of the propensity score estimated from the selection model in equation (3) with replacement. Caliper distance is 0.03 following Lawrence et al. (2011). The probit regression model for the auditor choice, similar to the ones proposed by Lawrence et al. (2011) and Robin and Zhang (2015) combined with variables relevant to the IPO setting, is as follows:

$$
\begin{aligned}
\text{PROBIT}[IPOSPEC = 1] \\
&= \beta_0 + \beta_1 ATURN + \beta_2 ROALOSS + \beta_3 OSCORE + \beta_4 VC + \beta_5 PRESTIGE \\
&\quad + \beta_6 SECGEO + \sum CONTROLS + \varepsilon \quad (3),
\end{aligned}
$$

where *IPOSPEC* is an indicator variable that takes a value of 1 if an auditor is an IPO specialist auditor, and 0 otherwise. *ATURN* is the ratio of sales to average total assets. *ROALOSS* is one if ROA is less than zero, and zero otherwise. *VC* is an indicator variable which equals 1 if the IPO is backed by venture capital, and otherwise 0. *PRESTIGE* is an indicator variable which takes 1 if the underwriter for the IPO has a modified Carter Manaster Rank of 9.1 (Carter and Manaster 1990; Loughran and Ritter 2004; Ertimur et al. 2014) and 0 otherwise. *SECGEO* is the number of geographical segments in a firm. I include all control variables from my audit fees model and my underpricing model for each test. All variables are as defined in Appendix.

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[14] Shipman, Swanquist, and Whited (2017) document complications associated with PSM. PSM is not appropriate when relevant variables are unobserved and reduces sample size leading to diminished power of tests. PSM design can also significantly change sample composition and inferences. My study uses both the traditional ordinary least squares regression and the PSM method and shows consistent results, which should alleviate concerns which arise from weaknesses inherent in these two econometric approaches.

CHAPTER 5

RESULTS

Table 3, Panel B tabulates descriptive statistics for my audit fee sample. I partition my sample between clients with an IPO specialist auditor and clients with non-IPO specialist auditors under the two definitions of IPO specialists. I find that the natural log of a firm's annual audit fees with an IPO specialist auditor are significantly higher in means and medians (at 1% significance level) except for the means of national level definition 1 and 2, which provides initial evidence to suggest that IPO specialist auditors earn higher audit fees.

Other control variables including *INDUSTRYSPEC* (city levels definition 1, national levels definition 2 and city levels definition 2), *EGC* (national level definition 2), *SIZE* (the mean of national level definition 1, the mean of city level definition 1, and the mean of city level definition 2), *CATA* (national levels definition 1 and city levels definition 1)*, ICW* (national level definition 1, city level definition 1, and city level definition 2), *BIG4*, *SECTIER*, *LIT* (national level definition 1, city level definition 1 and national level definition 2)*,* and *LNPROCEEDS* (all means) differ significantly (at 5% significance level) between the two groups which further supports including them as control variables in the multivariate analysis.

I report mean and median amounts for audit fees, total assets, revenues, and IPO proceeds in raw amounts, rather than in the natural logarithm, in order to compare to other IPO studies. The average of means (medians) audit fees of IPO specialists' clients are $.875 million ($.519 million), while the average of means (medians) audit fees of non-IPO specialists' clients are $.788 million ($.473 million) which is comparable to mean of $.612 million (median of $.413 million) in Venkatarman et al. (2008) and reasonable considering my study covers the longer and more recent sample period (2002-2015) than their study (2000-2002).

The average of means (medians) total assets of IPO specialists' clients are $606 million ($79 million), while the average of means (medians) total assets of non-IPO specialists' clients are $564 million ($78 million) which is comparable to a mean of $421 million (median of $36 million) in Venkatarman et al. (2008).The average of means (medians) revenue of IPO specialists' clients are $538 million ($74 million), while the average of means (medians) revenue of non-IPO specialists' clients are $439 million ($73 million) which is comparable to mean of $346 million (median of $22 million) in Venkatarman et al. (2008). The average of means (medians) proceeds of IPO specialists' clients are $177 million ($94 million), while the average of means (medians) proceeds of non-IPO specialists' clients are $169 million ($93 million) which is similar to Venkatarman et al. (2008).

Table 3, Panel C tabulates descriptive statistics for my underpricing sample. I again partition my sample between clients with an IPO specialist auditor and clients with non-IPO specialist auditors under the two definitions of IPO specialists. I find that underpricing of clients with a national IPO specialist auditor using definition 2 is significantly lower in means using a paired t-test, which provides initial evidence to suggest that national IPO specialist auditors reduce underpricing.

Other control variables including *INDUSTRYSPEC*, *BIG4*, *VC, RANK,* and *PROCEEDS* (all means) differ significantly between the two groups, clients with an IPO specialist auditor and clients with non-IPO specialist auditors. This result further supports including *INDUSTRYSPEC*, *BIG4*, *VC, RANK,* and *PROCEEDS* as control variables in the multivariate analysis.

Table 3. Descriptive Statistics

Panel A: Definition of IPO Specialists by Auditor and National and City IPO Specialist Auditors by Year (Based on the Audit Fees Sample)

IPO Specialist Definition 1: An auditor is defined as a national (city) IPO specialist if it has the largest annual market share in the IPO market at the U.S. national (city) level and has more than 10% greater market share than the closest competitor. City is defined as the Metropolitan Statistical Area following the 2005 U.S. Census Bureau MSA definitions.

IPO Specialist Definition 2: An auditor is defined as a national (city) IPO specialist if it has the largest ratio of market share of IPO clients over market share of total clients at the U.S. national (city) level, and has more than 10% greater market share than the closest competitor for a given fiscal year, and 0 otherwise. For a national IPO specialist, I use the top five largest ratio auditors to have enough observations.

Panel A-1: National IPO Specialists by Year—Definition 1

Fiscal Year	IPO National Specialists
2001	PricewaterhouseCoopers LLP
2002	PricewaterhouseCoopers LLP
2003	Ernst & Young LLP
2004	Ernst & Young LLP
2005	Ernst & Young LLP
2006	Ernst & Young LLP
2007	Ernst & Young LLP
2008	Deloitte & Touche LLP
2009	Deloitte & Touche LLP
2010	NA
2011	PricewaterhouseCoopers LLP
2012	Ernst & Young LLP
2013	Ernst & Young LLP
2014	Ernst & Young LLP

The fiscal year for IPO specialist auditors starts from 2001 and ends 2014 because my sample consist of firms that went public from January 1, 2002 to December 31, 2015 and the majority of IPO clients select their auditor a year before they go public. An auditors is defined as a national IPO specialist if it has the largest annual market share in IPO market at the U.S. national level and has more than 10% greater market share than the closest competitor. The auditor with the largest market share in 2010 did not have more than 10% greater market share than the closest competitor

Panel A-2: City IPO Specialists by Auditor and Year—Definition 1 (Table 3 Continued)

Auditors/Fiscal Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Ernst & Young LLP	1	3	9	10	9	5		1	5	6	3	4	8	4	68
PricewaterhouseCoopers LLP	1	2	2	1	2	3		1	3	4	3	7	3	1	33
Deloitte & Touche LLP			2	3	3	1	1	3	3	1	2	1	3		23
KPMG LLP	1	1	1	1	1	1					1		1	3	11
McGladrey & Pullen LLP			1						1		1				3
Grant Thornton LLP				1	1	1									3
Baker Tilly Virchow Krause LLP													1		1
BDO USA LLP												1			1
De Joya Griffith & Company LLP										1					1
McGladrey LLP												1			1
Total City IPO Specialists	3	6	15	16	16	11	1	5	12	12	10	14	16	8	145

An auditor is defined as a city IPO specialist if it has the largest annual market share in the IPO market at the U.S. city level and has more than 10% greater market share than the closest competitor. City is defined as a Metropolitan Statistical Area following the 2005 U.S. Census Bureau MSA definitions.

Panel A-3: Top 5 National IPO Specialists by Year—Definition 2 (Table 3 Continued)

2001	2002	2003	2004
Grant Thornton LLP	Stowe & Degon LLC	Singer Lewak Greenbaum & Goldstein	Rothstein Kass & Company PC
PricewaterhouseCoopers LLP	PricewaterhouseCoopers LLP	Ernst & Young LLP	Miller Ray Houser & Stewart LLP
Deloitte & Touche LLP	Ernst & Young LLP	KPMG LLP	WithumSmith + Brown PC
KPMG LLP	Deloitte & Touche LLP	Deloitte & Touche LLP	Tullius Taylor Sartain & Sartain LLP
Ernst & Young LLP	KPMG LLP	Grant Thornton LLP	Aidman Piser & Company PA

2005	2006	2007	2008
Anton Collins Mitchell LLP	Cole & Reed PC	Weiser LLP	Mao & Company CPAs Inc
Schechter Dokken Kanter	Malin Bergquist & Company LLP	Rothstein Kass & Company PC	AGCA Inc
Meaden & Moore Ltd	Murrell Hall McIntosh & Co PC	Ernst & Young LLP	Kempisty & Company CPAs PC
Crowe Chizek & Company LLP	Daszkal Bolton LLP	KPMG LLP	Hansen Barnett & Maxwell PC
Singer Lewak Greenbaum & Goldstein	Marcum & Kliegman LLP	PricewaterhouseCoopers LLP	Moore Stephens Wurth Frazer and Torbet LLP

2009	2010	2011	2012
Caturano & Company Inc/PC	Baker Tilly Virchow Krause LLP	PKF Certified Public Accountants	Windes & McClaughry Accountants
WT Uniack & Co CPAs PC	JH Cohn LLP	Webb & Company PA	ParenteBeard LLC
Burr Pilger Mayer Inc	SingerLewak LLP	Gumbiner Savett Inc	KMJ Corbin & Company LLP
McGladrey & Pullen LLP	EisnerAmper LLP	Drake & Klein CPAs PA	Lurie Besikof Lapidus & Company LLP
Jewett, Schwartz, Wolfe & Associates	Acquavella, Chiarelli, Shuster & Co., LLP	Peterson Sullivan LLP/PLLC	Rosenberg Rich Baker Berman & Company

2013	2014
Raich Ende Malter & Co LLP	Li & Company PC
Haskell & White LLP	WithumSmith + Brown PC
EFP Rotenberg LLP	CohnReznick LLP
Crowe Horwath LLP	Sadler Gibb & Associates LLC
Mayer Hoffman McCann PC	PMB Helin Donovan LLP

An auditor is defined as a national IPO specialist if it has the top five largest ratio of market share of IPO clients over market share of total clients at the U.S. national level.

Panel A-4: City IPO Specialists by Auditor and Year—Definition 2 (Table 3 Continued)

Auditors/Fiscal Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Ernst & Young LLP		3	9	11	8	6		1	5	7	3	5	7	4	69
PricewaterhouseCoopers LLP	1	1	1	1	2	3		1	2	4	2	6	1	1	26
Deloitte & Touche LLP	1		3	2	2	1		3	4	1	1	1	3		22
KPMG LLP	1	2	2	2	1								2	2	12
Grant Thornton LLP					1	2					1				4
McGladrey & Pullen LLP					1				1		1				3
BDO Seidman LLP					2										2
BDO USA LLP													2		2
Baker Tilly Virchow Krause LLP													1		1
De Joya Griffith & Company LLP										1					1
Friedman LLP														1	1
KCCW Accountancy Corp.											1				1
KMJ Corbin & Company LLP												1			1
Mayer Hoffman McCann PC													1		1
McGladrey LLP												1			1
PKF Certified Public Accountants											1				1
Rothstein Kass & Company PC							1								1
Total City IPO Specialists	3	6	15	16	17	12	1	5	12	13	10	14	17	8	149

An auditor is defined as a city IPO specialist if it has the largest ratio of market share of IPO clients over market share of total clients at the U.S. city level, and has more than 10% greater market share than the closest competitor for a given fiscal year, and 0 otherwise.

(Table 3 continued)

Panel B: Descriptive Statistics For Audit Fee Tests For Full Sample (n = 1,226)

IPO Specialist Definition 1: An auditor is defined as a national (city) IPO specialist if it has the largest annual market share in the IPO market at the U.S. national (city) level and has more than 10% greater market share than the closest competitor. City is defined as a Metropolitan Statistical Area following the 2005 U.S. Census Bureau MSA definitions.

IPO Specialist Definition 2: An auditor is defined as a national (city) IPO specialist if it has the largest ratio of market share of IPO clients over market share of total clients at the U.S. national (city) level, and has more than 10% greater market share than the closest competitor for a given fiscal year, and 0 otherwise. For a national IPO specialist, I use the top five largest ratio auditors to have enough observations.

Variable		Definition 1						Definition 2					
		NAT IPO SPEC (n=364)	Non NAT IPO SPEC (n=862)	Test Diff. p-value	CITY IPO SPEC (n=361)	Non CITY IPO SPEC (n=865)	Test Diff. p-value	NAT IPO SPEC (n=213)	Non NAT IPO SPEC (n=1,013)	Test Diff. p-value	CITY IPO SPEC (n=355)	Non CITY IPO SPEC (n=871)	Test Diff. p-value
LNAFEES	Mean	11.020	10.430	0.0604	11.728	10.136	<.0001	10.594	10.607	0.9698	11.755	10.136	<.0001
	Median	12.846	12.411	0.0087	13.102	12.253	<.0001	12.032	12.717	0.0001	12.996	12.308	<.0001
	STD	4.853	5.097		4.343	5.223		4.365	5.163		4.120	5.289	
AUDITFEES ($thousands)	Mean	924.510	783.739	0.0393	1,094.922	713.108	<.0001	491.034	895.868	<.0001	987.605	759.478	0.0022
	Median	600.000	455.724	0.0245	650.000	415.000	<.0001	278.500	567.000	<.0001	549.000	455.000	0.1156
	STD	1,125.326	1,002.616		1,333.908	869.085		752.020	1,080.519		1,267.604	927.442	
INDUSTRYSPEC	Mean	0.173	0.179	0.8153	0.540	0.327	<.0001	0.127	0.188	0.0196	0.476	0.355	<.0001
	Median	0.000	0.000	0.8152	1.000	0.000	<.0001	0.000	0.000	0.0346	0.000	0.000	<.0001
	STD	0.379	0.383		0.499	0.469		0.333	0.391		0.500	0.479	
EGC	Mean	0.107	0.081	0.1663	0.072	0.096	0.1575	0.033	0.101	<.0001	0.068	0.098	0.0732
	Median	0.000	0.000	0.1450	0.000	0.000	0.1798	0.000	0.000	0.0016	0.000	0.000	0.0945
	STD	0.310	0.273		0.259	0.295		0.179	0.301		0.251	0.297	
SIZE	Mean	4.735	4.467	0.0310	4.893	4.402	0.0002	4.233	4.612	0.2002	4.765	4.457	0.0211
	Median	4.354	4.372	0.9006	4.484	4.320	0.1884	4.151	4.404	0.6803	4.457	4.351	0.4887
	STD	1.885	2.209		1.980	2.162		1.984	2.144		2.063	2.139	
ASSETS ($millions)	Mean	608.908	574.719	0.7003	763.955	510.130	0.0137	351.954	633.844	0.0013	697.425	538.995	0.1153
	Median	77.769	79.183	0.9006	88.628	75.189	0.1884	63.528	81.799	0.2002	86.207	77.540	0.4887
	STD	1,470.030	1,399.150		1,778.930	1,233.490		1,071.280	1,478.760		1,705.360	1,284.030	

Tests of differences in means is a paired t-test. Tests of differences in medians is a Wilcoxon signed rank test. The sample is 1,226 firm-commitment IPOs from January 1, 2002 to December 31, 2015. All variables are as defined in Appendix.

(Table 3 Panel B continued)

Variable		Definition 1						Definition 2					
		NAT IPO SPEC (n=364)	Non NAT IPO SPEC (n=862)	Diff. Test p-value	CITY IPO SPEC (n=361)	Non CITY IPO SPEC (n=865)	Diff. Test p-value	NAT IPO SPEC (n=213)	Non NAT IPO SPEC (n=1,013)	Diff. Test p-value	CITY IPO SPEC (n=355)	Non CITY IPO SPEC (n=871)	Diff. Test p-value
REVENUES ($millions)	Mean	567.724	433.050	0.1084	657.860	395.900	0.0041	325.705	504.014	0.0147	599.331	421.560	0.0464
	Median	73.551	73.948	1.0000	80.420	69.086	0.2340	65.468	75.835	0.4072	77.924	71.348	0.4887
	STD	1,409.760	1,158.580		1,583.190	1,055.180		879.737	1,300.700		1,523.830	1,099.540	
LNSALES	Mean	3.928	3.834	0.5705	4.141	3.745	0.0177	3.627	3.911	0.4072	4.036	3.791	0.1447
	Median	4.298	4.303	1.0000	4.387	4.235	0.2340	4.182	4.329	0.8047	4.356	4.268	0.4887
	STD	2.687	2.654		2.679	2.649		2.612	2.672		2.689	2.651	
SEGBUS	Mean	3.547	3.683	0.4523	3.906	3.533	0.0644	3.723	3.626	0.6483	3.865	3.552	0.1237
	Median	3.000	3.000	0.6679	3.000	3.000	0.1080	3.000	3.000	0.0028	3.000	3.000	0.1983
	STD	2.774	3.196		3.308	2.969		2.751	3.141		3.316	2.970	
INVAR	Mean	0.182	0.209	0.0305	0.197	0.202	0.6930	0.227	0.195	0.0403	0.203	0.194	0.4617
	Median	0.126	0.157	0.1692	0.134	0.156	0.1884	0.179	0.139	0.0831	0.156	0.133	0.2317
	STD	0.182	0.205		0.197	0.196		0.215	0.199		0.206	0.190	
FOREIGN	Mean	0.172	0.079	0.6585	0.174	0.078	0.7142	-0.020	0.133	0.2457	0.291	0.031	0.3018
	Median	0.000	0.000	0.5639	0.000	0.000	0.8890	0.000	0.000	0.2003	0.000	0.000	0.4925
	STD	3.532	2.928		4.854	1.992		3.390	1.136		4.514	2.319	
CATA	Mean	0.606	0.541	0.0007	0.588	0.549	0.0434	0.554	0.561	0.7624	0.582	0.551	0.1160
	Median	0.678	0.561	0.0124	0.637	0.581	0.0522	0.597	0.601	0.7064	0.631	0.585	0.1156
	STD	0.309	0.305		0.308	0.307		0.299	0.310		0.306	0.308	
QUICK	Mean	2.640	2.662	0.9522	2.431	2.749	0.3598	3.282	2.524	0.2660	3.457	2.329	0.0907
	Median	1.272	1.159	0.0609	1.271	1.165	0.1497	1.319	1.193	0.3273	1.250	1.183	0.4887
	STD	3.693	8.838		3.270	8.893		9.355	7.274		12.155	4.744	
ROA	Mean	-0.332	-0.698	0.0341	-0.403	-0.668	0.1916	-1.042	-0.495	0.3756	-0.329	-0.696	0.0332
	Median	-0.039	-0.020	0.4534	-0.034	-0.021	0.5730	-0.015	-0.026	0.4977	-0.043	-0.015	0.1156
	STD	0.666	4.957		2.331	4.736		8.951	2.065		0.780	4.925	

(Table 3 Panel B continued)

Variable		Definition 1						Definition 2					
		NAT IPO SPEC (n=364)	Non NAT IPO SPEC (n=862)	Test Diff. p-value	CITY IPO SPEC (n=361)	Non CITY IPO SPEC (n=865)	Test Diff. p-value	NAT IPO SPEC (n=213)	Non NAT IPO SPEC (n=1,013)	Test Diff. p-value	CITY IPO SPEC (n=355)	Non CITY IPO SPEC (n=871)	Test Diff. p-value
LEV	Mean	0.377	0.546	0.0728	0.377	0.545	0.0745	0.744	0.443	0.3779	0.400	0.534	0.1594
	Median	0.225	0.290	0.0802	0.210	0.294	0.0048	0.271	0.274	0.8212	0.223	0.292	0.0276
	STD	0.632	2.577		0.654	2.571		4.961	0.794		0.764	2.551	
LOSS	Mean	0.588	0.580	0.7988	0.596	0.577	0.5457	0.596	0.579	0.6521	0.625	0.565	0.0515
	Median	1.000	1.000	0.7987	1.000	1.000	0.5455	1.000	1.000	0.6519	1.000	1.000	0.0515
	STD	0.493	0.494		0.491	0.494		0.492	0.494		0.485	0.496	
ICW	Mean	0.003	0.016	0.0084	0.003	0.016	0.0088	0.019	0.011	0.4233	0.003	0.016	0.0096
	Median	0.000	0.000	0.0497	0.000	0.000	0.0516	0.000	0.000	0.3394	0.000	0.000	0.0556
	STD	0.052	0.126		0.053	0.126		0.136	0.104		0.053	0.126	
GCONCERN	Mean	0.082	0.104	0.2171	0.086	0.103	0.3611	0.075	0.103	0.1791	0.082	0.104	0.2027
	Median	0.000	0.000	0.2366	0.000	0.000	0.3609	0.000	0.000	0.2189	0.000	0.000	0.2235
	STD	0.275	0.306		0.281	0.304		0.264	0.304		0.274	0.306	
NONDEC	Mean	0.165	0.200	0.1567	0.177	0.194	0.4906	0.169	0.193	0.4076	0.183	0.192	0.7265
	Median	0.000	0.000	0.1566	0.000	0.000	0.4904	0.000	0.000	0.4074	0.000	0.000	0.7264
	STD	0.372	0.400		0.382	0.396		0.376	0.395		0.387	0.394	
BIG4	Mean	1.000	0.700	<.0001	0.964	0.716	<.0001	0.690	0.809	0.0005	0.901	0.743	<.0001
	Median	1.000	1.000	<.0001	1.000	1.000	<.0001	1.000	1.000	0.0001	1.000	1.000	<.0001
	STD	0.000	0.459		0.187	0.451		0.464	0.393		0.299	0.437	
SECTIER	Mean	0.000	0.081	<.0001	0.017	0.074	<.0001	0.019	0.065	<.0001	0.031	0.068	0.0035
	Median	0.000	0.000	<.0001	0.000	0.000	<.0001	0.000	0.000	0.0080	0.000	0.000	0.0119
	STD	0.000	0.273		0.128	0.262		0.136	0.247		0.174	0.251	
LIT	Mean	0.602	0.501	0.0013	0.576	0.512	0.0406	0.432	0.552	0.0014	0.566	0.517	0.1150
	Median	1.000	1.000	0.0013	1.000	1.000	0.0406	0.000	1.000	0.0014	1.000	1.000	0.1150
	STD	0.490	0.500		0.495	0.500		0.497	0.498		0.496	0.500	

43

(Table 3 Panel B continued)

Variable		Definition 1						Definition 2					
		NAT IPO SPEC (n=364)	Non NAT IPO SPEC (n=862)	Test Diff. p-value	CITY IPO SPEC (n=361)	Non CITY IPO SPEC (n=865)	Test Diff. p-value	NAT IPO SPEC (n=213)	Non NAT IPO SPEC (n=1,013)	Test Diff. p-value	CITY IPO SPEC (n=355)	Non CITY IPO SPEC (n=871)	Test Diff. p-value
LNPROCEEDS	Mean	4.731	4.519	0.0006	4.781	4.498	<.0001	4.257	4.650	<.0001	4.733	4.520	0.0029
	Median	4.605	4.522	0.2607	4.589	4.522	0.2340	4.357	4.585	0.0129	4.613	4.512	0.0892
	STD	0.869	1.229		1.057	1.161		1.190	1.115		1.186	1.113	
PROCEEDS (*$millions*)	Mean	170.848	173.515	0.8511	202.566	160.268	0.0116	135.534	180.542	0.0044	198.827	162.083	0.0267
	Median	100.000	92.000	0.2607	98.400	92.000	0.2340	78.000	98.000	0.0129	100.800	91.100	0.0892
	STD	220.612	242.180		286.621	210.096		200.552	242.036		279.766	214.743	
ATURN	Mean	1.031	1.139	0.1569	1.103	1.109	0.9332	1.184	1.091	0.3152	1.081	1.118	0.6358
	Median	0.793	0.829	0.4534	0.822	0.809	0.8510	0.953	0.796	0.2002	0.812	0.813	0.9498
	STD	1.214	1.227		1.196	1.236		1.238	1.220		1.174	1.244	
ROALOSS	Mean	0.585	0.553	0.3055	0.593	0.550	0.1717	0.577	0.560	0.6355	0.611	0.543	0.0290
	Median	1.000	1.000	0.3053	1.000	1.000	0.1716	1.000	1.000	0.6353	1.000	1.000	0.0290
	STD	0.493	0.497		0.492	0.498		0.495	0.497		0.488	0.498	
O_SCORE	Mean	0.966	2.157	0.0025	0.935	2.166	0.0019	1.366	1.896	0.3473	1.280	4.635	0.1249
	Median	0.280	0.367	0.6172	0.081	0.413	0.1174	0.027	0.381	0.2584	0.227	0.369	0.4887
	STD	5.249	8.211		5.362	8.170		7.642	7.438		7.578	63.364	
VC	Mean	0.591	0.426	<.0001	0.565	0.437	<.0001	0.394	0.492	0.0098	0.541	0.448	0.0031
	Median	1.000	0.000	<.0001	1.000	0.000	<.0001	0.000	0.000	0.0098	1.000	0.000	0.0031
	STD	0.492	0.495		0.496	0.496		0.490	0.500		0.499	0.498	
PRESTIGE	Mean	0.610	0.429	<.0001	0.571	0.446	<.0001	0.390	0.502	0.0027	0.600	0.435	<.0001
	Median	1.000	0.000	<.0001	1.000	0.000	<.0001	0.000	1.000	0.0028	1.000	0.000	<.0001
	STD	0.492	0.495		0.496	0.496		0.490	0.500		0.499	0.498	
SEGGEO	Mean	3.962	4.053	0.7884	4.332	3.898	0.2054	3.812	4.071	0.4985	4.110	3.992	0.7323
	Median	3.000	3.000	0.1371	3.000	3.000	0.1099	3.000	3.000	0.5892	3.000	3.000	0.7957
	STD	5.747	5.351		5.420	5.488		4.956	5.572		5.380	5.508	

(Table 3 continued)

Panel C: Descriptive Statistics For Underpricing Tests (n = 1,022)

Variable		Definition 1						Definition 2					
		NAT IPO SPEC (n=319)	Non NAT IPO SPEC (n=703)	Test Diff. p-value	CITY IPO SPEC (n=308)	Non CITY IPO SPEC (n=714)	Test Diff. p-value	NAT IPO SPEC (n=171)	Non NAT IPO SPEC (n=851)	Test Diff. p-value	CITY IPO SPEC (n=298)	Non CITY IPO SPEC (n=724)	Test Diff. p-value
UNDERPRICING	Mean	0.138	0.146	0.6786	0.146	0.143	0.8765	0.102	0.152	0.0040	0.133	0.148	0.4258
	Median	0.083	0.071	0.4172	0.083	0.069	0.1721	0.071	0.075	0.9331	0.077	0.072	0.5814
	STD	0.272	0.272		0.292	0.263		0.182	0.286		0.277	0.270	
INDUSTRYSPEC	Mean	0.182	0.182	<.0001	0.552	0.340	<.0001	0.135	0.192	0.0099	0.493	0.367	0.0002
	Median	0.000	0.000	<.0001	1.000	0.000	<.0001	0.000	0.000	0.0099	0.000	0.000	0.0002
	STD	0.386	0.386		0.498	0.474		0.342	0.394		0.501	0.482	
BIG4	Mean	1.000	0.734	<.0001	0.968	0.752	<.0001	0.743	0.832	0.0136	0.916	0.776	<.0001
	Median	1.000	1.000	<.0001	1.000	1.000	<.0001	1.000	1.000	0.0059	1.000	1.000	<.0001
	STD	0.000	0.442		0.178	0.432		0.438	0.374		0.278	0.417	
EGC	Mean	0.110	0.083	0.1821	0.071	0.099	0.1301	0.029	0.103	<.0001	0.064	0.102	0.0341
	Median	0.000	0.000	0.1612	0.000	0.000	0.1533	0.000	0.000	0.0021	0.000	0.000	0.0522
	STD	0.313	0.275		0.258	0.299		0.169	0.305		0.245	0.303	
VC	Mean	0.592	0.438	<.0001	0.562	0.454	0.0015	0.392	0.505	0.0067	0.530	0.468	0.0718
	Median	1.000	0.000	<.0001	1.000	0.000	0.0015	0.000	1.000	0.0068	1.000	0.000	0.0718
	STD	0.492	0.497		0.497	0.498		0.490	0.500		0.500	0.499	
RANK	Mean	8.333	7.678	<.0001	8.353	7.680	<.0001	7.419	7.976	0.0016	8.291	7.714	<.0001
	Median	9.001	8.501	<.0001	9.001	8.501	0.0007	8.001	9.001	0.0246	9.001	8.501	<.0001
	STD	1.251	2.057		1.279	2.039		2.133	1.797		1.498	1.977	
REVISION	Mean	-0.021	-0.019	0.7843	-0.014	-0.022	0.4360	-0.005	-0.022	0.1374	-0.012	-0.022	0.2944
	Median	0.000	0.000	0.5850	0.000	0.000	0.3737	0.000	0.000	0.7942	0.000	0.000	0.3756
	STD	0.142	0.138		0.138	0.140		0.127	0.141		0.130	0.143	
SPREAD	Mean	0.010	0.012	0.0004	0.010	0.012	0.0012	0.013	0.011	0.0313	0.010	0.011	0.1575
	Median	0.010	0.010	0.6367	0.009	0.010	0.5857	0.011	0.009	0.0786	0.009	0.010	0.0987
	STD	0.005	0.013		0.008	0.012		0.016	0.010		0.011	0.012	

(Table 3 Panel C continued)

Variable		Definition 1						Definition 2					
		NAT IPO SPEC (n=319)	Non NAT IPO SPEC (n=703)	Test Diff. p-value	CITY IPO SPEC (n=308)	Non CITY IPO SPEC (n=714)	Test Diff. p-value	NAT IPO SPEC (n=171)	Non NAT IPO SPEC (n=851)	Test Diff. p-value	CITY IPO SPEC (n=298)	Non CITY IPO SPEC (n=724)	Test Diff. p-value
TECH	Mean	0.226	0.238	0.6788	0.263	0.221	0.1487	0.275	0.226	0.1654	0.245	0.229	0.5907
	Median	0.000	0.000	0.6786	0.000	0.000	0.1486	0.000	0.000	0.1653	0.000	0.000	0.5905
	STD	0.419	0.426		0.441	0.415		0.448	0.418		0.431	0.421	
VWTOT	Mean	0.019	0.024	0.0324	0.025	0.021	0.1849	0.018	0.023	0.2425	0.025	0.022	0.2053
	Median	0.019	0.026	0.0365	0.028	0.024	0.5857	0.024	0.024	0.9332	0.026	0.024	0.5821
	STD	0.043	0.040		0.039	0.042		0.053	0.038		0.039	0.042	
IPORET	Mean	14.686	14.727	0.9311	14.508	14.803	0.5243	13.675	14.923	0.0179	14.282	14.892	0.2134
	Median	13.750	13.700	0.6801	13.725	13.700	0.7359	13.500	13.700	0.6737	13.600	13.750	0.4499
	STD	6.863	7.252		6.506	7.385		6.018	7.318		6.744	7.279	
IPOTOT	Mean	24.401	23.572	0.2403	24.383	23.592	0.2676	22.006	24.197	0.0123	23.960	23.778	0.8004
	Median	25.000	23.000	0.0233	25.000	24.000	0.3771	21.000	25.000	0.0049	24.500	24.000	0.6872
	STD	9.873	10.711		10.392	10.485		10.357	10.447		10.286	10.535	
LNAGE	Mean	2.498	2.391	0.1228	2.515	2.385	0.0623	2.323	2.445	0.1779	2.492	2.397	0.1778
	Median	2.303	2.398	0.5058	2.398	2.398	0.6766	2.303	2.398	0.4419	2.398	2.398	0.8150
	STD	0.980	1.120		0.977	1.119		1.149	1.064		0.996	1.111	
PROCEEDS	Mean	-0.603	-0.731	0.0494	-0.529	-0.761	0.0011	-0.885	-0.653	0.0081	-0.534	-0.756	0.0020
	Median	-0.806	-0.780	0.6364	-0.755	-0.802	0.3396	-0.784	-0.791	0.8014	-0.739	-0.813	0.1685
	STD	0.890	1.110		0.982	1.067		1.080	1.037		1.069	1.032	

Tests of differences in means is a paired t-test. Tests of differences in medians is a Wilcoxon signed rank test. The sample is 1,022 firm-commitment IPOs from January 1, 2002 to December 31, 2015. All variables are as defined in Appendix.

Table 4, Panel A and Table 4, Panel B presents a Pearson and Spearman correlation matrix for my audit fee variables and underpricing variables, respectively. I report the Pearson correlation coefficients above the diagonal and Spearman correlation coefficients below the diagonal. Bolded coefficients are significant at the five percent level.

The Pearson correlations between IPO specialists and audit fees are 0.05 (national level definition 1), 0.14 (city level definition 1), 0.00 (national level definition 2), and 0.15 (city level definition 2), indicating that overall there is no linear correlation between IPO specialists and audit fees. The Pearson correlations between IPO specialists and underpricing are -0.01 (national level definition 1), 0.01 (city level definition 1),
-0.07 (national level definition 2), and -0.02 (city level definition 2), indicating that overall there is no linear correlation between IPO specialists and underpricing. The Pearson correlations results and univariate test results together suggest that multivariate regression tests should be conducted to make inferences for my H1 and H2.

The Pearson correlations between IPO specialists at the U.S. national level and industry specialists at the U.S. national level are -0.01 (definition 1) and -0.06 (definition 2), suggesting that national IPO specialist are not positively correlated with national industry specialists. The Pearson correlations between IPO specialists at the U.S. city level and industry specialists at the U.S. city level are 0.20 (definition 1) and 0.11 (definition 2), indicating that there is a weak correlation between city IPO specialists and city industry specialists. None of the variance inflation factors on any of the variables exceeds five, which is below the threshold of ten recommended by Kennedy (1992) to test for multicollinearity.

Table 4.

Panel A: Pearson/Spearman Correlation Matrix for Audit Fees Tests

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]	[23]	[24]	[25]
[1]	LNAUDITFEE	1.00	0.05	0.00	0.14	0.03	-0.14	0.18	0.14	0.17	-0.04	0.01	-0.01	-0.05	0.01	0.04	0.01	0.02	-0.03	-0.08	-0.17	0.06	0.05	-0.02	0.23	-0.19
[2]	NATIPOSPEC_DEF1	0.08	1.00	0.33	0.02	0.27	-0.01	-0.01	0.04	0.03	0.01	-0.01	0.06	-0.01	0.06	0.01	0.03	0.01	0.01	-0.06	-0.03	-0.04	0.34	-0.16	0.09	0.09
[3]	CITY IPOSPEC_DEF1	0.19	0.33	1.00	-0.05	-0.01	-0.06	-0.08	-0.09	-0.06	-0.04	0.06	0.06	-0.03	0.06	0.07	-0.01	-0.02	0.02	0.03	-0.04	-0.02	-0.11	-0.08	0.06	0.09
[4]	NATIPOSPEC_DEF2	-0.12	0.02	-0.05	1.00	0.73	-0.03	-0.06	-0.05	0.06	0.08	0.08	-0.01	0.02	-0.01	0.02	0.01	-0.02	0.06	0.01	-0.03	-0.02	0.28	-0.07	0.05	-0.12
[5]	CITY IPOSPEC_DEF2	0.15	0.27	-0.05	0.73	1.00	-0.06	0.11	-0.05	0.11	0.05	0.05	0.06	0.08	0.04	0.04	0.01	0.00	-0.03	0.06	-0.05	-0.02	0.24	-0.11	-0.02	0.08
[6]	NAT INDUSTRYSPEC	0.08	-0.01	-0.06	-0.03	-0.06	1.00	0.18	-0.05	0.11	0.10	0.05	0.01	0.04	-0.02	0.06	-0.01	0.04	0.03	-0.05	-0.07	0.03	0.26	-0.11	-0.11	0.15
[7]	CITY INDUSTRYSPEC	0.19	-0.01	-0.08	-0.06	0.11	0.18	1.00	-0.04	0.14	0.14	0.05	-0.02	-0.06	-0.03	0.03	-0.01	-0.08	0.04	-0.06	-0.06	-0.12	-0.09	-0.02	-0.11	0.14
[8]	EGC	-0.15	0.03	-0.09	-0.05	-0.05	-0.05	-0.04	1.00	-0.32	-0.50	-0.17	-0.29	-0.01	0.27	0.23	-0.09	0.25	0.25	-0.08	-0.10	-0.09	-0.09	-0.33	-0.32	-0.19
[9]	SIZE	0.42	0.03	-0.06	0.06	0.11	0.11	0.14	-0.34	1.00	0.81	0.33	0.09	0.18	0.20	-0.55	-0.48	0.28	0.24	-0.44	-0.09	-0.39	0.03	0.06	-0.11	0.77
[10]	LNSALES	0.39	0.01	-0.04	0.08	0.05	0.10	0.14	-0.44	0.85	1.00	0.34	0.38	0.46	0.19	-0.11	-0.25	0.51	0.28	-0.36	-0.11	-0.38	0.14	0.02	-0.01	0.66
[11]	SEGBUS	0.25	-0.01	0.06	0.08	0.05	0.05	0.05	-0.28	0.31	0.34	1.00	0.09	0.06	0.17	-0.06	-0.06	0.21	0.11	-0.20	-0.11	-0.15	0.08	0.03	0.02	0.16
[12]	INVAR	0.10	-0.01	0.06	-0.01	0.01	0.01	-0.02	-0.41	0.09	0.38	0.09	1.00	0.05	0.08	0.08	0.06	0.43	0.06	-0.35	-0.07	-0.22	0.16	0.03	0.03	0.09
[13]	FOREIGN	0.10	-0.02	-0.03	0.02	0.08	0.04	-0.06	-0.06	0.18	0.46	0.06	0.05	1.00	0.01	0.00	0.03	0.15	0.03	-0.19	0.00	-0.07	0.07	0.02	0.07	0.15
[14]	CATA	-0.21	0.10	0.06	-0.01	0.04	-0.02	-0.03	0.30	0.20	0.19	0.17	0.08	0.01	1.00	0.25	-0.05	0.24	0.02	0.02	0.13	-0.06	0.06	-0.07	-0.01	0.04
[15]	QUICK	-0.08	0.10	0.07	0.02	0.04	0.06	0.03	0.14	-0.55	-0.11	-0.06	0.08	0.00	0.25	1.00	0.51	-0.08	-0.09	-0.09	-0.09	-0.09	0.02	-0.03	-0.02	-0.12
[16]	ROA	0.15	-0.03	-0.01	0.01	0.01	-0.01	-0.01	-0.36	-0.48	-0.25	-0.06	0.06	0.03	-0.05	0.51	1.00	-0.15	-0.85	-0.05	-0.02	-0.04	-0.09	0.01	-0.09	0.36
[17]	LEV	0.16	-0.06	-0.02	-0.02	0.00	0.04	-0.08	-0.15	0.28	0.51	0.21	0.43	0.15	0.24	-0.08	-0.15	1.00	0.12	-0.10	-0.01	0.01	-0.08	0.00	-0.08	0.17
[18]	LOSS	-0.13	0.01	0.02	0.06	-0.03	0.03	0.04	0.25	0.24	0.28	0.11	0.06	0.03	0.02	-0.09	-0.88	0.05	1.00	0.24	0.18	-0.10	-0.20	-0.06	-0.02	-0.08
[19]	ICW	-0.03	-0.06	0.03	0.01	0.06	-0.03	-0.06	-0.08	-0.44	-0.36	-0.20	-0.35	-0.19	0.02	-0.09	-0.05	0.05	0.24	1.00	0.21	0.00	-0.05	0.24	-0.24	-0.18
[20]	GCONCERN	-0.18	-0.03	-0.04	-0.03	-0.05	-0.07	-0.06	-0.10	-0.09	-0.11	-0.11	-0.07	0.00	0.02	-0.09	-0.02	0.26	0.21	0.21	1.00	0.00	0.00	0.06	0.06	-0.36
[21]	NONDEC	-0.11	-0.04	-0.02	-0.02	-0.02	0.03	-0.12	-0.09	-0.39	-0.38	-0.15	-0.22	-0.07	0.13	0.02	-0.04	0.02	0.00	0.00	0.00	1.00	-0.04	-0.03	0.06	-0.36
[22]	BIG4	0.22	0.34	-0.11	0.28	0.24	0.26	-0.09	0.32	0.06	0.14	0.08	0.16	0.07	0.06	0.06	-0.09	-0.05	-0.20	0.02	0.00	-0.04	1.00	-0.48	0.06	0.42
[23]	SECTIER	0.00	-0.16	-0.08	-0.07	-0.11	-0.11	-0.02	-0.33	0.06	0.02	0.03	0.03	0.02	-0.07	-0.03	0.01	-0.06	-0.03	-0.06	0.06	-0.03	-0.48	1.00	-0.07	0.00
[24]	LIT	-0.11	0.09	0.06	0.05	-0.02	-0.11	-0.11	-0.32	-0.11	-0.01	0.02	0.03	0.07	-0.01	-0.02	-0.02	0.00	-0.02	0.01	0.06	0.06	0.06	-0.07	1.00	-0.22
[25]	LNPROCEEDS	0.31	0.06	0.09	-0.12	0.08	0.15	0.14	-0.21	0.77	0.66	0.16	0.09	0.15	-0.40	-0.12	0.36	0.16	-0.28	-0.14	-0.34	0.06	0.36	0.00	-0.29	1.00

This table presents the Pearson correlation coefficients above the diagonal and Spearman correlation coefficients below the diagonal. Bolded coefficients are significant at the 5 percent level. The sample contains 1,226 firm-year observations. Variables are defined in Appendix. None of the variance inflation factors on any of the variables exceeds 5, which is below the threshold of 10 recommended by Kennedy (1992) to test for multicollinearity.

Panel B: Pearson/Spearman Correlation Matrix for Underpricing Tests (Table 4-Continued)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
[1] UNDERPRICING	1.00	-0.01	0.01	-0.07	-0.02	0.03	-0.04	0.08	0.06	0.17	0.18	0.40	0.00	0.04	0.05	0.03	0.03	0.00	0.07
[2] NAT IPOSPEC_DEF1	0.01	1.00	0.32	0.02	0.00	0.04	0.06	-0.01	-0.08	0.14	0.16	-0.01	-0.08	-0.01	-0.07	0.00	0.04	0.05	0.06
[3] CITY IPOSPEC_DEF1	0.04	0.32	1.00	-0.04	0.73	0.18	0.32	0.26	0.04	0.10	0.17	0.02	-0.09	0.05	0.04	-0.02	0.03	0.06	0.10
[4] NAT IPOSPEC_DEF2	-0.03	0.02	-0.04	1.00	-0.06	-0.06	-0.06	0.16	-0.06	-0.08	0.17	0.02	0.08	0.04	0.02	-0.07	-0.08	0.02	-0.06
[5] CITY IPOSPEC_DEF2	0.00	0.26	0.73	-0.06	1.00	-0.03	-0.03	0.12	-0.06	0.06	0.14	0.03	-0.04	0.02	0.04	0.01	0.01	0.04	-0.08
[6] NAT INDUSTRYSPEC	0.03	0.00	-0.02	-0.06	-0.03	1.00	0.21	0.12	0.00	0.10	0.12	0.01	-0.10	-0.06	0.05	-0.05	0.00	0.14	0.14
[7] CITY INDUSTRYSPEC	-0.02	0.00	-0.08	-0.06	-0.03	0.21	1.00	0.25	0.06	0.14	0.14	0.03	0.04	-0.05	0.00	0.00	-0.01	0.14	0.14
[8] BIG4	0.12	0.32	-0.09	0.16	0.22	0.25	0.25	1.00	-0.11	0.17	0.51	-0.05	-0.35	0.04	0.00	-0.10	-0.07	0.20	0.36
[9] EGC	-0.01	-0.08	-0.04	-0.06	-0.03	0.00	0.06	-0.11	1.00	0.19	-0.19	-0.06	0.14	-0.09	-0.11	0.06	0.11	-0.06	-0.26
[10] VC	0.16	0.14	-0.08	-0.08	0.06	0.10	0.14	0.17	0.19	1.00	0.12	0.08	0.32	0.20	-0.03	-0.07	0.00	-0.29	-0.34
[11] RANK	0.20	0.16	-0.11	0.17	0.11	0.11	0.11	0.44	-0.19	0.12	1.00	0.12	-0.54	0.06	0.02	-0.06	-0.07	0.26	0.55
[12] REVISION	0.54	0.00	0.03	0.02	0.01	0.01	0.08	0.08	-0.05	0.08	0.12	1.00	-0.07	0.05	0.07	0.04	0.04	-0.10	0.25
[13] SPREAD	-0.03	-0.01	-0.06	0.08	-0.07	-0.05	0.04	-0.24	0.21	0.32	-0.42	-0.11	1.00	0.09	0.05	0.06	0.04	-0.19	-0.71
[14] TECH	0.08	-0.01	0.05	0.04	-0.06	-0.06	-0.05	-0.13	0.19	0.20	-0.11	0.05	0.09	1.00	0.06	-0.01	0.05	-0.20	-0.10
[15] VWTOT	0.08	-0.07	0.02	0.02	0.04	0.05	0.00	0.00	-0.11	-0.03	-0.01	0.08	-0.02	0.06	1.00	-0.03	-0.16	-0.05	0.04
[16] IPORET	0.02	0.00	0.00	-0.07	0.01	0.00	0.00	-0.10	0.08	-0.07	0.04	0.06	0.04	-0.02	-0.03	1.00	0.08	0.06	-0.04
[17] IPOTOT	0.01	0.04	-0.08	-0.08	0.01	-0.01	-0.06	-0.06	0.11	0.00	-0.06	-0.03	0.04	0.05	-0.20	0.08	1.00	-0.02	-0.06
[18] LNAGE	0.01	0.02	0.03	0.02	0.04	0.14	0.14	0.20	0.14	-0.29	0.13	-0.01	-0.27	-0.06	-0.11	-0.11	-0.02	1.00	0.36
[19] PROCEEDS	0.16	0.03	0.07	-0.06	0.14	0.12	0.12	0.31	-0.26	-0.34	0.49	0.33	-0.85	-0.10	0.03	-0.08	-0.06	0.32	1.00

This table presents the Pearson correlation coefficients above the diagonal and Spearman correlation coefficients below the diagonal. Bolded coefficients are significant at the 5 percent level. The sample contains 1,022 firm-year observations. Variables are defined in Appendix. None of the variance inflation factors on any of the variables exceeds 3.5, which is below the threshold of 10 recommended by Kennedy (1992) to test for multicollinearity.

Results of my audit fee tests are reported in Table 5. My test variable is *IPOSPEC*. The coefficients on *IPOSPEC* are positive and statistically significant in all four models (national IPO specialist using definition one, city IPO specialist using definition one, national IPO specialist using definition two, city IPO specialist using definition two) and are consistent with my expectations. These significant positive coefficients on *IPOSPEC* support my first hypothesis that IPO clients with an IPO specialist auditor pay higher audit fees compared to clients with non-IPO specialists.

Using my first measure of specialization, national IPO specialists charge 78% higher audit fees than non-national IPO specialists, while city IPO specialists charge 141% higher audit fees than non-city IPO specialists. Using my second measure of specialization, national IPO specialists charge 272% higher audit fees than non-national IPO specialists, while city IPO specialists charge 173% higher audit fees than non-city IPO specialists.[15] These results demonstrate the economic significance of IPO specialists. My adjusted R^2s range from 36% to 37% which are comparable to previous IPO audit fee studies (adjusted R^2s in Venkataraman et al. (2008) range from 31% to 38% and the adjusted R^2 in Mayhew and Wilkins (2003) is 26%).

The coefficients on *INDUSTRYSPEC*, *SIZE, LOSS*, *ICW,* and *SECTIER* in my city models are positive and statistically significant, suggesting that audit fees are higher for firms that are audited from an industry city specialist audit office, are larger, reported a net loss, reported internal control weaknesses, and/or were audited from second tier audit firms. The coefficients on *FOREIGN* and *NONDEC* are negative and statistically significant, suggesting that audit fees are lower for clients with foreign incomes and/or without a December 31st fiscal year-end.

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[15] The interpretation of coefficients is the following: $\%\Delta\, y = 100(e^{\beta_1} - 1)$ when $\beta_1 \leq$ -0.1 and $\beta_1 \geq 0.1$ (Craswell et al. 1995).

Table 5. Regression of Multivariate Analysis (Dependent Variable: LNAFEES)

	Definition 1				Definition 2			
	National		City		National		City	
Variable	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Intercept	3.562	0.059*	3.610	0.054*	3.438	0.068*	3.388	0.070*
IPOSPEC	**0.577**	**0.043****	**0.880**	**0.001*****	**1.315**	**0.010****	**1.005**	**0.000*****
INDUSTRYSPEC	0.148	0.650	0.706	0.007***	0.110	0.735	0.769	0.003***
EGC	-0.390	0.478	-0.290	0.596	-0.366	0.505	-0.234	0.668
SIZE	0.458	0.001***	0.441	0.001***	0.431	0.001***	0.457	0.001***
LNSALES	0.081	0.484	0.068	0.552	0.083	0.471	0.070	0.542
SEGBUS	0.007	0.881	-0.005	0.902	0.009	0.834	-0.005	0.904
INVAR	0.083	0.927	0.096	0.914	0.011	0.990	0.082	0.927
FOREIGN	-0.092	0.015**	-0.093	0.013**	-0.090	0.016**	-0.097	0.009***
CATA	-0.317	0.625	-0.333	0.604	-0.321	0.620	-0.314	0.624
QUICK	-0.018	0.312	-0.020	0.260	-0.020	0.269	-0.026	0.138
ROA	0.020	0.765	0.027	0.682	0.023	0.730	0.016	0.809
LEV	0.063	0.595	0.074	0.530	0.053	0.660	0.055	0.640
LOSS	0.634	0.037**	0.546	0.070*	0.570	0.060*	0.503	0.095*
ICW	3.266	0.006***	3.316	0.005***	3.354	0.005***	3.324	0.005***
GCONCERN	-0.360	0.443	-0.391	0.402	-0.255	0.587	-0.382	0.412
NONDEC	-2.112	<.0001***	-2.185	<.0001***	-2.123	<.0001***	-2.197	<.0001***
BIG4	-0.194	0.660	-0.417	0.334	0.467	0.309	-0.378	0.377
SECTIER	1.213	0.049**	1.110	0.070*	1.682	0.009***	1.085	0.076*
LIT	0.264	0.492	0.317	0.405	0.269	0.484	0.316	0.407
LNPROCEEDS	-0.232	0.177	-0.226	0.186	-0.223	0.195	-0.246	0.149
YEAR & INDUSTRY FIXED EFFECT	Yes		Yes		Yes		Yes	
Adj. R²	0.3599		0.3683		0.3618		0.3704	
N	1,226		1,226		1,226		1,226	

*, **, *** Indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Bolded variables are the variables of interest. The dependent variable is LNAFEES. The sample contains 1,226 firm-year observations. The sample period covers from 2001 to 2015. Year and industry (based on 2-digit SIC codes) are included in the model. My adjusted R²s are comparable to previous IPO and audit fee studies (adjusted R²s in Venkataraman et al. (2008) range from 30.9 to 38% and adjusted R² in Mayhew and Wilkins (2003) is 26%).

51

Results of my audit fee tests using the propensity score matching (PSM) method tests are reported in Table 6. I also evaluate whether covariates are balanced and report these results in Table 6. All twenty-five of the covariates (twenty-four covariates for city IPO specialist using definition one and national IPO specialist using definition two) are insignificantly different between IPO specialist clients and non-IPO specialist clients after matching.[16] These results suggest that the covariate balance substantially improves in the matched sample.

The coefficients on *IPOSPEC*, the test variable, are again positive and statistically significant in all four models. These results are consistent with the results from my OLS models. These significant positive coefficients on *IPOSPEC* support my first hypothesis that IPO clients with an IPO specialist auditor pay higher audit fees compared to clients with non-IPO specialists after controlling for a self-selection bias issue. Economically, using my first measure of specialization, national IPO specialists charge 177% higher audit fees than non-national IPO specialists, while city IPO specialists charge 86% higher audit fees than non-city IPO specialists. Using my second measure of specialization, national IPO specialists charge 755% higher audit fees than non-national IPO specialists, while city IPO specialists charge 96% higher audit fees than non-city IPO specialists.

Results from my underpricing tests are reported in Table 7. My test variable is *IPOSPEC*. The coefficients on *IPOSPEC* are negative and statistically significant in three out of four models (city IPO specialist using definition one, national IPO specialist using definition two and city IPO specialist using definition two). These results support my second hypothesis that IPO clients with an IPO specialist auditor will exhibit lower levels of first-day underpricing.

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[16] I evaluate covariate balance using the same set of nineteen covariates from equation (1) and 6 covariates from equation (3).

Table 6. Regression of Multivariate Analysis for Matched Sample (Dependent Variable: *LNAFEES*)

| | Definition 1 | | | | Definition 2 | | | |
| | National | | City | | National | | City | |
Variable	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Intercept	-1.072	0.605	-1.044	0.602	1.891	0.365	2.400	0.162
IPOSPEC	**1.020**	**0.002*****	**0.623**	**0.035*****	**2.146**	**0.002*****	**0.674**	**0.018*****
INDUSTRYSPEC	0.317	0.442	0.500	0.101	-1.273	0.032**	-0.145	0.626
EGC	-0.725	0.310	0.048	0.950	-0.508	0.667	-0.665	0.346
SIZE	0.357	0.078*	0.861	<.0001***	0.465	0.054*	0.503	0.004***
LNSALES	0.093	0.601	-0.012	0.937	0.078	0.771	0.251	0.210
SEGBUS	-0.014	0.817	-0.065	0.165	-0.075	0.746	0.048	0.752
INVAR	-1.263	0.350	0.435	0.717	0.737	0.607	-0.647	0.579
FOREIGN	-0.195	0.001***	-0.075	0.062*	-0.067	0.423	-0.045	0.284
CATA	1.108	0.220	0.564	0.532	-0.381	0.734	0.148	0.860
QUICK	-0.012	0.800	-0.048	0.287	-0.033	0.226	-0.013	0.439
ROA	0.215	0.531	0.025	0.796	0.065	0.704	-0.104	0.705
LEV	0.197	0.279	1.604	0.048**	0.019	0.952	0.101	0.711
LOSS	-0.008	0.985	0.869	0.018*	0.531	0.301	0.653	0.079*
ICW	-0.457	0.916	7.928	0.001***	2.064	0.404	5.246	0.052*
GCONCERN	0.116	0.856	-0.242	0.700	0.491	0.617	0.005	0.994
NONDEC	-2.333	<.0001***	-2.847	<.0001***	-1.563	0.009***	-2.302	<.0001***
BIG4			1.068	0.380	2.310	0.002***	-0.309	0.654
SECTIER			3.593	0.020**	4.464	0.009***	-0.925	0.356
LIT	1.031	0.050**	-0.262	0.567	0.411	0.476	0.362	0.436
LNPROCEEDS	0.088	0.748	-0.376	0.147	-0.169	0.541	-0.205	0.368
YEAR & INDUSTRY FIXED EFFECT	Yes		Yes		Yes		Yes	
Covariates Balanced	25/25		24/25		24/25		25/25	
Adj. R	0.4554		0.3969		0.2981		0.4231	
N	728		722		426		710	

*, **, *** Indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Bolded variables are the variables of interest. The dependent variable is *LNAFEES*. The sample are matched by the propensity score. Year and industry (based on 2-digit SIC codes) are included in the mode. My adjusted R²s are comparable to previous IPO and audit fee studies (adjusted R²s in Venkataraman et al. (2008) range from 30.9 to 38% and adjusted R² in Mayhew and Wilkins (2003) is 26%).

Economically, on average, IPO specialists reduced underpricing worth $3.8 million (city IPO specialists definition 1), $6.2 million (national IPO specialists definition 2), and $6.7 million (city IPO specialists definition 2).

The coefficients on *EGC*, *VC, RANK, REVISION, SPREAD, VWTOT* and *IPOTOT* in my underpricing models are positive and statistically significant, suggesting that there is higher underpricing for firms that are emerging growth companies, are backed by venture capital, hire a more prestigious underwriter, have a higher price revision from the book building process, have a higher fraction of underwriters' fees over proceeds, and/or go public during a hot IPO market.

Results of my underpricing tests using the propensity score matching (PSM) method are reported in Table 8. I also evaluate whether covariates are balanced and report these results in Table 8. Sixteen covariates out of eighteen covariates are insignificantly different between IPO specialist clients and non-IPO specialist clients after matching.[17] These results suggest that the covariate balance substantially improves in the matched sample.

The coefficients on *IPOSPEC* are negative and statistically significant in three out of four models (city IPO specialist using definition one, national IPO specialist using definition two and city IPO specialist using definition two). These results are consistent with results from my OLS models and support my second hypothesis that IPO clients with an IPO specialist auditor will exhibit lower levels of first-day underpricing. Economically, on average, IPO specialists reduced underpricing worth $6.9 million (city IPO specialists definition 1), $6.6 million (national IPO specialists definition 2), and $8.3 million (city IPO specialists definition 2).

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[17] I evaluate covariate balance using the same set of fourteen covariates from equation (2) and 4 covariates from equation (3) after eliminating the same covariates in the two equations.

Table 7. Regression of Multivariate Analysis for Full Sample (Dependent Variable: *UNDERPRICING*)

Variable	Definition 1				Definition 2			
	National		City		National		City	
	Coefficient	Robust t-statistics	Coefficient	Robust t-statistics	Coefficient	Robust t-statistics	Coefficient	Robust t-statistics
Intercept	-0.204	-2.36**	-0.200	-2.35**	-0.181	-2.06**	-0.198	-2.37**
IPOSPEC	**-0.031**	**-1.36**	**-0.021**	**-1.96***	**-0.039**	**-2.32****	**-0.037**	**-2.35****
INDUSTRYSPEC	0.011	0.80	-0.014	-0.95	0.013	0.89	-0.014	-0.98
BIG4	0.004	0.14	0.004	0.18	-0.009	-0.37	0.004	0.17
EGC	0.080	2.12**	0.076	2.06*	0.072	1.97*	0.075	2.03**
VC	0.054	2.91***	0.053	2.87***	0.049	2.65***	0.053	2.90***
RANK	0.031	2.93***	0.030	2.93***	0.030	2.84***	0.031	2.95***
REVISION	0.752	9.37***	0.747	9.30***	0.762	9.65***	0.747	9.33***
SPREAD	2.670	1.65*	2.746	1.69*	2.658	1.66*	2.874	1.76*
TECH	-0.001	-0.04	-0.001	-0.03	0.001	0.07	-0.001	-0.06
VWTOT	0.280	1.93*	0.322	2.15**	0.272	1.86**	0.331	2.21**
IPORET	0.000	0.44	0.000	0.43	0.000	0.23	0.000	0.35
IPOTOT	0.002	2.74***	0.002	2.85***	0.001	2.51**	0.002	2.83***
LNAGE	0.004	0.66	0.005	0.71	0.003	0.53	0.004	0.66
PROCEEDS	-0.006	-0.50	-0.004	-0.35	-0.007	-0.59	-0.003	-0.25
YEAR& INDUSTRY CLUSTERING	YES		YES		YES		YES	
Adj. R2	0.2067		0.2059		0.2071		0.2085	
N	1,022		1,022		1,022		1,022	

*, **, *** Indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Bolded variables are the variables of interest. The dependent variable is *Underpricing*. The sample contains 1,022 firm-year observations. The sample period covers from 2001 to 2015. Robust t-statistics are adjusted for clustering of observations across years and 2-digit industry code (Fama-French industry category) to address correlations among standard errors.

55

Table 8. Regression of Multivariate Analysis for Matched Sample (Dependent Variable: *UNDERPRICING*)

	Definition 1				Definition 2			
	National		City		National		City	
Variable	Coefficient	Robust t-statistics	Coefficient	Robust t-statistics	Coefficient	Robust t-statistics	Coefficient	Robust t-statistics
Intercept	-0.373	-1.68*	-0.390	-1.35	0.018	0.26	-0.263	-0.99
IPOSPEC	**-0.037**	**-1.15**	**-0.038**	**-2.90*****	**-0.042**	**-1.93***	**-0.046**	**-3.10*****
INDUSTRYSPEC	0.034	1.86*	-0.013	-0.58	-0.024	-0.97	-0.031	-1.40
BIG4	0.007	0.18	0.015	0.50	-0.002	-0.05	-0.031	-0.69
EGC	0.067	1.65**	0.097	1.69*	0.126	1.52	0.055	0.71
VC	0.066	3.07***	0.058	2.27**	0.048	1.93*	0.042	1.32
RANK	0.052	2.14**	0.054	1.86*	0.016	2.86***	0.043	1.32
REVISION	0.857	10.30***	0.886	11.67***	0.592	2.69***	0.919	9.67***
SPREAD	6.673	1.28	2.602	0.62	1.930	1.36	2.680	0.66
TECH	-0.018	-0.73	-0.018	-0.98	0.019	0.68	-0.008	-0.28
VWTOT	0.041	0.26	-0.036	-0.17	0.482	1.79*	0.072	0.25
IPORET	0.000	-0.40	0.000	-0.52	-0.003	-1.51	0.000	-0.33
IPOTOT	0.002	2.59**	0.003	4.03***	0.000	-0.30	0.002	1.93*
LNAGE	-0.006	-0.58	0.000	0.02	0.003	0.23	0.016	1.74*
PROCEEDS	0.016	0.62	-0.014	-0.83	0.007	0.38	-0.026	-1.31
YEAR& INDUSTRY								
CLUSTERING	YES		YES		YES		YES	
Covariates Balanced	16/18		16/18		16/18		16/18	
N	638		616		342		596	
Adj. R2	0.2515		0.2686		0.1501		0.2278	

*, **, *** Indicate significance at the 10 percent, 5 percent, and 1 percent levels, respectively. Bolded variables are the variables of interest. The dependent variable is *Underpricing*. The sample period covers from 2001 to 2015. Robust t-statistics are adjusted for clustering of observations across years and 2-digit industry code (Fama-French industry category) to address correlations among standard error.

CHAPTER 6

ADDITIONAL ANALYSIS

I also reclassify my IPO specialist variable using a rolling three year window prior to IPO issue date. In my OLS audit fees tests, the coefficients on *IPOSPEC*, the test variable, are positive and statistically significant in three models (0.91 (t=2.94) for national IPO specialists using definition 1, 1.40 (t=4.72) for city IPO specialists using definition 1, 0.43 (t=1.03) for national IPO specialists using definition 2, and 1.08 (t=3.75) for city IPO specialists using definition 2). In my PSM audit fees tests, the coefficients on *IPOSPEC*, the test variable, are positive and statistically significant in all models (0.83 (t=3.10) for national IPO specialists using definition 1, 0.67 (t=2.54) for city IPO specialists using definition 1, 2.10 (t=3.17) for national IPO specialists using definition 2, and 0.87 (t=3.38) for city IPO specialists using definition 2).

In my underpricing tests, the coefficients on *IPOSPEC*, the test variable, are negative and statistically significant in all models (-0.04 (t=-1.98) for national IPO specialists using definition 1, -0.02 (t=-1.86) for city IPO specialists using definition 1, -0.03 (t=-1.80) for national IPO specialists using definition 2, and -0.02 (t=-1.46) for city IPO specialists using definition 2). In my PSM underpricing tests, the coefficients on *IPOSPEC*, the test variable, are negative and statistically significant in three models (-0.05 (t=-1.98) for national IPO specialists using definition 1, -0.03 (t=-2.03) for city IPO specialists using definition 1, -0.06 (t=-1.95) for national IPO specialists using definition 2, and -0.02 (t=-0.81) for city IPO specialists using definition 2). These results using a rolling three year window prove additional support that IPO specialist auditors earn fee premiums while reducing underpricing.

In my study, I also seek to better understand whether IPO specialist auditors provide higher audit quality. Audit specialists are believed to be better able to deliver higher audit quality

because they possess a deeper knowledge of business and accounting practices than non-specialist auditors, suggesting that specialists have greater competency in providing high quality audits (Dopuch and Simunic 1982; Reichelt and Wang 2010). I use restatements and discretionary accruals to examine the audit quality of IPO specialist auditors. Results of my restatement and discretionary accrual tests show that the coefficients of IPO specialist auditors are negative but not statistically significant.

CHAPTER 6

CONCLUSION

In this paper, I examine auditor specialization in the IPO market and then investigate the pricing of IPO auditor expertise and the issuer underpricing of IPO auditor expertise. I find that IPO clients with an IPO specialist auditor pay higher audit fees compared to clients with non-IPO specialists using both the traditional OLS regression and the propensity score matching method. When an audit firm is a national IPO audit specialist, I document significant fee premiums of 78 percent using an IPO market share measure and 272 percent using an IPO market concentration measure. Additionally, when an audit office is a city IPO audit specialist, I document significant fee premiums of 141 percent using an IPO market share measure and 173 percent using an IPO market concentration measure. I also document evidence that IPO clients with an IPO specialist auditor are associated with lower levels of first-day underpricing. Specifically, city IPO specialists using an IPO market share measure, national IPO specialists using an IPO market concentration measure and city IPO specialists using an IPO market concentration measure reduce first-day issuer underpricing by 2.1 percent, 3.9 percent and 3.7 percent, respectively.

Results from my study contribute to both the auditor specialization literature and the IPO audit literature by investigating auditor IPO specialization within the IPO audit market. I detail that prior auditor specialization literature only focuses on industry wide auditor specialization and does not distinguish between pre-IPO audits and post-IPO audits. While prior IPO audit literature

demonstrates that Big4 audit firms of IPO issuers earn higher fees and that the increased litigation risk imposed on auditors in pre-IPO audits leads to higher audit quality, no study has linked IPO auditor specialization and audit fees. In addition, I also contribute to the auditing literature by finding that IPO auditor specialization is associated with reduced levels of underpricing.

Additionally, my study also provides useful information to IPO market participants, such as auditors, issuers, regulators, and investors. For auditors, a better understanding of audit pricing in the IPO market should provide audit firms with practical information as they develop business strategies to differentiate themselves from other audit firms in the course of becoming an IPO specialist auditor. For issuers, private companies considering an IPO should benefit from knowing the costs and the benefits of hiring IPO specialist auditors and which auditors differentiate themselves within the IPO market. Regulators including the PCAOB will be able to use the results from my study during their audit firm inspections because my analysis provides evidence of auditor specialization within the IPO audit market. Also, I provide evidence that IPO specialized auditors exert more effort (higher audit fees) which should help regulators to better understand the role auditors (specialists and non-specialists) play in enforcing requirements in the IPO market as a result of my study. Lastly, for potential investors, it should be beneficial information to know that IPO specialist auditors have some effect on the value of the underlying security.

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APPENDIX

Variable Definitions

Variable	Definition
LNAFEES	the natural log of a firm's annual audit fees which consist in all fees necessary to perform the audit or review in accordance with GAAS. This category also may include services that generally only the independent accountant reasonably can provide, such as comfort letters, statutory audits, attest services, consents and assistance with and review of documents filed with the SEC;
IPOSPEC	an indicator variable that takes a value of 1 if an auditor is an IPO specialist auditor, and 0 otherwise;
INDUSTRYSPEC (National level)	1 if auditors have the largest annual market share in a given industry at the U.S. national level (the entire audit analytics sample) and have more than 10% greater market share than the closest competitor, and 0 otherwise.
INDUSTRYSPEC (City level)	1 if auditors that have the largest annual market share in a given industry at the U.S. city level (the entire audit analytics sample) , where city is defined as a Metropolitan Statistical Area following the 2005U.S. Census Bureau MSA definitions, and have more than 10% greater market share than the closest competitor, and 0 otherwise.
EGC	an indicator variable which take the value one if the client is an emerging growth company whose annual revenues are less than $1 billion, and zero otherwise;
SIZE	the natural log of a client's total assets (AT);
LNSALES	the natural log of total sales (SALE);
SEGBUS	the natural log of the number of unique business segments;
SEGGEO	the natural log of the number of unique geographical segments in a firm;
INVAR	sum of inventory (INVT)and receivables (RECT) scaled by assets (AT);
FOREIGN	foreign pre-tax income (PIFO) divided by pre-tax income (PI) which is set to zero if there is no revenue from foreign operation;
CATA	the ratio of current assets (ACT) to total assets (AT);
QUICK	the ratio of current assets (less inventories ACT-INVT) to current liabilities(LCT);
ROA	net income before extraordinary items (IB) divided by lagged total assets(AT);
LEV	total long-term debt (DLTT) scaled by average total assets;
LOSS	1 if net income (NI) is negative, and otherwise 0;
ICW	1 if the client firm has internal control weaknesses in year *t-1*, and 0 otherwise;
GCONCERN	1 if the auditor gave a going-concern opinion to a client in the fiscal year, and 0 otherwise;
NONDEC	1 if the client's fiscal year-end is not December 31st, and 0 otherwise;

Appendix-Continued

Variable	Definition
BIG4	1 if a clients' auditor is one of the Big 4 auditors, and 0 otherwise. At the beginning of my sample time period (i.e. January 1, 2002), Arthur Andersen still existed and the Big 4 at that time was the Big 5;
SECTIER	1 if a client's auditor is either BDO Seidman LLP or Grant Thornton LLP, 0 otherwise;
LIT	is an indicator variable which takes the value one if the company operates in a high litigation industry (SIC codes of 2833–2836, 3570–3577, 3600–3674, 5200–5961,and 7370–7374), and zero otherwise;
LNPROCEEDS	the natural log of IPO client's proceeds;
ATURN	total sales (SALE) divided by lagged assets (AT);
ROALOSS	one if ROA is less than zero, and zero otherwise;
VC	an indicator variable which equals 1 if the IPO is backed by venture capital, and otherwise 0;
PRESTIGE	an indicator variable which takes 1 if the underwriter for the IPO has a modified Carter Manaster Rank of 9.1 (Carter and Manaster 1990; Loughran and Ritter 2004; Ertimur et al. 2014) and 0 otherwise;
O_SCORE	-1.32-0.407(Log of Total Assets (AT)) +6.03(Total Liabilities (LT)/Total Assets (AT))-1.43(Working Capital (ACT-LCT) /Total Assets (AT))-0.076(Current Liabilities (LCT) /Current Assets (ACT))-1.72(1 if Total Liabilities (LT) > Total Assets (AT), and 0 otherwise)-0.521(Net Income(t)-Net Income(t-1))/(|Net Income(t) |-|Net Income(t-1) |);
UNDERPRICING	the difference between first-day closing price and offer price divided by offer price;
RANK	the reputation of underwriters using the updated Carter-Manaster ranking (Carter and Manaster,1990) available on Jay Ritter's website;
REVISION	the percentage price revision from midpoint of initial filing range to the offer price;
SPREAD	underwriters' fees calculated as the total underwriting/ management/ selling fees as a percentage of the amount offered in the IPO;
TECH	an indicator variable that equals one for technology firms defined using the four-digit SIC codes in Cliff and Denis(2004);
VWTOT	the sum of the value weighted market return for the two months prior to the IPO;
IPORET	the average IPO first-day return during the two months prior to a firm's IPO month available on Jay Ritter's website;
IPOTOT	the total number of IPOs over the two months prior to a firm's IPO month available on Jay Ritter's website;
LNAGE	the natural log of IPO firm Age defined as the year of the IPO minus the year of founding available on Jay Ritter's website;
PROCEEDS	the log of IPO proceeds in millions, divided by CPI.

VITA

Jung Eun Park was born and grew up in Seoul, South Korea. She graduated from Catholic University of Korea with a Bachelor of Science in Accounting in 2007. After graduation she worked for 4 years in industry in South Korea. During this time she made the decision to pursue her master's degree in Accounting and her doctorate degree of Accounting in the United States. She graduated from Florida State University with her master's degree in Accounting in 2013. Upon graduation, she attended Louisiana State University to pursue a doctorate in Accounting. Her research interests include financial reporting quality, auditing, initial public offerings, and specialization. Her teaching interests include financial accounting, cost accounting, and auditing.