Auditor Industry Specialisation and IPO Underpricing: Recent Australian Evidence

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Abstract

High quality auditors are believed to increase the credibility of financial reports and reduce information asymmetry, thereby reducing the level of IPO underpricing. This paper examines the relationship between auditor industry specialization, a common proxy for audit quality, and IPO underpricing. The analysis is performed on Australian IPOs listed between 2007 and 2009, and uses the portfolio share method to determine auditor specialization. The pooled results show that there is no significant relationship between auditor industry specialization and IPO underpricing. Contrary to predictions, auditor specialization is positively associated with underpricing, specifically in exuberant market conditions and for mature firms listing on the ASX. Our results suggest that IPO firms do not systematically use industry specialist auditors to reduce information asymmetry. IPO firms appear to use specialist auditors in specific settings to signal their value. Specialist auditors appear to be engaged to signal firm value when other intermediaries are absent, such as underwriters.

Keywords: Auditor industry specialization, Initial public offering underpricing, Signaling, Auditor quality
1. Introduction

We examine the association between hiring an industry specialist auditor and the level of underpricing of initial public offerings (IPOs) in Australia. Our intention is to investigate whether IPO firms can benefit from a lower level of underpricing by employing industry specialist auditors since all IPO firms seek ways to reduce the level of IPO underpricing so as to minimize losses when raising funds from capital markets. The issue of IPO underpricing is important in the IPO literature and archival studies have sought to identify the determinants of IPO underpricing.\(^1\) In amongst the different factors which have been identified to affect the level of IPO underpricing, the external auditor is one party that has a strong association with the level of IPO underpricing. In particular, high quality auditors, representing increased audit quality, are believed to be associated with reduced IPO underpricing (Albring, Elder, & Zhou, 2007; Lenz & Ostrowski, 2005).

Audit quality is not directly observable and as a result, prior literature utilizes proxies for audit quality (such auditor brand name, audit firm size et cetera) when examining the relationship between audit quality and the level of IPO underpricing. However, the past literature on IPO underpricing has rarely utilized auditor industry specialization as a proxy for audit quality. Auditor industry specialization is a popular proxy for audit quality and past empirical literature has concluded that auditor specialization is an important aspect of audit quality given that industry specialist auditors, as a result of have better knowledge of a particular industry, have a greater ability to detect errors contained in financial statements (Bruce K Behn, Carcello, Hermanson, & Hermanson, 1997; Palmrose, 1988; Solomon, Sheilds, & Whittington., 1999). The gap in the IPO underpricing literature arising from the paucity of research investigating the role of auditor industry specialization in IPO underpricing is the factor that triggers this research.

Our paper makes various contributions. First, although a number of studies have utilized proxies for audit quality, little attention has been paid to the impact of auditor industry specialization on IPO underpricing (Albring et al., 2007; Chang, Gygax, Oon, & Zhang, 2008; Craswell, Francis, & Taylor, 1995). In fact, no published study do date (to the best knowledge of the authors) has examined auditor industry specialization as a proxy for audit quality when examining IPO underpricing in Australia. Second, given the importance of IPOs in equity capital raisings, findings from our study will be able to assist firms in pricing their equity offerings and minimize IPO underpricing.\(^2\) One of the ways this may be achieved is by hiring industry specialist auditors during the IPO process. Third, the results from our study provides important insights to auditing firms wishing to invest in industry specialization knowledge/skills as a strategy in developing or increasing IPO market share. Finally, unlike most published studies which have examined the United States of America (US) IPO market,

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1 One of the practical benefits of research into IPO underpricing is that firms can avoid unnecessary losses when pricing their securities.
this study adopts an Australian focus. The results from our paper will therefore provide additional information about the generalizability of US results to Australia.\footnote{This is notwithstanding the different regulatory and institutional settings in both countries.}

We utilize a sample of 280 IPO firms that were listed between 2007 and 2009 and still listed on the Australian Securities Exchange (ASX) as at 2010. Our pooled results indicate that there is no significant relationship between auditor industry specialization and IPO underpricing. There is however a significant association between underpricing and year of listing. IPOs listed in 2007 exhibit significantly higher underpricing compared to IPOs in 2008 and 2009. This period coincides with the Global Financial Crisis (GFC).

These findings are robust to our sensitivity analysis (alternative measures of auditor industry specialization and several control variables). The results, therefore, imply that engaging an industry specialist auditor is not associated with reduced underpricing. Rather, market exuberance appears to have a greater bearing on the extent of underpricing.

Our paper proceeds as follows: Section Two presents the literature review while Section Three discusses the underpinning theoretical framework and hypothesis development. Section Four describes our sample, the research methodology and measurement of all of the variables in our study. Section Five presents the descriptive statistics and univariate results with Section Six outlining our main results and sensitivity tests. Chapter Seven then summarizes and concludes our study.

2. Literature review

Underpricing is a major challenge faced by firms undertaking an IPO (Brau & Fawcett, 2006). Underpricing represents the difference between the first-day closing price and the initial issue price and is also viewed as the difference between the investment banker’s initial valuation of the firm and the stock market’s valuation of the firm at the end of the first day of public trading (Certo, Daily, & Dalton, 2001). For most firms, the primary reason for seeking a public listing is to raise funds for future growth and expansion (Ritter & Welch, 2002). Issuing firms, therefore, prefer to incur a lower level of underpricing since underpricing is seen as ‘leaving money on the table’ and losing potential funds (Loughran & Ritter, 2004).\footnote{In contrast, underpricing benefits the first-day investors who subscribe to the IPO and then sell their shares at the first-day closing price which is higher than issue price in the underpricing phenomenon.}

Ritter (1998) provides a comprehensive summary of underpricing of IPO firms globally and shows positive average first-day returns on investment in IPO stocks. Ritter (1998) reports that the average initial return for IPOs in the US during the period 1960-1996 is 15.8%. Ritter and Welch (2002) subsequently show that in the US IPO market from 1980 to 2001, the first-day closing price of
IPO shares is on average 18.8% above the price at which the issuing firms sold them. Evidence from Australia also shows considerable positive initial returns as well. For example, Finn and Higham (1988) reveal an average initial return of 29.2% in the period 1966-1978 in the Australian IPO market whilst Lee, Taylor and Walter (1996b) report the average initial returns as 11.9% from 1976 to 1989 in Australia.

2.1 Information asymmetry in IPO underpricing

Information asymmetry lies in the heart of interpreting the occurrence of IPO underpricing. Leland and Pyle (1977) argue that information asymmetry is particularly pronounced in capital markets. Specifically, Leland and Pyle (1977) indicate that entrepreneurs are in possession of ‘inside’ information about the quality of their own projects for which the entrepreneurs seek financing. However, it is difficult for lenders to distinguish the quality of different projects given that the market value of a project must reflect the average project quality. For firms with high quality projects, the firms will lose money in financing because such firms will receive value (in the form of funding) reflecting lower average quality. In other words, projects of these firms are underpriced as there is information asymmetry between the firms and the market. Welch (1989) argues that issuing firms also utilize IPO underpricing as a tool to signal their potential to the market from which capital funds are sought. Issuers intentionally underprice the shares to induce the investors to collect information on the firm’s prospects. Consequently, the value of issuing firms is revealed to the public. As a result, firms whose quality is higher are able to set a higher issue price on subsequent offerings as such firms are willing to bear the losses arise from underpricing because such losses can offset against benefits resulting from higher future offerings (Ritter, 1991; Rock, 1986). Therefore, information regarding a firm’s value is asymmetric between insiders, outsiders as well as amongst different outsiders. As a result, the IPO offers can be underpriced.

2.2 Audit quality and IPO underpricing

Audit quality is the probability that an auditor will both discover and report material misstatements contained in the client’s financial statements (DeAngelo, 1981). When firms require capital and choose to become publicly-held, such firms employ auditors to enhance the credibility of the information contained in the financial statements and therein signal the firm’s overall value to the public, thereby reducing the level of information asymmetry. Auditors have the ability to increase the quality of reported information in the financial statements due to their technical knowledge, experience and independence which enables auditors to detect material errors in the financial report. Audit quality cannot be directly measured and proxies for audit quality have been identified in the literature (for example, Beatty, 1989; Chang et al., 2008; Craswell et al., 1995).

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5 Refer to Rock (1986), Beatty and Ritter (1986) and Tinic (1988) for a detailed discussion of information asymmetry within an IPO setting.
Jones (1991) finds that firms audited by Big6 auditors have lower abnormal accruals suggesting that firms audited by Big6 auditors are better able to constrain earnings management by firms and increase reported earnings quality. Teoh and Wong (1993) examine the association between audit quality and a firm’s earning response coefficient and report that investor’s response to an earnings surprise differs between clients of Big8 auditors and those of non-Big8 auditors. The earning surprise of firms audited by Big8 auditors is valued higher by investors. This is consistent with higher earnings quality of firms with auditors of ‘better quality’. Weber and Willenborg (2003) research the audit report contained in the prospectuses of firms going to public. Weber and Willenborg (2003) find that Big6 auditors’ pre-IPO opinions are more predictive on post-IPO delisting. Weber and Willenborg (2003) also find that firms audited by Big6 auditors and who do not receive going-concern opinions are more strongly associated with first-year stock return and Big6 auditors are more likely to issue going-concern opinion to the distressed clients. In other words, prospectuses of firms with Big6 auditors contain more accurate predictions regarding future stock returns and subsequent delisting than prospectuses of firms with non Big6 auditors. Willenborg (1999) argues that high quality auditors can reduce information asymmetry in the small-client segment of the IPO market as well as provide an insurance function for IPO firms. Hogan (1997) utilized self-selection analysis to study the IPO firm’s management’s decisions on the trade-off between benefit of high quality auditors (representing lower levels of underpricing) and the costs (higher audit fees). Hogan (1997) finds that IPO firms choose high quality auditors in order to minimize total costs of IPO underpricing and auditor compensation. Audit quality, therefore, has been documented to be positively associated with the credibility of audited financial statements. The information asymmetry inherent within the IPO context creates demand for auditors of higher quality because such auditors can ‘help’ IPO firms to reveal information and signal the firm’s true value to the public, therefore reducing the level of IPO underpricing.

2.3 Auditor industry specialization

Mayhew and Wilkins (2003) point out that an industry specialist auditor can provide greater value to clients given that an audit is not simply a standardized report but a process which reveals two factors about industry specialist auditors that are often ignored. The first one is that an industry specialist auditor can reduce the effort required by the client given that an audit requires effort from both the auditor and client. The effort required by the client is considered part of cost-benefit analysis when they select an auditor. An industry specialist auditor has better understanding of the characteristic of the industry and better industry-specific knowledge so that the client can spend less time in explanations with the auditor. This view is also supported by the research of Behn, Carcello, Hermanson and Hermanson (1997). They (Bruce K Behn et al., 1997) investigate the determinants of audit client satisfaction among clients of Big6 auditors and discover that there is significant positive relationship between client satisfaction and industry specialist auditors. In other words, clients are
more satisfied with the work done by industry specialist auditors than the non-specialist auditors. The second factor in Mayhew and Wilkins’s (2003) argument is that industry specialist auditors also have a positive impact on the quality of audited financial statement. Mayhew and Wilkins (2003) suggest that an external audit does not just produce an audit opinion but also results in audited financial statements. An industry specialist auditor who has a better ability to detect errors contained in financial statements can enhance the credibility of the financial statements audited.

Other published research also provides evidence that industry specialist auditors provide higher quality audits. Specifically, Carcello and Nagy (2004) investigate the fraudulent financial reporting identified by the SEC between 1990 and 2001 and discover a negative relationship between auditor industry specialization and client financial fraud. Carcello and Nagy (2004) argue that industry specialist auditors have better ability to both detect and, therefore, prevent financial fraud. Abbott and Parker (2000) also examined the selection of auditors by audit committees and report that audit committees which are both independent and active are more likely to employ industry specialist auditors. This is because audit committees are concerned about the monetary and reputational losses that may result from lawsuits and believe auditors who specialize in the client’s industry can provide high level of audit quality as opposed to non-specialist auditors.

Stanley and DeZoort (2007) also provide evidence on how auditor industry specialization affects financial reporting quality. They (Stanley & DeZoort, 2007) study the issue of financial report restatements and discover that there is inverse relationship between the likelihood of financial report restatements and industry specialist auditors. Findings suggest that auditors with industry expertise have a better ability to identify potential problems in the financial statements. This argument is also supported by Romanus, Maher and Fleming (2008) who state that auditor industry specialization is associated with improved error detection and greater financial report quality. Balsam, Krishnan and Yang (2003) investigate industry specialist auditor’s ability to mitigate earning management by utilizing the absolute level of discretionary accruals (DAC) and earning response coefficient (ERC) as proxies for the earnings quality. Results show that firms audited by industry specialist auditors have lower DAC suggesting that industry specialist auditors reduce earning management by their clients. The results also report there is positive relationship between the client’s ERC and industry specialist auditors suggesting that specialist auditors increase the market’s perception about the quality of reported earnings. Krishnan’s (2003) study examined the same issue and found similar results in that the clients of Big6 auditors are associated lower level of DAC are audited by industry specialist auditors. Overall findings, therefore, support the notion that industry specialist auditors mitigate earning management compared to non-industry specialist auditors.
2.3.1 Auditor industry specialization and information asymmetry

In addition to playing an important role in enhancing the credibility of financial statements, the role of an industry specialist auditor has also been specifically examined within an information asymmetry context, particularly in relation to analyst’s forecasts and IPO underpricing in the US. Behn, Choi and Kang (2008) investigate the association between audit quality and accuracy of the analysts’ earnings forecasts and conclude that non-Big5 industry specialist auditors are associated with higher analyst’s earnings forecast accuracy and smaller forecast dispersion. Findings suggest that industry specialist auditors reduce the level of information asymmetry between the firm and outside investors by improving the credibility and reliability of the information contained in the financial reports. As financial reports are the main source of information about firms in the stock market, analysts with the financial reports that audited by industry specialist auditors have more accurate information and, therefore, may be able to forecast more precisely.

Almutairi, Dunn and Skantz (2009) utilize a firm’s bid-ask spread as a proxy for information asymmetry. Bid-ask spread is the difference between the highest bid price a investor is willing to pay for a security and the lowest price at which the investor is willing to sell the security and provides a reasonable measurement of the market’s perception of information asymmetry. Using a sample of 31,689 firm-years from 1992 to 2001, Almutairi, Dunn and Skantz (2009) contend that clients of industry specialist auditors have lower bid-ask spreads than clients with non-industry specialist auditors indicating that the selection of industry specialist auditors can influence the level of information asymmetry. Wang and Wilkins (2007) directly examine the impact of auditor industry specialization on IPO underpricing in the US. Wang and Wilkins (2007) find that firms audited by industry specialist auditors incur a significant lower level of IPO underpricing than the firms whose auditors are non-industry specialist. Wang and Wilkins (2007) also find that the choice of industry specialist auditors are particularly important in reducing the level of IPO underpricing in the small client segment of the market, because they believe that the level of information asymmetry is more severe in that (small client) segment.

Auditor industry specialization is an important measure of audit quality. Prior literature is consistent with the argument that industry specialist auditors enhance the quality of audited financial statements. Prior studies also document the strong relationship between industry specialist auditors with reducing information asymmetry. The latter finding is the based on the premise that auditor industry specialization reduces information asymmetry and, therefore, reduces the level of IPO underpricing.
3. **Theoretical framework and hypothesis development**

Signaling theory underpins our study from a theoretical perspective. We contend that firms employing an industry specialist auditor experience less underpricing during IPOs resulting from the market perceiving the appointment of an industry specialist auditor as a sign of a higher-quality firm.

3.1 **Signaling theory**

Signaling theory has been widely adopted in prior literature to explain the incentives for engaging the services of high quality auditors (Beatty, 1989; Chang et al., 2008; Titman & Trueman, 1986a). Consistent with previous studies in IPO underpricing, signaling theory is also utilized in this study to provide a potential explanation for firms hiring industry specialist auditors. Signaling theory is premised upon information asymmetry (Leland and Pyle 1977). In an IPO market, firms issuing securities have superior-quality information regarding the prospects of the firm than outside investors/stakeholders. Signaling theory suggests that higher-quality firms may seek different mechanisms to signal their quality and true value to potential investors in order to differentiate themselves from lower-quality firms. Welch (1989) argues that issuing firms utilize underpricing as a tool to signal their value to the market since underpricing is costly for firms and difficult for lower-quality firms to imitate. As a result, underpricing becomes a credible signal suggesting high firm quality and in the long-run high quality firms can offset the costs of underpricing against better future offering pricing.

Apart from underpricing, hiring high quality auditors is also considered a credible signal of firm quality. Titman and Trueman (1986a) and Chang et al. (2008) adopt signaling theory to investigate the relationship between IPO underpricing and audit quality and to explain the impact of quality audit on IPO underpricing. Both studies argue that a higher-quality auditor can reduce information asymmetry resulting ultimately in lower IPO underpricing by sending a signal to the public of the firm’s value (Chang et al., 2008; Titman & Trueman, 1986a). Given the plethora of private information within an IPO setting, higher-quality firms can send a positive signal (to the market) by hiring a high quality auditor (Titman & Trueman, 1986a). Investors can, therefore, distinguish higher-quality firms from lower-quality firms when receiving the signal. In relation to information asymmetry between informed and uninformed investors, Beatty (1989) argues that a higher-quality auditor has a better ability to discover material misstatements in financial statements and, therefore, financial statements audited by a higher-quality auditor can reduce information asymmetry with uninformed investors and assist the investors in determining firm value.

Resolving the problem of information asymmetry within an IPO context is crucial for issuing firms wishing to reduce their level of underpricing. In other words, issuing firms may wish initiate action to reveal their value to the public. Hiring a higher-quality auditor is one of method IPO firms can utilize. Beatty (1989) suggests that higher-quality auditors have a greater ability to detect material
misstatements in financial statements as they have invested heavily in building up this kind of ability and skill-set. Therefore, higher-quality auditors increase the credibility of information contained in the financial statements and provide more reliable information regarding firm value thus helping investors to determine the value of IPO firms and ultimately reduce ex-ante information uncertainty. Consequently, firms audited by higher-quality auditors do not necessarily have to underprice their security to illicit the purchase by investors of their security (Beatty, 1989). Results from Balvers, McDonald and Miller (1988) are also consistent with the contention that higher-quality auditors improve information quality.

Industry-specific knowledge enables an auditor to better assess the audit risk related with an audit engagement client and to conduct better quality substantive testing. Specifically, we contend that auditors with industry-specific knowledge can better identify risky areas that requiring greater audit attention and resources when planning an audit engagement. Prior research suggests three ways in which industry specialist auditors affect planning decisions (Low, 2004; Ritter & Welch, 2002). First, auditor’s knowledge of the client’s industry affects the manner in which auditors formulate and modify audit procedures. Specifically, industry specialist auditors have more procedure-changes while non-industry specialist auditors have more time-changes. Second, the quality of such procedure-changes is also affected by industry-specific knowledge. Last, the risk-sensitivity of auditor’s planning decisions are affected by knowledge of the client’s industry. Industry specialist auditor’s proclivity to change audit planning procedures is sensitive to their audit risk assessment. Overall results suggest better efficiency and effectiveness of industry specialist auditors in performing audits (Low, 2004).

Signaling theory suggests that there ought to be a negative association between IPO underpricing and higher-quality auditors since higher-quality auditors reduce information asymmetry and signal the firm value to the public. Auditor industry specialization has been documented as one important component of audit quality (Chris Hogan & Jeter, 1999; Mayhew & Wilkins, 2003; Porter, 1985). Accordingly, this study tests whether firms employing industry specialist auditors incur lower underpricing during IPOs than firms without industry specialist auditors. The following hypothesis is therefore expressed:

\[ H_1: \text{There is a negative association between the use of an industry specialist auditor by a firm and the extent of IPO underpricing by that firm.} \]

4. Research design

4.1 Sample

The sample contains IPO firms that went public on the ASX between 2007 and 2009 and are still being traded at the time of collection of sample (March, 2010). The Morningstar DatAnalysis
database is employed to identify the IPOs during the period. Based on the Morningstar DatAnalysis database, 327 firms were successfully listed on the ASX between 2007 and 2009. 25 firms are excluded in the final sample because they were subsequently delisted in the post-IPO period. 22 firms are excluded in the final sample due to incomplete information to process the analysis. Therefore, the final usable sample comprises 280 IPO firms that were listed between 2007 and 2009 and currently are still listed on the ASX. See Table 1 for a breakdown of the sample by industry.

The Morningstar DatAnalysis database is also used to collect other information. Details of the IPO offers, including listing date, incorporation date, ASX Code, GICS Sector code, issue price, first-day closing price and offer proceeds were collected from the Morningstar DatAnalysis database. The auditor information for the IPO is collected from the company’s prospectuses maintained in the announcement section on the ASX website. The total assets of all the listed companies between 2007 and 2009 are obtained from both Aspect FinAnalysis database and Orbis database to calculate the auditor specialization.

4.2 Calculation of auditor specialization

Similar to audit quality, industry specialization cannot be directly measured, and researchers must rely on proxies to estimate it. Different from audit quality, the proxies for industry specialization are standard in the literature and there are two basic methods: Auditor Portfolio Share (Yardley, Kauffman, Cairney, & Albrecht, 1992) and Auditor Industry Market Share (Gramling & Stone, 2001).

Krishnan (2003) also provides a comparison between these two models in his article. He suggests that more firms will be classified as specialist auditors under the industry market share than the portfolio share measure. About 51% of sample firms are classified as specialist auditors according to industry market share, compared to about 12% according to portfolio share. The study also argues that the portfolio share is a more appropriate measure of specialization because the industry market shares show more variation, and it is consistent with the author’s research in 2001 which suggests portfolio share reflects the efforts of auditors to differentiate themselves better than industry market share. Consistent with Krishnan, this study will utilize the portfolio share method of calculating auditor industry specialization.

For each year’s calculation of total three years from 2007 to 2009, the sample comprises all the listed companies exclude those which are listed in the same year. The reason is that when IPO firms consider the choice of an auditor, they usually will look at previous year’s information. The GICS Sector is used to divide different industries and gives a total of ten different industries in the calculation. 20% is the cut-off applied in the calculation. In other words, if all the clients’ total assets in one particular industry account for equal or more than 20% of an auditor’s clients’ total assets in all industries, the auditor is concluded as a specialist in that particular industry.
4.3 Variable definitions

This sub-section introduces the definitions of dependent, independent and control variables used to test the hypothesis developed in section three.

4.3.1 Dependent variable

**IPO underpricing (UP)**

IPO underpricing is described as the difference between the offer price and the first day closing price, and is calculated as follows:

\[ UP_i = \frac{P_{i,t} - E_i}{E_i} \]

Where:
- \( UP_i \) = Initial return of company \( i \) on the day of initial listing
- \( P_{i,t} \) = Closing price of company \( i \) on the first trading day
- \( E_{i,0} \) = IPO offer price of company \( i \)

4.3.2 Independent variables

**Auditor specialization (AudSpec)**

This is a dummy variable given the value of 1 if the firm is audited by an industry specialist and 0 otherwise. This control variable is consistent with Mayhew and Wilkins (2003).

4.3.3 Control variables

**IPO Underwritten (Underwritten)**

This is a dummy variable given the value of 1 if the IPO is underwritten and 0 otherwise. This control variable is also consistent with Wang and Wilkins (2007).

**Firm size (LnAsset)**

Firm size is measured by the natural logarithm of total assets immediately before the initial public offerings. This control variable is consistent with Beatty (1989) and Willenborg (1999).

**Issue size (LnProceeds)**

Issue size is measured by the natural log of offer proceeds, which are the offer price times the total number of shares offered. The reason to have this control variable is that small IPOs are argued
to have greater information asymmetry than larger IPOs and have been found to underprice more (Michaely & Shaw, 1994).

**Age (LnAge)**

This control variable is also taken from Beatty (1989) and Willenborg (1999). It represents log of the number of days between firm incorporation date and IPO date.

**Bubble market (Bubble)**

This variable represents the year in which the firm was listed. This variable is included to take into account any differences attributable to listing prior to or after the GFC. This dummy variable will be given a value of 1 if the IPO is listed in 2007 and 0 otherwise.

**Profitability (ROA)**

This variable represents the profitability of the IPO firm just prior to listing on the ASX. This is measured by dividing the net profit after tax by the total assets of the firm.

**Duration from announcement to listing (Duration)**

This variable represents the number of days between prospectus registration date and the listing date (Albring, Elder and Zhou, 2007)

**Complexity (SQRTSubs) and (SQRTIndSeg)**

This variable measures the level of complexity of the IPO firm. Complexity in this case is proxied by the number of subsidiaries and industry segments of the IPO firm at the time of listing.

### 4.4 Regression model

Descriptive statistics will be used to investigate the means, medians and standard deviation of each variable. Multiple regression model will also be employed as the primary method to test the hypothesis. The regression model tests the association between dependent variable of IPO underpricing and independent variable of industry specialist auditors. In addition, a number of control variables will also be included in the model to test the hypothesis. The summary of the regression model is described as follows:

\[
UP_i = \lambda + \beta_1 Aud\ Spec_i + \beta_2 Underwritten_i + \beta_3 Ln\ Proceeds_i + \beta_4 Ln\ Asset_i + \beta_5 Ln\ Age_i + \beta_6 SQRTSubs_i + \beta_7 SQRTIndSeg_i + \beta_8 ROA_i + \beta_9 Duration_i + \beta_{10} Bubble_i + \eta \tag{1}
\]

Where:

\(\lambda\) = the constant
\(\beta\) = the regression coefficient
\[ UP = (\text{first-day closing price} - \text{offer price})/\text{offer price} \]
\[ AudSpec = 1 \text{ when the auditor is an industry specialist, } 0 \text{ otherwise} \]
\[ Underwritten = 1 \text{ if the IPO is underwritten, } 0 \text{ otherwise} \]
\[ LnProceeds = \log \text{ of the proceeds from issue} \]
\[ LnAsset = \log \text{ of pre-IPO total assets} \]
\[ LnAge = \log \text{ of the number of days between firm incorporation date and IPO date} \]
\[ SQRTSubs = \text{Square root of the number of foreign subsidiaries} \]
\[ SQRTIndSeg = \text{Square root of the number of industry segments} \]
\[ ROA = \text{Net profit after tax/total assets} \]
\[ Duration = \text{number of days between prospectus registration and company listing} \]
\[ Bubble = 1 \text{ if the company listed in 2007, } 0 \text{ otherwise} \]
\[ \eta = \text{the error term} \]

5. **Descriptive statistics**

Table 2 Panel A shows the results of the independent variable auditor specialization by IPO year. Approximately 38% of all the IPO firms listed between 2007 and 2009 hired industry specialist auditors. It should also be noted that the proportion of firms engaging an industry specialist auditor increased over the three year period. The latter part of the sample period (i.e. 2008 and 2009) coincides with the Global Financial Crisis (GFC). Correspondingly, the descriptive statistics indicate that the proportion of Big 4 auditors decreases over the sample period. This may suggest that has the GFC took effect, larger audit firms were less willing to take on audits of IPOs which are generally more risky. It also appears that second tier audit firms are emerging as industry specialists, particularly in the resources sector.

Table 2 Panel B shows the descriptive statistics for the dependent variable, IPO underpricing and other control variables. The mean of underpricing of total 280 IPO firms is 19.34%, and it indicates that IPO underpricing is a common phenomenon experienced by most firms listed in Australian stock market between 2007 and 2009. However, it should be noted that the level of underpricing varies significantly (significant at the 1% significance level in tests of means) between 2007 and 2008/09 (combined). Underpricing in 2008 is particularly low (3.65%) and this is characterized by a subdued IPO market given the impact of the GFC. Some of this impact is also seen in 2009 with an average underpricing of 14.92%. This result is consistent with the findings of Lee, Taylor et al. (1996a). They report that the average initial return is 11.9% from 1976 to 1989 in the Australian market. Another statistic to note is the age of IPO firms. IPO firms listing in 2009 are significantly more established than those listing in 2007. This is probably due again to the impact of the GFC. Older, more established firms tend to contemplate a stock exchange listing during subdued IPO markets as they are more likely to be able to attract capital and survive a tougher environment. This is evidenced by the fact that the mean proceeds sought in 2009 is $146million while the mean proceeds sought in 2007 is $42million. Firms listing in 2009 are also larger (mean total assets of $296million compared to $105million in 2007).
The bivariate correlations shown in Table 3 indicate that the amount of proceeds sought from the listing process is negatively correlated with the extent of underpricing (pooled sample). This indicates that as firms seek a larger amount of funding, they actively disclose more information or there are sufficient players in the market with private information to reduce the information asymmetry that might otherwise exist thereby narrowing the level of underpricing. The time period between the registration of the prospectus and the official listing is also negatively correlated with underpricing. This suggests that a longer window allows more information to be conveyed to the market while a shorter duration between registration and listing is characterized by higher information asymmetry and therefore higher underpricing. A bubble market in 2007 is associated with higher underpricing. There is a negative and significant correlation between firms hiring an industry specialist and the IPO being underwritten. This appears to suggest that when an IPO is not underwritten, the listing firm engages an industry specialist to provide a credible signal to the market of the firm’s quality. In this case, the industry specialist substitutes the signal that may have been provided by having the offer underwritten. There is a significant positive correlation between the age of the IPO firm and the duration between prospectus registration and official listing. More established firms tend to have a longer time period to market their IPO.

We partition the sample by market hype and age of firms in the main regression analysis to determine the potential impact of this on the association between underpricing and auditor specialization.

6. Main results and sensitivity tests

Table 4 presents the main regression results. Results for the pooled sample indicate that underpricing is significantly and negatively associated with the amount of proceeds sought from the IPO. As suggested earlier, as firms seek a greater amount of funds, they provide additional information required by the market in order to reduce the information asymmetry to a point where there is sufficient interest in their shares. An alternative explanation is that as more funds are sought, a potentially greater investor pool forms which either has access to private information or incurs costs to unravel that information in order to maximise their allocation of shares. Profitability is moderately significantly and positively associated with underpricing. This is explained by the opening share price being pushed up by investors who perceive that profitability will continue and indeed improve as the IPO firm lists on the ASX. This in turn increases the level of underpricing. The duration between when the IPO is announced and the company lists on the ASX is significantly negatively associated with underpricing. Firms that have a longer time period for their issue to be evaluated, tend to experience lower underpricing.
We firstly partition the sample into two periods (Pre-GFC - 2007 and GFC 2008/09 combined). Similar results are found in the pre-GFC IPOs in 2007 to the pooled sample. The amount of proceeds sought is negatively significantly associated with underpricing, but only moderately so in the 2007 sample. Similarly for profitability, we report a moderate positive and significant association. The duration to listing is negative and significantly associated with underpricing in a bubble market. In 2007, having a specialist auditor is moderately and positively associated with underpricing. This is contrary to our hypothesis. However, it may be consistent with firms selecting specialist auditors during exuberant markets to signal the quality of the IPO.

For the GFC period IPOs listing in 2008 and 2009, the significant and negative association between underpricing and issue proceeds persists. In addition we find a significant and negative association between firm age and underpricing for the GFC period sample. This indicates that older, more established firms tend to withstand the subdued market and are able to successfully list during economic downturns. The association between underpricing and profitability persists in 2008 and 2009. We find a significant and negative association between underpricing and the duration to listing during a subdued market. This suggests that a longer window between announcing the IPO and official listing allows information to be released and information asymmetry to reduce.

Our second partitioning was by firm age prior to listing. Younger, less established firms experience reduced underpricing to the extent that the amount sought is higher. These firms are likely under more pressure to reduce information asymmetry given their lack of a track record, in particular when the funds sought are significant. Older, more established firms tend to engage specialist auditors and this is associated with higher underpricing. This goes against the direction predicted in our hypothesis that audit quality reduces the ex ante uncertainty surrounding IPO firms.

Our results are robust to sensitivity analysis performed. We used different thresholds for auditor specialisation (15% and 25%). We use other measures of firm size (total revenue), profitability (ROE), firm complexity (number of foreign subsidiaries) and risk (current ratio).

7. Conclusion

Our results suggest that IPO firms do not systematically use industry specialist auditors to reduce information asymmetry. Other market factors such as buoyant or subdued markets tend to influence the level of underpricing more heavily. Firm specific factors such as age, complexity and risk also influence the level of underpricing, particularly when markets are experiencing a contraction and there is heightened uncertainty. IPO firms appear to use specialist auditors in specific settings to signal their value. Specialist auditors appear to be selected when other intermediaries are absent, such as underwriters.
Future research can examine the IPOs in 2010 and include these as part of the GFC period analysis. 2010 is characterized at least in the Australian context as a period of uncertainty and analysing this period would complement the existing dataset.
Table 1 Sample information

<table>
<thead>
<tr>
<th>Industry\Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Discretionary</td>
<td>11</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Consumer Staples</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Energy</td>
<td>32</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Financials</td>
<td>17</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Healthcare</td>
<td>13</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Industrials</td>
<td>16</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Information Technology</td>
<td>5</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Materials</td>
<td>91</td>
<td>35</td>
<td>18</td>
</tr>
<tr>
<td>Telecommunication Services</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Utilities</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>190</strong></td>
<td><strong>59</strong></td>
<td><strong>31</strong></td>
</tr>
</tbody>
</table>
Table 2 Descriptive Statistics

Panel A: Auditor Characteristics by Year of Listing

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of IPOs</th>
<th>AudSpec</th>
<th>Non AudSpec</th>
<th>Big_4</th>
<th>Non-Big_4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>190</td>
<td>69 (36.32%)</td>
<td>121 (63.68%)</td>
<td>55 (28.95%)</td>
<td>135 (71.05%)</td>
</tr>
<tr>
<td>2008</td>
<td>59</td>
<td>24 (40.68%)</td>
<td>35 (59.32%)</td>
<td>10 (16.95%)</td>
<td>49 (83.05%)</td>
</tr>
<tr>
<td>2009</td>
<td>31</td>
<td>14 (45.16%)</td>
<td>17 (54.84%)</td>
<td>4 (12.90%)</td>
<td>27 (87.10%)</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>107 (38.21%)</td>
<td>173 (61.79%)</td>
<td>79 (26.78%)</td>
<td>201 (75.35%)</td>
</tr>
</tbody>
</table>

Panel B: Underpricing and other control variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Statistic</th>
<th>Pool, t</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP_{it}</td>
<td>Mean (Median)</td>
<td>19.343 (10.000)</td>
<td>24.888* (11.000)</td>
<td>3.650 (0.000)</td>
<td>14.918 (10.000)</td>
</tr>
<tr>
<td>Assets_{it}</td>
<td>Mean (Median)</td>
<td>$114,648,556 ($9,036,014)</td>
<td>$105,434,341 ($9,434,901)</td>
<td>$50,781,409 ($7,204,239)</td>
<td>$296,267,940 ($11,282,635)</td>
</tr>
<tr>
<td>Proceeds_{it}</td>
<td>Mean (Median)</td>
<td>$52,297,150 ($8,000,000)</td>
<td>$42,088,698 ($7,018,484)</td>
<td>$36,744,962 ($8,000,000)</td>
<td>$146,551,356 ($8,000,000)</td>
</tr>
<tr>
<td>Age_{it}</td>
<td>Mean (Median)</td>
<td>1,221.390 (349.000)</td>
<td>1,127.370 (307.000)</td>
<td>1,406.290 (371.000)</td>
<td>1,453.690 (548.000)</td>
</tr>
<tr>
<td>ROA_{it}</td>
<td>Mean (Median)</td>
<td>-16.099 (-8.020)</td>
<td>-14.949 (-7.040)</td>
<td>-22.897 (-12.025)</td>
<td>-10.160 (-9.935)</td>
</tr>
<tr>
<td>Subsidiaries_{it}</td>
<td>Mean (Median)</td>
<td>3.100 (2.000)</td>
<td>3.632 (2.000)</td>
<td>2.271 (2.000)</td>
<td>1.419 (1.000)</td>
</tr>
<tr>
<td>Industry Segments_{it}</td>
<td>Mean (Median)</td>
<td>1.311 (1.000)</td>
<td>1.363 (1.000)</td>
<td>1.237 (1.000)</td>
<td>1.129 (1.000)</td>
</tr>
</tbody>
</table>

*The extent of underpricing in 2007 is statistically different to the extent of underpricing in 2008 and 2009 in tests of means.
Table 3 Bivariate Correlations

<table>
<thead>
<tr>
<th>#</th>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UP_{i,t}</td>
<td>1</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>AudSpec_{i,t}</td>
<td>0.047</td>
<td>1</td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>3</td>
<td>Underwritten_{i,t}</td>
<td>0.069</td>
<td>-0.166**</td>
<td>1</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>LnProceeds_{i,t}</td>
<td>-0.169*</td>
<td>-0.075</td>
<td>0.293**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>LnAssets_{i,t}</td>
<td>-0.050</td>
<td>-0.089</td>
<td>0.313**</td>
<td>0.748**</td>
<td>1</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>6</td>
<td>LnAge_{i,t}</td>
<td>-0.108</td>
<td>-0.077</td>
<td>0.105</td>
<td>0.032</td>
<td>0.106</td>
<td>1</td>
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</tr>
<tr>
<td>7</td>
<td>SQRTSub_{i,t}</td>
<td>-0.010</td>
<td>-0.173**</td>
<td>0.125*</td>
<td>0.407**</td>
<td>0.455**</td>
<td>0.009</td>
<td>1</td>
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<tr>
<td>8</td>
<td>SQRTIndSeg_{i,t}</td>
<td>-0.024</td>
<td>-0.145*</td>
<td>0.194**</td>
<td>0.229**</td>
<td>0.322**</td>
<td>0.056</td>
<td>0.358**</td>
<td>1</td>
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</tr>
<tr>
<td>9</td>
<td>ROA_{i,t}</td>
<td>0.129*</td>
<td>0.039</td>
<td>0.163**</td>
<td>0.215**</td>
<td>0.379**</td>
<td>-0.031</td>
<td>0.074</td>
<td>0.092</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Duration_{i,t}</td>
<td>-0.276**</td>
<td>0.070</td>
<td>-0.186**</td>
<td>-0.171**</td>
<td>-0.285**</td>
<td>0.155**</td>
<td>-0.127*</td>
<td>-0.135*</td>
<td>-0.141*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Bubble_{i,t}</td>
<td>0.160**</td>
<td>-0.057</td>
<td>0.060</td>
<td>0.030</td>
<td>0.043</td>
<td>0.008</td>
<td>0.205**</td>
<td>0.109</td>
<td>0.040</td>
<td>-0.229**</td>
<td>1</td>
</tr>
</tbody>
</table>

Legend: ^ - Numbers shown in the top row correspond to the relevant number in the first column aligned with a specific variable; ** – significant 1% confidence level; * – significant 5% confidence level. See Equation 1 for definitions of variables.
### Table 4 Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pooled Sample</th>
<th>2007 IPOs</th>
<th>2008 &amp; 2009 IPOs</th>
<th>New IPOs</th>
<th>Mature IPOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>AudSpec(_{it})</td>
<td>1.001 (0.318)</td>
<td><strong>0.129</strong> (1.776) (^*)</td>
<td>-0.080 (-0.801)</td>
<td>-0.054 (-0.621)</td>
<td><strong>0.209</strong> (2.640) (^***)</td>
</tr>
<tr>
<td>Underwritten(_{it})</td>
<td>0.091 (1.490)</td>
<td>0.092 (1.155)</td>
<td>0.083 (0.843)</td>
<td>0.116 (1.310)</td>
<td>0.078 (0.947)</td>
</tr>
<tr>
<td>LnProceeds(_{it})</td>
<td>-0.279 (-3.242) (^***)</td>
<td>-0.260 (-2.214) (^**)</td>
<td>-0.331 (-2.435) (^**)</td>
<td>-0.434 (-3.317)</td>
<td>-0.105 (-0.915)</td>
</tr>
<tr>
<td>LnAsset(_{it})</td>
<td>0.003 (0.031)</td>
<td>-0.093 (-0.700)</td>
<td>0.221 (1.469)</td>
<td>0.186 (1.173)</td>
<td>-0.210 (-1.675)</td>
</tr>
<tr>
<td>LnAge(_{it})</td>
<td>-0.059 (-1.019)</td>
<td>0.015 (0.203)</td>
<td><strong>-0.273</strong> (-2.728) (^***)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SQRTSub(_{it})</td>
<td>0.056 (0.822)</td>
<td>0.090 (1.086)</td>
<td>0.015 (0.121)</td>
<td>0.066 (0.635)</td>
<td>0.082 (0.914)</td>
</tr>
<tr>
<td>SQRTIndSeg(_{it})</td>
<td>-0.043 (-0.704)</td>
<td>-0.042 (-0.538)</td>
<td>0.025 (0.227)</td>
<td>-0.084 (-0.915)</td>
<td>0.013 (0.157)</td>
</tr>
<tr>
<td>ROA(_{it})</td>
<td><strong>0.128</strong> (2.087) (^**)</td>
<td><strong>0.129</strong> (1.675)</td>
<td>0.100 (0.910)</td>
<td>0.029 (0.293)</td>
<td>0.166 (2.053)</td>
</tr>
<tr>
<td>Duration(_{it})</td>
<td><strong>-0.260</strong> (-4.202) (^***)</td>
<td><strong>-0.186</strong> (-2.394) (^**)</td>
<td><strong>-0.329</strong> (-3.351) (^***)</td>
<td>-0.146 (-1.575)</td>
<td><strong>-0.334</strong> (-4.145) (^***)</td>
</tr>
<tr>
<td>Bubble(_{it})</td>
<td>0.095 (1.610)</td>
<td></td>
<td></td>
<td>-0.004 (-0.045)</td>
<td><strong>0.200</strong> (2.594) (^**)</td>
</tr>
</tbody>
</table>

**Where:** Values not in brackets are the coefficients on the respective values whilst values in the brackets are the \(t\)-statistic; \(^***\), \(^**\) and \(^*\) - Significance at 1%, 5% and 10% levels (two-tailed tests) respectively; and See Equation 1 for definitions of regression variables.
References


