The effect of mandatory XBRL and IFRS adoption and audit fees
Evidence from the Shanghai Stock Exchange

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Abstract
Purpose – The purpose of this paper is to evaluate the impact of the International Financial Reporting Standards (IFRS) and eXtensible Business Reporting Language (XBRL) on audit fees based on evidence from listed companies operating in an emerging economy. Whilst IFRS constitute high-quality accounting standards, XBRL represents a technology standard that can enhance the usability of IFRS and overall financial reporting transparency.
Design/methodology/approach – Multivariate analyses are used on a sample of 1,798 firm-year observations between 2000 and 2011 from companies listed in the Shanghai Stock Exchange that were subject to XBRL and IFRS adoption mandates.
Findings – The main results suggest that XBRL has a main negative effect on audit fees which is weaker for larger firms. Additionally, the authors find that IFRS increases audit fees for all companies. Whilst this effect is positive for firms of different sizes, it is weaker for larger firms.
Research limitations/implications – Whilst the findings are applicable to the selected sample and may or may not be generaliseable to other economies, they can provide important implications for both regulators and companies that are undertaking IFRS convergence and XBRL implementation projects in developing economies around the world.
Originality/value – This study offers a timely assessment of the economic consequences of IFRS and XBRL on listed companies operating in an emerging economy, in addition to providing an important basis upon which further research can be designed in order to extend the analysis.
Keywords China, IFRS, XBRL, Audit fees, Firm size
Paper type Research paper

1. Introduction
The global financial reporting environment has been undergoing significant changes in the last decade. One of the key changes concerns the adoption of the International Financial Reporting Standards (IFRS). The IFRS are principles-based standards that are developed by the International Accounting Standards Board (IASB) to improve the quality of accounting principles (Chen and Zhang, 2010) and represent uniform global accounting principles which are expected to enhance financial reporting quality (Tyrrall *et al.*, 2007), reduce risk and cost of capital (Leuz and Verrecchia, 2000), facilitate international investment and enhance global economic growth (Street and Bryant, 2000; Pacter, 2001; Ball, 2006; Pickard, 2007; Chen and Zhang, 2010; Peng and Bewley, 2010; De George *et al.*, 2013). In addition to IFRS, other changes concern ongoing efforts to address transparency, efficiency and accuracy problems in relation to financial reporting which are, at least partially, attributable to the formats in which financial reports are produced and disseminated. Existing paper and digital formats (e.g. HTML, PDF, MS Excel) lack interchangeability in the ways in which financial data

are collected, stored, processed, integrated, repurposed and reported. These formats also do not offer sufficient semantics to enable the automated analysis of financial reports, making the realisation of efficient and effective transparency and compliance objectives expensive or even elusive (Debreceny *et al.*, 2010).

The eXtensible Business Reporting Language (XBRL) is a data formatting standard that enables the electronic communication of financial reports (Li *et al.*, 2007; Rezaee, 2009; Troshani and Doolin, 2007; Troshani and Rao, 2007; Troshani and Lymer, 2010). XBRL can enhance the usability of accounting standards such as IFRS (Bergeron, 2003), streamline and integrate information flows amongst heterogeneous organisations by facilitating the exchange of financial data amongst their disparate computer platforms and software applications. In doing so, XBRL can generate enormous efficiencies in the business information supply chain whilst enforcing the application of accounting standards. As a result, XBRL systems address current financial reporting problems including transparency whilst also facilitating company efforts to cost effectively achieve legislative compliance in relation to financial reporting (Abdolmohammadi *et al.*, 2002; Doolin and Troshani, 2004, 2007; Pinsker and Li, 2008; Troshani and Lymer, 2010, 2011; Troshani *et al.*, 2015).

Thus, IFRS and XBRL can have an important impact on auditing functions generally and audit costs specifically. The objective of this paper is to address the following research question:

RQ1. What is the effect of IFRS and XBRL on audit fees? Is such effect moderated by firm size?

We focus on auditing as it constitutes an important activity in the business information supply chain. It evaluates the accuracy and fairness of financial statements relative to a jurisdiction's generally accepted accounting principles (GAAP) and accounting standards (Arens *et al.*, 2007). As a result, auditing enhances the credibility of the firms that produce them. This can, in turn, make it less costly for them to raise capital and achieve investment growth (Khurana and Raman, 2004) whilst also facilitating compliance with financial reporting legislation (Li *et al.*, 2007; Rezaee, 2009). Drawing on the work of De George *et al.* (2013), we argue that examining audit fees is useful as it allows us to gain insight into the effect of IFRS and XBRL on the audit function since audit fees constitute directly measurable and observable cash outflows of audited firms.

To address our research questions we focus on listed companies in China for a number of reasons. Since China has mandated both IFRS and XBRL use for financial reporting for listed firms, it presents an ideal setting to investigate our research questions (XBRLChina, 2004; Li, 2006; Peng and Bewley, 2010; IFRSChina, 2014). Whilst China constitutes a unique setting featuring a single party political system with extensive state ownership of business enterprises and centralised control of economy, it also features many characteristics of emerging economies, including the desire to attract foreign direct investment into China; list Chinese-owned companies overseas; enhance the credibility of the accounting profession; and enhance the infrastructure supporting efficient capital markets (Peng and Bewley, 2010). Emerging economies, including China, anticipate that IFRS adoption constitutes a necessary condition for modernising their economies and capital markets (Peng and Bewley, 2010). Finally, representing the fastest emerging economy, China is having an increasing impact on the world economy, which suggests that IFRS adoption can have important practical implications for investors and academics alike (Peng and Bewley, 2010).

We focus on XBRL adoption in China since XBRL was mandated for use by listed companies in China from April 2004 (XBRLChina, 2004; KPMG, 2011), which makes China one of the early adopters of XBRL.

There are a number of studies that have investigated either IFRS or XBRL use in a number of jurisdictions. For example, prior studies have examined the impact of IFRS on auditing in Australia (De George *et al.*, 2013), China (Wang *et al.*, 2009; Chen and Zhang, 2010; Peng and Bewley, 2010) and European Union (Kim *et al.*, 2012). To our best knowledge, the only study that has empirically examined the impact of XBRL on financial statement auditing is that of Shan and Troshani (2014) that focuses on the impact of XBRL on audit fees on US listed companies during 2009-2011. We have found no study concerning the impact of XBRL and IFRS on audit fees. Consequently, this study fills an important gap by both extending existing literature in relation to the economic impact of XBRL generally with a focus on a mandatory environment in an emerging economy (Rao *et al.*, 2013). Specifically, this study contributes by providing evidence concerning the impact of IFRS-convergent accounting standards and XBRL on financial reporting quality and transparency as measured by audit fees. Specifically, we find that XBRL has a main negative effect on audit fees which is weaker for larger firms. While XBRL is being used by listed firms in China, we also find that IFRS increases audit fees for all companies. This effect is positive for firms of various sizes, though weaker for larger companies. As China is not alone amongst emerging and growing economies worldwide that are considering and adopting both IFRS and XBRL, our findings can, thus, inform the strategies of accounting regulators internationally (Liu *et al.*, 2011).

This study and its findings are important for many reasons. First, whilst studies exist that have examined the impact of IFRS (Chen and Zhang, 2010; Kim *et al.*, 2012; De George *et al.*, 2013) or XBRL use on audit fees (Shan and Troshani, 2014) separately, no research has been found that examines the impact of both XBRL and IFRS on audit fees. This is important as the use of IFRS and XBRL can have offsetting or complementary effects. Additionally, IFRS critics argue that single standards may not be suitable for all jurisdictions and settings, and thus, may not equally improve financial reporting quality and transparency due to specific country differences (Soderstrom and Sun, 2007). This suggests that assessments of IFRS/XBRL practices need to be made on a country-by-country basis and therefore further strengthens the motivation for this study (Nobes, 2006). Second, much of the research on audit fees to date focuses on developed economies including the USA, Australia, Canada and Hong Kong whilst research on emerging economies is limited. By focusing on China, this study is also contributing by improving current understanding concerning the determinants of audit fees in emerging economies (Wang *et al.*, 2009). Thus, we focus on IFRS in China since China's national accounting standards are considered to be substantially converged with IFRS from 2007 by all listed companies (Li, 2006; Peng and Bewley, 2010; IFRSChina, 2014).

This paper is structured as follows. Before examining related literature and developing our hypotheses, we discuss IFRS convergence in China. Research design is subsequently examined before results are discussed and conclusions made.

2. IFRS convergence in China
Whilst over 100 countries have adopted IFRS for listed companies, concerns have emerged that convergence[1] of accounting standards may not necessarily lead to convergence of accounting practices if *de facto* compliance with standards is not achieved (Street and Bryant, 2000). At least in part, these concerns stem from the fact that

the IASB has been influenced by the Anglo-American perspective of countries with highly developed capital markets such as the UK and the USA with lesser developed countries having been neglected (Fritz and Lammle, 2003; Chen and Zhang, 2010).

Emerging economies are of particular concern. Constituting over 80 per cent of IFRS adopters (Deloitte, 2012), these economies may lack the necessary financial reporting infrastructure of accountants, auditors and regulators to support IFRS compliance (Chen and Zhang, 2010). Additionally, the IASB has been criticised for the lack of worldwide enforcement mechanisms for ensuring that its standards work as expected (Ball, 2006).

China constitutes a good example of an emerging and transitional economy that is attempting to converge Chinese GAAP with IFRS. In response to an emerging and rapidly growing stock market and growing demand from foreign investors to invest in Chinese stocks, and the desire for both domestic and foreign investment, the Chinese government undertook a number of reforms to improve the quality of financial reporting and the underlying accounting standards in China. These reforms were conducted in 1992, 1998, 2001 and 2006, each culminating with policies which replaced their predecessors and were widely considered to be in increasingly greater conformity with IFRS (Chen et al., 1999, 2002). For example, inventory valuation using the lower of cost or market value (LCM) was optional in the 1998 GAAP, but was made compulsory in the 2001 GAAP (Chen and Zhang, 2010). Likewise, fair value accounting was not adopted in China, until the 2006 GAAP (Peng and Bewley, 2010).

Whilst significant differences were found in 1992 and 1998 between the Chinese GAAP and IFRS-based earnings reports (Chen et al., 2002), these differences were significantly reduced after the 2001 reforms (Chen and Cheng, 2004). In fact, the 2001 and the 2006 compliance reform policies on accounting practices convergence were found to have made a particular contribution in reducing the differences between the Chinese GAAP- and the IFRS-based earnings and curbing the inconsistencies of the application of these standards (Peng et al., 2008; Chen and Zhang, 2010; Peng and Bewley, 2010). Chen and Zhang (2010) argue that the differences are attributed to the lack of an effective financial reporting infrastructure, low quality of external auditing in China, insufficient IFRS understanding by local professional accountants and opportunistic behaviours of management (Chen and Zhang, 2010).

Nevertheless, the most recent revision of the Chinese GAAP issued in February 2006 is the first that is widely regarded to have a "substantial convergence" with IFRS which is recognised by the IASB (IASB, 2006; Peng and Van der Laan Smith, 2010). Accordingly, "substantial convergence" is defined to mean that principles of recognition, measurement and reporting are applied so as to result in equivalent financial statements whether firms apply the Chinese GAAP or IFRS standards (Li, 2006; Peng and Bewley, 2010). Equivalence means that financial statements prepared using the Chinese GAAP are accepted without the need of restating them in countries that have adopted the IFRS (Peng and Bewley, 2010). Presently, equivalence standing has been reached between China and the Hong Kong Institute of CPAs and with the European Union whilst negotiations are underway with other countries including Australia, Japan, Korea and Russia (Peng and Bewley, 2010; CEC, 2011).

3. Literature and hypotheses development
Theoretical underpinning
According to agency theory, the firm consists of a nexus of contracts between principals (i.e. owners of economic resources including equity or shareholders and debt holders) and the agents (i.e. managers who are responsible to use and control these

resources) (Jensen and Meckling, 1976; Adams, 1994). Agency theory posits that principals do not have access to all available information when decisions are made by agents. This information asymmetry can create an "adverse selection" problem which impairs a principal's ability to determine if agents are, in fact, acting in the best interests of the firm (Jensen and Meckling, 1976). Additionally, agents may face the "moral hazard" (Scapens, 1985) of acting against their principals' interests whilst attempting to maximise their own wealth (Sarens and Abdolmohammadi, 2011) which can be manifested in the form of excessive use of perquisites, asset misappropriation and enhancement of salary (Rediker and Seth, 1995). Taken together, these problems give rise to agency costs which principals attempt to mitigate by establishing monitoring processes such as auditing (Francis and Wilson, 1988). Additionally, whilst agency theory suggests that highly leveraged companies are likely to disclose more information in order to satisfy the needs of the debt holders in order to reduce investor uncertainty and borrowing costs (Watson *et al.*, 2002), debt holders might be concerned about wealth transfers to shareholders (Smith and Warner, 1979) since managers may favour the interests of the shareholders to the detriment of the debt holders (Francis and Wilson, 1988). Consequently, debt holders include restrictive covenants in their contracts, the presence of which can increase agency costs.

As gatekeepers, auditors attempt to protect the interests of shareholders and/or debt holders by monitoring and verifying the actions undertaken by management through financial reporting, internal controls and risk management (Sarens *et al.*, 2009). In this context, Jensen and Meckling (1976, p. 329) argue that the "existence and size of the agency costs depend on the nature of [agent] monitoring costs [...]". Given their duty to inspect firm accounts and financial statements, auditors also have the responsibility to ensure that agents are acting according to the principal's best interest which suggests that auditing is a means for mitigating agency costs (Nikkinen and Sahlström, 2004).

Audit fees constitute "a specific and measurable agency cost" (Leventis *et al.*, 2011, p. 113). In fact, a reduction in audit fees signals that agency costs are reduced (Leventis *et al.*, 2011) and evidence exists that audit fees are affected by agency costs (Gul and Tsui, 2001; Leventis *et al.*, 2011). For example, auditors are likely to spend more time inspecting managers' activities where agency problems are suspected (Dopuch and Simunic, 1982; Nikkinen and Sahlström, 2004; Leventis *et al.*, 2011).

IFRS impact on audit fees
IFRS is likely to have a deep impact on a firm's financial reporting costs (Hail *et al.*, 2010). Regulators and standard setters claim that use of IFRS can enhance the quality and comparability of financial reporting worldwide suggesting that audit fees may be reduced as a result (Kim *et al.*, 2012; De George *et al.*, 2013). Their argument is based on the expectation that IFRS will improve the quality of financial reporting by way of reducing financial misstatements, limiting opportunistic management discretion, improving management accounting decisions and measurement, providing higher quality disclosures reflecting a "true and fair view" of the firm's financial and economic conditions thereby improving compliance (Barth *et al.*, 2008), which taken together can reduce audit risks and audit fees (Kim *et al.*, 2012). However, many firms that are subject to IFRS adoption mandates have raised concerns about IFRS-compliant financial reporting preparation and certification costs (Jermakowicz and Gornik-Tamaszewski, 2006). Arguably, IFRS can result in increases in audit fees since these are determined by the complexity of audit tasks, financial reporting quality and the country's legal regime where audited firms operate (Kim *et al.*, 2012). IFRS can

increase audit complexity which results in higher audit fees (De George *et al.*, 2013) as IFRS adoption may increase audit tasks due to the increase in "information overload" (Choi and Mueller, 1984) as well as the cost of additional complexity that IFRS compliance will bring about.

There are two main factors in relation to IFRS adoption that can impact on audit fees. First, auditors undertake additional effort to become knowledgeable about the new IFRS reporting regime relative to existing GAAP so that they can evaluate the extent to which IFRS has been adequately implemented. Whilst such effort constitutes a one-off cost, IFRS requires disclosure of additional detail (e.g. in footnotes, management's forecasts, and assessment of assets and liabilities) which also need to be certified by auditors (De George *et al.*, 2013). Second, as IFRS standards are principle based, fair-value oriented and comprehensive, increased subjective professional judgement and less prescriptive guidance in accounting measurement and estimates is expected (KPMG, 2007; Deloitte, 2008; Diehl, 2010) which can increase the potential for errors and subsequently the audit effort required to manage increased risk in terms of increased probability of material misstatements and the associated litigation risk (De George *et al.*, 2013).

These factors can jointly contribute to increase compliance uncertainty by firms, as well as the auditors' risk assessment of these firms. Auditors' efforts are likely to increase, as a result, if they are to protect their reputation capital (De George *et al.*, 2013). In fact, a study reporting the experience of IFRS adopters in France found that first time IFRS adopting French firms were perceived to signal an increase in the quality of financial statements (Cormier *et al.*, 2009). Yet in another study, earnings management pervasiveness was found to have increased rather than declined after IFRS was introduced in France (Jeanjean and Stolowy, 2008). In fact, some evidence has already been reported that audit fees increased after IFRS was adopted (Vieru and Schadewitz, 2010).

Additionally, IFRS adopters may incur audit costs to different extents which is, at least in part, affected by their size. This is suggested as IFRS adoption costs vary across firms of different sizes. For example, a survey carried out in relation to the mandatory adoption of IFRS in the EU indicates that IFRS transition costs are expected to add up to 0.31 per cent of revenues for small firms (less than US$700 million in sales) and up to 0.05 per cent of revenues for larger firms (ICAEW, 2007). IFRS reporting costs are "likely to have a fixed component, making certain reports or disclosures particularly burdensome for smaller firms" (Hail *et al.*, 2010, p. 3).

Thus, arguably as IFRS can result in improved reporting quality, audit fees are expected to be reduced. However, IFRS also increases audit complexity which can increase audit fees. The impact of IFRS on audit fees will therefore be determined by which of these opposite pressures dominates (Kim *et al.*, 2012). Hence we hypothesise:

> *H1. Ceteris paribus*, audit fees are affected by the interactive effects of IFRS and firm size.

XBRL impact on audit fees
We argue that auditing of financial statements can be facilitated by increased financial reporting transparency which can be enhanced by XBRL. Whilst transparency represents the extent to which a company provides complete and fair disclosure of clear, relevant, reliable and timely information about its business activities (Arens *et al.*, 2007; Roohani *et al.*, 2009), the aim of auditing is to independently verify the financial statements provided by management (O'Sullivan, 2000). It constitutes a "policing"

function which is part of the regulatory processes in financial reporting (Alleyne *et al.*, 2013). The value of auditing results from the expectation or probability that an auditor will detect and report breaches (or risks thereof) in the client's accounting systems (e.g. inadequate internal controls) and in financial statements (e.g. material omissions or misstatements) (DeAngelo, 1981; Dopuch and Simunic, 1982). Audit failure is deemed to have occurred when GAAPs are not enforced and when auditors fail to qualify audit reports when material misstatements are detected which can mislead users of financial statements (Francis, 2004). Our principal motivation is to determine whether XBRL can assist auditors in carrying out their duties as a result of the increased transparency it offers thereby reducing the information asymmetry that exists between the principal (e.g. firm owners) and the agent (e.g. management), hence reducing agency costs.

XBRL proponents argue that XBRL can positively impact on auditing by reducing its costs and enhancing the efficiency of auditing processes (Pinsker and Li, 2008; Troshani and Lymer, 2010; KPMG, 2012). It can effect greater corporate transparency (Scannell, 2006) whilst reducing the cost of compiling financial information and streamlining internal and external financial reporting for companies. In turn, this reporting process can facilitate both internal and external auditing processes (Premuroso and Bhattacharya, 2008) in relation to the identification and correction of material omissions and misstatements (Khurana and Raman, 2004) resulting in savings in audit fees (Leventis *et al.*, 2011).

Specifically, from the auditor's viewpoint XBRL can reduce audit fees in at least two ways. First, XBRL improves access to and analysis of financial information in financial statements by auditors by facilitating data gathering, integration, and sharing between audit clients (i.e. auditees) and auditors (Xiao *et al.*, 2004; Chen and Liu, 2008; Ye and He, 2008; Gao, 2011; Han and Liu, 2011; Ragothaman, 2012; Jimei *et al.*, 2013; Boyle *et al.*, 2014; Shan, 2014). For example, audit data can be offered as a whole electronically to auditors at the beginning of the audit process which addresses piece-meal data access inefficiencies that characterise traditional audit processes (Brands, 2013; Jimei *et al.*, 2013). By standardising the data format, XBRL creates data access efficiencies that were not previously available to auditors who, although may have had access to financial data electronically, had to undertake manual retrieval of data and analysis to overcome lack of interchangeability and interoperability issues affecting auditee data typically available in different formats (e.g. MS Excel spreadsheets, MS Word documents, PDF and HTML) or platforms and software applications (Peng *et al.*, 2011; Jimei *et al.*, 2013; Liu *et al.*, 2014). Thus, whilst XBRL formatted financial statements are not intended to offer new information beyond what is reported in traditional formats, XBRL facilitates accessibility by facilitating extraction and integration of financial information from financial statements, thereby improving transparency and potentially reducing auditing costs (Peng *et al.*, 2011).

Second, XBRL facilitates analytical reviews carried out by auditors on financial statements that are in XBRL format resulting in reduced labour, time and costs (Xiao *et al.*, 2004; Chen and Liu, 2008; Ye and He, 2008; Gao, 2011; Han and Liu, 2011; Peng *et al.*, 2011; La Rosa and Caserio, 2013; Shan, 2014). That is, as XBRL enables financial data to be captured at a much more granular level (PWC, 2011) for each disclosed item, it facilitates the work of auditors by supporting auditing processes with computers (Bizarro and Garcia, 2010; Eccles and Krzus, 2010). This enables the automatic validation of calculated numbers or compliance with disclosure checklists, improves analysis, enhances audit trails whilst also reducing spreadsheet proliferation (Jimei *et al.*, 2013). To illustrate, when financial data is captured in XBRL format, suitable

XBRL-enabled applications or even publicly available tools (e.g. available at the Shanghai Stock Exchange (SHSE) website) can be used to facilitate auditing by quickly identifying anomalies that might be indicative of financial reporting fraud. For example, financial statement data in XBRL format can be quickly analysed to identify patterns of risk indicators or potentially faulty internal controls over financial reporting that might suggest firms may be engaging in earnings management (Peng *et al.*, 2011). Specific examples include high proportions of off-balance-sheet transactions, understatement and overstatement of earnings based on the level of discretionary (abnormal) accruals (e.g. accounting policies that increase reported book earnings and attempts to minimise taxable income), compensation incentives that do not meet analysts' earnings targets (Xiao *et al.*, 2004; Chen and Liu, 2008; Ye and He, 2008; Gao, 2011; Han and Liu, 2011; Holzinger, 2013; Roselli, 2013; Tysiac, 2013; Boyle *et al.*, 2014; Shan, 2014). Whilst these auditing analyses can be carried out with traditional financial statements, they are likely to be time-consuming, error-prone and costly (Peng *et al.*, 2011).

There is evidence to suggest that filing in XBRL format is improving the quality of financial information in China (Kernan, 2008; Zion *et al.*, 2008; Li *et al.*, 2013; Rao *et al.*, 2013; Wang *et al.*, 2014). For example drawing on evidence from listed companies in China, Peng *et al.* (2011) show that total accruals in the post-XBRL implementation period is lower relative to that of the pre-XBRL implementation period. Thus, XBRL can facilitate auditing and potentially reduce audit-related costs, resulting in lower audit fees (Leventis *et al.*, 2011). In this study, we deliberately focus our attention on publicly listed firms and auditing fees paid to external auditors, which is particularly important given the potential agency costs that may arise as a direct result of the separation of firm ownership and management (Francis, 2004).

Current research has found that a significant correlation exists between audit fees and firm size, though results are mixed (Simunic, 1980; Wallace, 1984; Firth, 1985; Casterella *et al.*, 2004; Fleischer and Goettsche, 2012; Fung *et al.*, 2012). For instance, some studies have found that audit fees are inversely related to firm size (e.g. Simunic, 1980; Wallace, 1984) which is attributed to a firm's accounting information systems and internal audit functions. For example, larger clients usually benefit from more sophisticated accounting information systems and more efficient internal audit functions than their smaller counterparts, which can facilitate external auditing whilst also enabling external auditors to taking advantage of the work carried out by internal auditors thereby reducing audit fees. Also, larger firms are likely to have more human and financial resources to support XBRL implementations relative to smaller firms. It follows that larger firms are more likely to incorporate XBRL into their business reporting processes (than their smaller counter parts), which in turn can make their auditors more likely to benefit from XBRL use resulting in reduced audit costs. Furthermore, larger firms have stronger bargaining power than smaller firms which enables the former to increase the scale of audit fee discounts (Casterella *et al.*, 2004; Fung *et al.*, 2012).

Conversely, other studies have found that a positive relationship exists between audit fees and firm size (e.g. Firth, 1985; Fleischer and Goettsche, 2012) which is attributed to the inherent complexity (Firth, 1985), risk (Firth, 1985) and the political visibility of larger firms relative to smaller firms (Premuroso and Bhattacharya, 2008). Increasing complexity can make it harder for external auditors to audit the accounts of larger firms and detect fraud (Firth, 1985). Furthermore, external auditors may charge large firms a premium when they perceive the audit to be risky (Reynolds and Francis, 2001; Khadaroo, 2005). Risk may be driven by potential litigation costs and loss of

goodwill (Firth, 1985). Also, larger firms are more likely to receive more public attention since they are more politically prominent than smaller firms (Meek *et al.*, 1995; Marston and Polei, 2005; Premuroso and Bhattacharya, 2008). Consequently, larger firms often respond to public scrutiny pressures by disclosing additional information beyond what is legally required which, in turn, can increase the external auditors' work, also leading to higher audit fees. Based on these arguments, we, thus, hypothesise that:

> *H2. Ceteris paribus*, audit fees are affected by the interactive effects of XBRL and firm size.

4. Research design
Data
This study investigates the impact of XBRL and IFRS on audit fees with data sourced from listed companies in the SHSE. The SHSE became the world's sixth largest stock market with a market capitalisation of US\$2.3 trillion as of the end of 2011 and is treated as the vane of economic reform and capital market in China.

The data for this study were sourced from the Thomson Reuters database. As shown in Figure 1, the duration of 12 years commencing in 2000 until 2011 was selected which includes the time spans of 2000-2003 and 2004-2011, denoted as pre-XBRL and post-XBRL mandate, respectively (XBRLChina, 2004), and the time spans of 2000-2006 and 2007-2011 which are denoted as pre-IFRS and post-IFRS convergence, respectively.

As shown in Table I, a total of 9,645 listed companies on SHSE issued A-Shares between 2000 and 2011. However, since reporting audit fees is voluntary, many Chinese companies do not disclose audit fees (Lin and Liu, 2009) which results in a significant reduction in observations. After removing missing data, financial institutions and insurance companies, the final data set consists of 1,798 firm-year observations.

Dependent variable
Prior studies have commonly used audit fees as a proxy of audit cost in firms (e.g. O'Sullivan, 2000; Boo and Sharma, 2008; Elder *et al.*, 2009; Leventis *et al.*, 2011; Zaman *et al.*, 2011; Fleischer and Goettsche, 2012). Following these studies, we use the natural logarithm of total audit fees (AUDITFEES) paid by company i in fiscal year t as the dependent variable.

Independent variables
Independent variables in this study consist of XBRL, IFRS and FIRMSIZE. Following Premuroso and Bhattacharya (2008), XBRL is a dichotomous variable to measure whether the company files its financial statements in XBRL format, coded as 1 if the company is an XBRL filer for the years after the XBRL mandate came into effect, i.e., 2004 onwards, 0 otherwise for the years prior to the XBRL mandate. According to
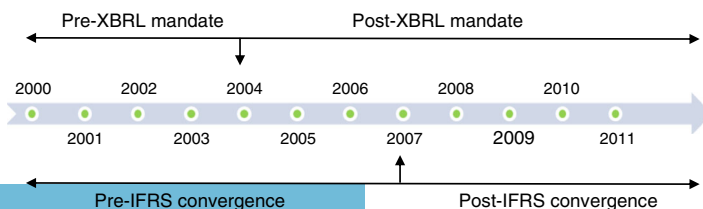

Figure 1.
XBRL mandate and
IFRS convergence
timelines in China

	No. of observations
Data	
No. of A-shares on SHSE at the end of 2000	572
No. of A-shares on SHSE at the end of 2001	646
No. of A-shares on SHSE at the end of 2002	715
No. of A-shares on SHSE at the end of 2003	780
No. of A-shares on SHSE at the end of 2004	837
No. of A-shares on SHSE at the end of 2005	834
No. of A-shares on SHSE at the end of 2006	842
No. of A-shares on SHSE at the end of 2007	860
No. of A-shares on SHSE at the end of 2008	864
No. of A-shares on SHSE at the end of 2009	870
No. of A-shares on SHSE at the end of 2010	894
No. of A-shares on SHSE at the end of 2011	931
Less: missing, financial institutions and insurance companies	(7,847)
Total firm-year observations	1,798
Distribution of observation by year	
Year 2000	22
Year 2001	29
Year 2002	89
Year 2003	153
Year 2004	158
Year 2005	163
Year 2006	173
Year 2007	174
Year 2008	193
Year 2009	204
Year 2010	215
Year 2011	225
Total firm-year observations	1,798

Table I.
Distribution of
observations

Liu *et al.* (2011), IFRS is a dichotomous variable that measures whether financial statements are prepared in accordance with IFRS, i.e., coded as 1 when companies lodge their financial statements for the years post-IFRS convergence, i.e., 2007 onwards, 0 otherwise for the years prior to IFRS convergence. The relationship between firm size and audit quality has been widely examined in previous research (Abbott *et al.*, 2007; Gul *et al.*, 2007; Premuroso and Bhattacharya, 2008). Consistent with prior research, in this study, we measure firm size (FIRMSIZE) as the natural logarithm of total assets of company *i* at the end of fiscal year *t*.

Control variables
Consistent with prior related research, we define the control variables as follows. Change of earnings per share (ΔEPS) is computed as the difference between EPS for company *i* at the end of fiscal year *t* and EPS for company *i* at the end of fiscal year *t*−1 (Chen and Zhang, 2010); change of sales ratio (ΔSALES) is calculated as the difference between sales for company *i* at the end of fiscal year *t* and sales for company *i* at the end of fiscal year *t*−1, divided by sales for company *i* at the end of fiscal year *t*−1 (Houqe *et al.*, 2012); debt-to-equity ratio (DERATIO) is measured as the ratio of long-term debt to total equity for company *i* at the end of fiscal year *t* (Seetharaman *et al.*, 2002); Tobin's *Q* (TOBINSQ)

represents a market performance indicator and is computed as the ratio of market value of stock and book value of debt, divided by book value of total assets, for company i at the end of fiscal year t (Shan, 2014); Big 4 auditor (BIG4) is coded as 1 if the company is audited by a Big 4 auditor, 0 otherwise (Premuroso and Bhattacharya, 2008); year dummy (YEAR) represents the year effect reflecting the years between 2000 and 2011; industry dummy (INDUSTRY) reflects the company's industry in accordance with the industry classification of the China Securities Regulatory Commission.

Model development and diagnostics
This study builds on the model of Shan and Troshani (2014) as the basic model to examine the hypotheses and investigate whether there is an interaction between IFRS and XBRL use and firm size on firm audit fees in the selected SHSE firms (see Table I):

$$\begin{aligned}
\text{AUDITFEES}_i = {} & \alpha + \beta_1\text{IFRS}_i + \beta_2\text{XBRL}_i + \beta_3\text{FIRMSIZE}_i + \beta_4\text{IFRS}_i \times \text{FIRMSIZE}_i \\
& + \beta_5\text{XBRL}_i \times \text{FIRMSIZE}_i + \beta_6\Delta\text{EPS}_i + \beta_7\Delta\text{SALES}_i + \beta_8\text{DERATIO}_i \\
& + \beta_9\text{TOBINSQ}_i + \beta_{10}\text{BIG4}_i + \gamma_j\sum_{j=1}^{8}\text{YEAR}_i + \eta_k\sum_{k=1}^{11}\text{INDUSTRY}_i + \varepsilon_i
\end{aligned}$$

(1)

We extend the work of Shan and Troshani (2014) by investigating the interaction of IFRS and firms size, in addition to the interaction of XBRL and firm size in an emerging economy, namely, China.

5. Results
Descriptive statistics
The descriptive statistics of key variables in our model are provided in Table II. Accordingly, the mean (median) for audit fees is RMB172,819 (129,314) for all years, with a mean (median) of RMB125,492 (102,744) and RMB185,350 (137,310) for the pre- and post-XBRL mandate periods, respectively, and a mean (median) of RMB131,926 (101,722) and RMB215,346 (151,752) for the pre- and post-IFRS convergence periods, respectively. The mean (median) for firm size is RMB321,980,003 (288,440,678) for all years, with a mean (median) of RMB183,917,896 (205,303,514) and RMB366,679,967 (338,488,271) for the pre- and post-XBRL mandate years, respectively; and a mean (median) of RMB217,998,775 (222,402,642) and RMB447,863,923 (421,782,358) for the pre- and post-IFRS convergence periods, respectively (see Figure 1)[2].

The descriptive statistics of the control variables are shown in Panel A of Table II. The mean (median) for the change of EPS is 0.01 (0.003) for all years with a range of −0.18 to 0.19, and the mean (median) for the change of sales ratio is 0.27 (0.2) for all years with a range of −0.74 to 3.74. The mean (median) for the long-term debt-to-equity ratio is 0.35 (0.11) for all years with a range of 0.00 to 3.91. The mean (median) for Tobin's Q, the market performance indicator, is 1.28 (1.04).

Model diagnostics and multivariate analyses
Model diagnostics consist of the Pearson correlation diagnostic (PCD) and the variance inflation factor (VIF) test. First, the PCD coefficients presented in Panel A of Table III indicate that the values of any pairs of independent variables are well below the critical value of 0.8. Second, the VIF test is also conducted, as multicollinearity may still exist

Table II.
Descriptive statistics for key variables[a]

Panel A: All years 2000-2011

Key variable	Mean	Med	Min	Max	SD
AUDITFEES	12.06	11.77	10.15	16.22	1.2
AUDITFEES (RMB)	172,819	129,314	25,591	11,072,776	
FIRMSIZE	19.59	19.48	15.2	24.01	1.56
FIRMSIZE (RMB)	321,980,003	288,440,678	3,992,787	26,755,342,233	
ΔEPS	0.01	0.003	−0.18	0.19	0.04
ΔSALES	0.27	0.2	−0.74	3.74	0.53
DERATIO	0.35	0.11	0.00	3.91	0.63
TOBINSQ	1.28	1.04	0.41	2.78	0.77

Panel B: XBRL timespan

	Pre-XBRL mandate					Post-XBRL mandate				
Key variable	Mean	Med	Min	Max	SD	Mean	Med	Min	Max	SD
AUDITFEES	11.74	11.54	10.15	16.22	1.09	12.13	11.83	10.15	16.22	1.22
AUDITFEES (RMB)	125,492	102,744	25,591	11,072,756		185,350	137,310	25,591	11,072,776	
FIRMSIZE	19.03	19.14	15.2	23.2	1.18	19.72	19.64	15.2	24.01	1.6
FIRMSIZE (RMB)	183,917,896	205,303,514	3,992,787	11,902,329,807		366,679,967	338,488,271	3,992,787	26,755,342,233	
ΔEPS	0.0001	0.001	−0.18	0.19	0.03	0.007	0.005	−0.18	0.19	0.05
ΔSALES	0.28	0.18	−0.74	3.74	0.53	0.27	0.21	−0.74	3.74	0.54
DERATIO	0.26	0.07	0.00	3.91	0.59	0.37	0.13	0.00	3.91	0.64
TOBINSQ	1.29	1.1	0.41	2.78	0.73	1.27	1.02	0.41	2.78	0.78

Panel C: IFRS timespan

	Pre-IFRS convergence					Post-IFRS convergence				
Key variable	Mean	Med	Min	Max	SD	Mean	Med	Min	Max	SD
AUDITFEES	11.79	11.53	10.15	16.22	1.13	12.28	11.93	10.15	16.22	1.22
AUDITFEES (RMB)	131,926	101,722	25,591	11,072,776		215,346	151,752	25,591	11,072,776	
FIRMSIZE	19.2	19.22	15.2	23.8	1.27	19.92	19.86	15.2	24.01	1.69
FIRMSIZE (RMB)	217,998,775	222,402,642	3,992,787	21,687,458,910		447,863,923	421,782,358	3,992,787	26,755,342,233	
ΔEPS	0.001	0.002	−0.18	0.19	0.03	0.01	0.007	−0.18	0.19	0.05
ΔSALES	0.28	0.2	−0.74	3.74	0.54	0.27	0.2	−0.74	3.73	0.53
DERATIO	0.28	0.08	0.00	3.91	0.55	0.41	0.15	0.00	3.91	0.69
TOBINSQ	1.15	0.93	0.41	2.78	0.7	1.37	1.12	0.41	2.78	0.81

Notes: [a]AUDITFEES = natural logarithm of audit fees; FIRMSIZE = natural logarithm of value of total assets at the end of fiscal year; ΔEPS = change of EPS, $EPS_t - EPS_{t-i}$; ΔSALES = change of sales ratio, $(SALES_t - SALES_{t-1})/SALES_{t-i}$; DERATIO = long-term debt to total equity; TOBINSQ = Tobin's Q, market value of stock and book value of debt divided by book value of total assets

Panel A: Pearson correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) XBRL	1.000							
(2) IFRS	0.495***	1.000						
(3) FIRMSIZE	0.164***	0.258***	1.000					
(4) ΔEPS	0.087***	0.136***	0.168***	1.000				
(5) ΔSALES	0.002	−0.004	0.237***	0.349***	1.000			
(6) DERATIO	0.065**	0.08**	0.352***	−0.003	0.153***	1.000		
(7) TOBINSQ	−0.004	0.144***	−0.281***	0.2***	0.045****	−0.214***	1.000	
(8) BIG4	−0.046****	−0.006	0.297***	0.094***	0.113***	0.182***	−0.088***	1.000

Panel B: VIF diagnostic

	XBRL	IFRS	FIRMSIZE	ΔEPS	ΔSALES	DERATIO	TOBINSQ	BIG4
VIF	1.34	1.49	1.43	1.09	1.06	1.08	1.27	1.16

Notes: [a]XBRL = filing financial statements in XBRL format, coded as 1 if company is an XBRL filer, 0 otherwise; IFRS = preparing financial statements in accordance with IFRS, coded as 1 if IFRS is applied, 0 otherwise; FIRMSIZE = natural logarithm of value of total assets at the end of fiscal year; ΔEPS = change of EPS, EPS_t–EPS_{t-1}; ΔSALES = change of sales ratio, $(SALES_t–SALES_{t-1})/SALES_{t-1}$; DERATIO = long-term debt to total equity; TOBINSQ = Tobin's Q, market value of stock and book value of debt divided by book value of total assets; BIG4 = Big 4 auditor, coded 1 if the firm is audited by a Big4 auditor, 0 otherwise; [b]The critical value of the VIF to test for multicollinearity is 10. Gujarati (2003) suggests that there is no evidence of multicollinearity unless the VIF of a variable exceeds 10. All values used in this study were well below this critical level; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.10$ (two-tailed p-values are used in determining significance)

Table III.
Collinearity
diagnostics[a,b]

even if the correlation value is small (Gujarati, 2003). The results, reported in Panel B of Table III, show that the largest VIF is 1.49 and that the VIFs of all other independent variables are well below the critical value of 10. Thus, the regression model has no evidence of multicollinearity.

Table IV provides the regression results of the multivariate model to examine the impact of independent variables (Column (1)) and the interactive effects of XBRL and IFRS with firm size (Column (2)) on audit fees. The regression results are characterised by an adjusted R^2 of 0.5582 with an F-statistic of 284.8 and an adjusted R^2 of 0.5621 with an F-statistic of 231.64, respectively[3]. The high adjusted R^2s and F-statistics suggest that the dependent variable – AUDITFEES is well explained by the independent variables and the interactive effects of XBRL and IFRS with firm size.

The results, shown in Column (1) of Table IV, reveal a positive coefficient for IFRS with a statistical significance ($\beta = 0.195$, $t = 4.29$, $p < 0.001$). We infer that the significantly positive relationship between IFRS convergence and audit fees is caused by the complexity of audit tasks, the quality of financial statements and legal regime in China (Kim *et al.*, 2012). These complex tasks can increase the number of hours worked by external auditors and additional information disclosure that IFRS compliance entails (Choi and Mueller, 1984; De George *et al.*, 2013).

The results indicate a weakly negative coefficient for XBRL ($\beta = -0.114$, $t = -1.88$, $p < 0.1$). This suggests that the auditing of financial statements of listed companies in XBRL format was facilitated. Consequently, XBRL has contributed by reducing auditing costs by improving accessibility and disclosure and facilitating analytical reviews carried out by auditors on financial statements that are in XBRL format resulting in reduced costs of financial statement auditing as also evidenced across a number of studies focusing on XBRL adoption in China and indicative XBRL benefits on financial statement auditing (Xiao *et al.*, 2004; Chen and Liu, 2008; Kernan, 2008;

Independent variable	Expected sign	Model without interactive effect Column (1)		Model with interactive effect Column (2)	
		β	t	β	t
Intercept	n/a	3.744	14.26***	3.381	4.26***
IFRS	−	0.195	4.29***	2.822	4.5***
XBRL	−	−0.114	−1.88****	−1.759	−1.83****
FIRMSIZE	+	0.407	29.61***	0.426	10.25***
IFRS × FIRMSIZE	?			−0.135	−4.2***
XBRL × FIRMSIZE	?			0.085	1.7****
ΔEPS	?	−0.865	−2.42*	−0.85	−2.38*
ΔSALES	?	−0.0003	−0.28	−0.0003	−0.28
DERATIO	?	0.078	3.99***	0.077	3.96***
TOBINSQ	?	0.006	2.5*	0.005	2.11*
BIG4	?	1.018	21.26***	1.013	21.25***
Year effect		Included		Included	
Industry effect		Included		Included	
Adjusted R^2		0.5582		0.5621	
F-statistic		284.8***		231.64***	
Observation		1,798		1,798	

This table reports the results of the pooled OLS regression models:

$$\mathrm{AUDITFEES}_i = \alpha + \beta_1 \mathrm{IFRS}_i + \beta_2 \mathrm{XBRL}_i + \beta_3 \mathrm{FIRMSIZE}_i + \beta_4 \mathrm{IFRS}_i \times \mathrm{FIRMSIZE}_i$$

$$+ \beta_5 \mathrm{XBRL}_i \times \mathrm{FIRMSIZE}_i + \beta_6 \Delta \mathrm{EPS}_i + \beta_7 \Delta \mathrm{SALES}_i + \beta_8 \mathrm{DERATIO}_i$$

$$+ \beta_9 \mathrm{TOBINSQ}_i + \beta_{10} \mathrm{BIG4}_{ii} + \gamma_j \sum_{j=1}^{8} \mathrm{YEAR}_i + \eta_k \sum_{k=1}^{11} \mathrm{INDUSTRY}_i + \varepsilon_i \qquad (1)$$

where AUDITFEES = natural logarithm of audit fees; IFRS = preparing financial statements in accordance with IFRS, coded as 1 if IFRS is applied, 0 otherwise; XBRL = filing financial statement in XBRL format, coded as 1 if company is an XBRL filer, 0 otherwise; FIRMSIZE = natural logarithm of value of total assets at the end of fiscal year; ΔEPS = change of EPS, $\mathrm{EPS}_t - \mathrm{EPS}_{t-1}$; ΔSALES = change of sales ratio, $(\mathrm{SALES}_t - \mathrm{SALES}_{t-1})/\mathrm{SALES}_{t-1}$; DERATIO = long-term debt to total equity; TOBINSQ = Tobin's Q, market value of stock and book value of debt divided by book value of total assets; BIG4 = BIG4 = Big 4 auditor, coded 1 if the firm is audited by a Big4 auditor, 0 otherwise; Year dummy (YEAR) represents dummy variables that reflect the years between 2000 and 2011; Industry dummy (INDUSTRY) reflects the company's industry in accordance with the industry classification of the CSRC.

Table IV.
Regression results

Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.10$. All tests are two-tailed

Ye and He, 2008; Zion *et al.*, 2008; Gao, 2011; Han and Liu, 2011; Peng *et al.*, 2011; Jimei *et al.*, 2013; Li *et al.*, 2013; Rao *et al.*, 2013; Liu *et al.*, 2014; Wang *et al.*, 2014). Additionally, the internal controls of filers were enhanced, which may suggest that other relevant costs in relation to auditing, such as verification costs and substantive tests were reduced (Chen and Liu, 2008; Rezaee, 2009; Gao, 2011; Han and Liu, 2011; Chen and Rezaee, 2012). The positive association between firm size and XBRL on audit fees may be indicative of firm size effects, that is, large companies are more likely to have more complex accounts, transactions, as well as a higher risk in potential litigation and goodwill loss (Firth, 1985) and higher political costs due to public visibility (Premuroso and Bhattacharya, 2008) than smaller companies.

As far as *H1* is concerned, the results, shown in Column (2) of Table IV, reveal that IFRS increases audit fees for all firms, with the negative coefficient for

IFRS×FIRMSIZE ($\beta = -0.135$, $t = -4.2$, $p < 0.001$) indicating that this effect is weaker for larger firms. Thus, *H1* is supported. One possible way to explain this could be that whilst IFRS might increase firms' audit fees, larger firms have a stronger bargaining power and thus could be in a better position to negotiate better terms with audit firms. This may explain why the positive association between IFRS and audit fees is weaker amongst large firms. Yet another way to explain this finding could be that large firms are more likely to have more effective corporate governance mechanisms in place which can reduce the positive association between IFRS and their audit fees.

With the *H2* concerning the interactive impact of XBRL and firm size on audit fees, we find a weak correlation between the XBRL × FIRMSIZE and AUDITFEES ($\beta = 0.085$, $t = 1.7$, $p < 0.1$). Although the coefficient is incremental, the combined values of the coefficients (-1.248) for XBRL, FIRMSIZE and XBRL × FIRMSIZE were clearly reduced since XBRL filing was mandated in China. This conclusion is evident by the coefficient of FIRMSIZE and the coefficient of XBRL × FIRMSIZE resulting in a decrease of 293 per cent. Thus, our results indicate that XBRL has a main negative effect on audit fees which is weaker for larger firms. Thus, *H2* is supported. Possible explanations of the positive coefficient might be related to the set-up and training costs and time required in the short-term which might be more substantial for larger firms; the coefficient is likely to become negative in the longer term (Shan *et al.*, 2015).

With the control variables, we find that the DERATIO, TOBINSQ and BIG4 are positively correlated with audit fees, whereas ΔEPS reveals negative associations. The other control variable, ΔSALES, is found to have no impact. Year dummies are significant for all years except 2006, 2008 and 2009.

Robustness checks
The robustness of our primary results was evaluated in five ways. First, Ramsey's Regression Specification Error Test (RESET) was conducted to determine the potential of nonlinear partial effects of omitted variables in the regression model. The RESET complete the second, third and fourth powers of fitted variables. The results (not reported in this paper) show that individual *t*-statistics are insignificant, which indicate that there is no nonlinear effect. This confirms that the linear regression model is a statistically appropriate model specification.

Second, we winsorized all continuous variables at the 1st and 99th percentile to assess the potential impact of outliers. The results (not reported in this paper) indicate that there are no differences with the primary findings.

Third, we regrouped our data set by firm size (FIRMSIZE), i.e., a data set comprising 899 observations that FIRMSIZE is greater than the median and another data set comprising 899 observations that FIRMSIZE is smaller than the median. The results (not reported in this paper) indicate that there are no differences with the primary findings, except the insignificant coefficient of IFRS×FIRMSIZE for smaller companies. This finding confirms our primary finding for *H1*, i.e., IFRS reporting costs become a burden for smaller companies (Hail *et al.*, 2010).

Fourth, prior studies conduct change analyses (Kim *et al.*, 2012; Holm and Thinggaard, 2014). For example, Kim *et al.* (2012) examine whether the change of audit fees is associated with changes of the independent variables with the intention of mitigating concerns about potential problems of correlated omitted variables. Similarly, Holm and Thinggaard (2014) modified a change model of audit fees using first-differences over time of the variables. Accordingly, we develop a change model to test both *H1* and *H2* and investigate whether and how change variables are different from

our primary results. The change model (Model (2)) is specified by computing change in the variables that appear in Model (1):

$$\Delta \text{AUDITFEES}_i = \alpha + \beta_1 \text{IFRS}_i + \beta_2 \text{XBRL}_i + \beta_3 \Delta \text{FIRMSIZE}_i$$

$$+ \beta_4 \text{IFRS}_i \times \Delta \text{FIRMSIZE}_i + \beta_5 \text{XBRL}_i \times \Delta \text{FIRMSIZE}_i$$

$$+ \beta_6 \Delta \text{EPS}_i + \beta_7 \Delta \text{SALES}_i + \beta_8 \Delta \text{DERATIO}_i + \beta_9 \Delta \text{TOBINSQ}_i$$

$$+ \beta_{10} \text{BIG4}_i + \gamma_j \sum_{j=1}^{8} \text{YEAR}_i + \eta_k \sum_{k=1}^{11} \text{INDUSTRY}_i + \varepsilon_i \quad (2)$$

Table V reports the results of the change model (Model (2)), focusing on the testing of H1 and H2.

Independent variable	Expected sign	Change model with interactive effect	
		β	t
Intercept	n/a	11.285	7.1***
IFRS	−	0.421	7.31***
XBRL	−	−0.123	−1.83****
ΔFIRMSIZE	+	0.011	5.22***
IFRS × ΔFIRMSIZE	?	−0.236	−2.04*
XBRL × ΔFIRMSIZE	?	0.127	1.71****
ΔEPS	?	0.649	1.17
ΔSALES	?	−0.01	−0.21
ΔDERATIO	?	0.011	0.18
ΔTOBINSQ	?	−0.016	−0.49
BIG4	?	1.584	30.37***
Year effect		Included	
Industry effect		Included	
Adjusted R^2		0.3755	
F-statistic		104.59***	
Observation		1,724	

This table reports the results of the pooled OLS regression models:

$$\Delta \text{AUDITFEES}_i = \alpha + \beta_1 \text{IFRS}_i + \beta_2 \text{XBRL}_i + \beta_3 \Delta \text{FIRMSIZE}_i + \beta_4 \text{IFRS}_i \times \Delta \text{FIRMSIZE}_i$$

$$+ \beta_5 \text{XBRL}_i \times \Delta \text{FIRMSIZE}_i + \beta_6 \Delta \text{EPS}_i + \beta_7 \Delta \text{SALES}_i + \beta_8 \Delta \text{DERATIO}_i$$

$$+ \beta_9 \Delta \text{TOBINSQ}_i + \beta_{10} \text{BIG4}_{ii} + \gamma_j \sum_{j=1}^{8} \text{YEAR}_i + \eta_k \sum_{k=1}^{11} \text{INDUSTRY}_i + \varepsilon_i \quad (2)$$

where $\Delta \text{AUDITFEES}$ = change of the natural logarithm of audit fees, $\Delta \text{AUDITFEES}_t$–$\Delta \text{AUDITFEES}_{t-1}$; IFRS = preparing financial statements in accordance with IFRS, coded as 1 if IFRS is applied, 0 otherwise; XBRL = filing financial statement in XBRL format, coded as 1 if company is an XBRL filer, 0 otherwise; $\Delta \text{FIRMSIZE}$ = change of the natural logarithm of value of total assets at the end of fiscal year, $\Delta \text{FIRMSIZE}_t$–$\Delta \text{FIRMSIZE}_{t-1}$; ΔEPS = change of EPS, EPS_t–EPS_{t-1}; ΔSALES = change of sales ratio, SALES_t–SALES_{t-1}; $\Delta \text{DERATIO}$ = change of the ratio of long-term debt to total equity, $\Delta \text{DERATIO}_t$–$\Delta \text{DERATIO}_{t-1}$; $\Delta \text{TOBINSQ}$ = change of Tobin's Q, market value of stock and book value of debt divided by book value of total assets, $\Delta \text{TOBINSQ}_t$–$\Delta \text{TOBINSQ}_{t-1}$; BIG4 = BIG4 = Big 4 auditor, coded 1 if the firm is audited by a Big4 auditor, 0 otherwise; Year dummy (YEAR) represents dummy variables that reflect the years between 2000 and 2011; Industry dummy (INDUSTRY) reflects the company's industry in accordance with the industry classification of the CSRC.
Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.10$. All tests are two-tailed

Table V.
Robustness check:
change analysis

We find that the change model results are consistent with the primary results (Table IV). That is, we find a negative coefficient for IFRS×FIRMSIZE ($\beta = -0.236$, $t = -2.04$, $p < 0.05$) and a weak correlation between the XBRL×FIRMSIZE and AUDITFEES ($\beta = 0.127$, $t = 1.71$, $p < 0.1$). These results indicate that our previous interpretation of the interactive effects in Table IV is accurate.

Fifth, prior studies indicate that corporate governance factors influence firms' financial reporting quality and audit fees (Cohen *et al.*, 2004; Larcker and Richardson, 2004). For example, Cohen *et al.* (2004) argue that corporate governance plays an important role in ensuring the quality of the financial reporting process. Larcker and Richardson (2004) include corporate governance variables to examine their effects of audit fees. Similarly, Shan (2014) investigates whether audit quality is affected by internal governance mechanisms. Accordingly, we extend our model (i.e. Model (1)) with two corporate governance factors of board characteristics as control variables. Consistent with prior literature these factors are board independence (BDINDP); and supervisory board size (SBSIZE). These variables represent the typical characteristics of the two-tier board system in China (Shan and Round, 2012; Shan, 2013). BDINDP is measured as the proportion of the number of independent directors to the total number of directors on the board (Larcker and Richardson, 2004), whereas SBSIZE represents the total number of supervisors serving on the supervisory board (Shan, 2013; Shan, 2014). Our empirical model is modified as follows:

$$\text{AUDITFEES}_i = \alpha + \beta_1\text{IFRS}_i + \beta_2\text{XBRL}_i + \beta_3\text{FIRMSIZE}_i + \beta_4\text{IFRS}_i \times \text{FIRMSIZE}_i$$
$$+ \beta_5\text{XBRL}_i \times \text{FIRMSIZE}_i + \beta_6\Delta\text{EPS}_i + \beta_7\Delta\text{SALES}_i$$
$$+ \beta_8\text{DERATIO}_i + \beta_9\text{TOBINSQ}_i + \beta_{10}\text{BIG4}_i + \beta_{11}\text{BDINDP}_i$$
$$+ \beta_{12}\text{SBSIZE}_i + \gamma_j \sum_{j=1}^{8} \text{YEAR}_i + \eta_k \sum_{k=1}^{11} \text{INDUSTRY}_i + \varepsilon_i \qquad (3)$$

The results of Column (1) of Table VI indicate a positive coefficient for IFRS ($\beta = 0.269$, $t = 5.43$, $p < 0.001$) and a weakly negative coefficient for XBRL ($\beta = -0.112$, $t = -1.69$, $p < 0.1$), and the results of Column (2) report a weakly negative coefficient for IFRS×FIRMSIZE ($\beta = -0.065$, $t = -1.73$, $p < 0.1$) and a weakly positive coefficient for XBRL×FIRMSIZE ($\beta = 0.104$, $t = 1.7$, $p < 0.1$). These findings are consistent with our primary results. We also note that both corporate governance variables, i.e. BDINDP and SBSIZE, are not significant in either model (see Columns (1) and (2) of Table VI). Therefore, we conclude that the primary results are not influenced by corporate governance variables.

6. Conclusion
We set out to investigate the following research question:

RQ1. What is the effect of IFRS and XBRL on audit fees? Is such effect moderated by firm size?

Whilst IFRS constitute high quality accounting standards, XBRL represents a technology standard that can enhance IFRS usability. With the increasing importance of auditing, we argue that IFRS and XBRL can affect auditing functions amongst companies that have adopted them and have offsetting impacts. Specifically, in this paper we have assessed the impact of IFRS and XBRL on audit fees by using evidence from companies listed in the SHSE in China. There is paucity of research concerning the

Independent variable	Expected sign	Model without interactive effect Column (1)		Model with interactive effect Column (2)	
		β	t	β	t
Intercept	n/a	4.029	13.22***	4.934	4.98***
IFRS	−	0.269	5.43***	1.524	2.1*
XBRL	−	−0.112	−1.69****	−2.112	−1.8****
FIRMSIZE	+	0.382	24.9***	0.335	6.48***
IFRS×FIRMSIZE	?			−0.065	−1.73****
XBRL×FIRMSIZE	?			0.104	1.7****
ΔEPS	?	−0.734	−1.99*	−0.72	−1.96*
ΔSALES	?	−0.0003	−0.28	−0.0003	−0.28
DERATIO	?	0.099	4.71***	0.097	4.67***
TOBINSQ	?	−0.011	−0.85	−0.013	−0.96
BIG4	?	1.006	19.83***	1.005	19.82***
BDINDP	?	0.188	0.6	0.207	0.66
SBSIZE	?	0.022	1.55	0.021	1.59
Year effect		Included		Included	
Industry effect		Included		Included	
Adjusted R^2		0.554		0.5545	
F-statistic		200.86***		167.91***	
Observation		1,610		1,610	

This table reports the results of the pooled OLS regression models:

$$\text{AUDITFEES}_i = \alpha + \beta_1 \text{IFRS}_i + \beta_2 \text{XBRL}_i + \beta_3 \text{FIRMSIZE}_i$$

$$+ \beta_4 \text{IFRS}_i \times \text{FIRMSIZE}_i + \beta_5 \text{XBRL}_i \times \text{FIRMSIZE}_i$$

$$+ \beta_6 \Delta \text{EPS}_i + \beta_7 \Delta \text{SALES}_i + \beta_8 \text{DERATIO}_i + \beta_9 \text{TOBINSQ}_i + \beta_{10} \text{BIG4}_i$$

$$+ \beta_{11} \text{BDINDP}_i + \beta_{12} \text{SBSIZE}_i + \gamma_j \sum_{j=1}^{8} \text{YEAR}_i + \eta_k \sum_{k=1}^{11} \text{INDUSTRY}_i + \varepsilon_i \qquad (3)$$

where AUDITFEES = natural logarithm of audit fees; IFRS = preparing financial statements in accordance with IFRS, coded as 1 if IFRS is applied, 0 otherwise; XBRL = filing financial statement in XBRL format, coded as 1 if company is an XBRL filer, 0 otherwise; FIRMSIZE = natural logarithm of value of total assets at the end of fiscal year; ΔEPS = change of EPS, $\text{EPS}_t - \text{EPS}_{t-1}$; ΔSALES = change of sales ratio, $(\text{SALES}_t - \text{SALES}_{t-1})/\text{SALES}_{t-1}$; DERATIO = long-term debt to total equity; TOBINSQ = Tobin's Q, market value of stock and book value of debt divided by book value of total assets; BIG4 = BIG4 = Big 4 auditor, coded 1 if the firm is audited by a Big4 auditor, 0 otherwise; BDINDEP = board independence, the proportion of independent directors to all directors on the board; SBSIZE = the number of members on the supervisory board; Year dummy (YEAR) represents dummy variables that reflect the years between 2000 and 2011; Industry dummy (INDUSTRY) reflects the company's industry in accordance with the industry classification of the CSRC.
Notes: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.10$. All tests are two-tailed

Table VI.
Robustness check: corporate governance factors

effect of XBRL and IFRS on audit fees, and investigating their joint use in firms is important as they can have offsetting impacts on audit fees (Kim *et al.*, 2012). Additionally, as IFRS critics argue that single standards may not be suitable for all jurisdictions, IFRS may not equally enhance financial reporting quality and transparency due to specific country differences (Soderstrom and Sun, 2007) suggesting that IFRS/XBRL practices need be assessed on a country-by-country basis (Nobes, 2006).

We find that XBRL has a main negative effect on audit fees which is weaker for larger firms. Our findings also indicate that IFRS increases audit fees for all companies, and that

this effect is positive for firms of different sizes though weaker for larger companies. We argue that our findings contribute to the existing body of knowledge by providing empirical evidence from listed companies in one of the largest economies in the world, China, indicating that IFRS and XBRL do impact on auditing costs of companies that have adopted them. Thus, this study contributes to the ongoing debate concerning whether the economic benefits of IFRS and XBRL are materialising in practice.

As others, this study also suffers from several limitations. This study provides a focused assessment of the impact of IFRS and XBRL on audit fees of companies listed in the SHSE in China which may or may not be generaliseable to other economies. For example, we have focused on listed companies in the SHSE due to data availability considerations (e.g. audit fees data). Nevertheless, we argue that our findings and conclusions provide an important basis upon which further research can be designed in order to extend this analysis. For example, further research can be conducted to confirm (or refute) whether our findings apply in other economies such as the UK, the Netherlands, Singapore and South Korea, where both IFRS and XBRL have been adopted in order to enhance the generaliseability of our findings.

Furthermore, this study has also ignored how auditing processes are influenced as a result of using IFRS and XBRL. Whilst IFRS convergence in an emerging economy such as China is necessary it is not by itself sufficient to achieve high accounting standards. Infrastructure support for enhancing widespread understanding amongst Chinese accountants, oversight and enforcement of the proper application of IFRS principles is also essential for the successful implementation of IFRS and need to be considered in relation to the manner in which they impact on auditing fees. Additionally, whilst current auditing practices are generally effective in providing some assurance of financial statements, they typically discover materials misstatements and fraud after these have adversely affected companies (Rezaee, 2009). Whilst IFRS offers high quality accounting standards, XBRL can enable continuous auditing cost-effectively, and in doing so, it can reduce or potentially eliminate the time lag between the occurrence of accounting events and assurance services carried out by auditors (Rezaee, 2009). That is, together IFRS and XBRL can reduce the risk of fraud or material misstatements by potentially identifying these sooner by enhancing the monitoring roles of auditors and regulators in relation financial statements for both individual companies and capital markets (Roohani *et al.*, 2009; Srivastava and Kogan, 2010). Further research could, therefore, also explore qualitatively how IFRS and XBRL are affecting the scope of the traditional audit function and the manner in which internal control activities are being carried out (Srivastava and Kogan, 2010).

Nevertheless, our findings have important implications for regulators, auditors and companies that are undertaking IFRS convergence and XBRL implementation projects in developing economies around the world. Based on our findings, regulators may need to consider how IFRS and XBRL compliance requirements and transition programmes may be better tailored for companies in order to reduce possible compliance stress in order to enhance transition and minimise disruption in business operations (De George *et al.*, 2013).

Additionally, our findings offer evidence supporting the business case of XBRL adoption in jurisdictions where XBRL use has been mandated (e.g. the USA, UK, South Korea, Japan, the Netherlands) whilst also informing the development of XBRL diffusion strategies in jurisdictions where XBRL use is voluntary (e.g. Australia) or currently still being considered. Whilst to the best of our knowledge there is little evidence to suggest whether or how XBRL filings are being audited in all jurisdictions

where XBRL use has been mandated (notable exceptions focusing on the US include Janvrin *et al.*, 2010; Brands, 2013; Holzinger, 2013; La Rosa and Caserio, 2013; Roselli, 2013; Tysiac, 2013; Boyle *et al.*, 2014; Shan and Troshani, 2014), being the first to address the impact of IFRS and XBRL, our study also can offer evidence to auditing practitioners that XBRL can reduce auditing costs and therefore encourage auditing of XBRL filings. Additionally, with auditing costs being reduced as a result of XBRL, auditors can reconsider the allocation of scarce internal auditing resources to other financial reporting activities after XBRL is introduced (Helliar *et al.*, 1996). Furthermore, our findings have wider implications as increased financial reporting transparency through XBRL use can reduce information asymmetry between management and shareholders and enhance the credibility of firms resulting in an overall improvement of investor confidence in today's capital markets.

Notes

1. Convergence of accounting standards is a process that denotes the "development of a single set of high quality, understandable and enforceable global accounting standards" (Pacter, 2001, p. 67).

2. The corresponding natural logarithm values used in the analysis can be found in Table II.

3. In the study of Shan and Troshani (2014) the value of the adjusted R^2 is 0.7405 which is relatively higher than the corresponding R^2 in this study.

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