1. Introduction

Financial disclosure (e.g. Verrecchia, 2001) is considered to be an important means of improving the health and liberalisation of capital markets. Widespread availability of high-quality financial information influences the economic decision-making process by increasing investor confidence in the credibility of the market. Reduction in information asymmetry affects the process of attracting liquidity and the cost of capital (Welker, 1995). The quality of the capital market plays a deeper and greater role in emerging economies by increasing liquidity and facilitating wealth creation and trading. In order to support developing economies, recent decades have witnessed ambitious programmes for reform, above all regarding financial reporting and disclosure (ACCA, 2012).

Although the effects of financial disclosure have been well discussed in the case of developed countries, few studies (Hassan *et al.*, 2011; Abraham *et al.*, 2015) have focused on emerging markets owing to difficulties in identifying the real effect of disclosures on emerging economies, where many institutional variables influence the growth of capital markets. This paper fills this gap by focusing on China, a country that, among so-called "BRIC" countries (Brazil, Russia, India, and China) at an advanced stage of economic development, has had a greater influence than others on worldwide economies in recent years (Chen and Wang, 2004).

According to Lan *et al.* (2013), the securities market in China has become a major global stock exchange in terms of total capitalisation, trading volume and rapid growth in both the number and size of public companies. There are two official national exchanges in China: the Shanghai Stock Exchange (SSE), established in 1990, and the Shenzhen Stock Exchange (SZSE), founded in 1991. A-shares and B-shares can be issued in both exchange markets. The key distinction is that A-shares are issued for domestic investors, denominated in renminbi (RMB), and B-shares are issued for foreign investors, predominantly in foreign currency (US dollars in Shanghai and Hong Kong dollars in Shenzhen). The segmented capital stock market shows differences in communication, trading rules and transfer of information in the different exchange markets (Elshandidy *et al.*, 2015). Chinese listed firms apply different accounting regulations depending on the type of security issued, whether A- or B-shares, or both. Firms that issue A-shares are required to comply with Chinese GAAP, firms that issue B-shares are required to comply with IFRS, and firms that issue both A- and B-shares are required to issue two sets of annual reports, one based on Chinese GAAP and the other based on IFRS (Peng *et al.*, 2008).

Although the China Securities Regulatory Commission (CSRC) has continuously improved its laws and regulations, with many reforms concerning financial reporting

disclosure, the effectiveness of the information disclosure system is still underplayed (Zhang and Zhang, 2014).

Despite the benefits of such reforms, which theoretically should enhance the performance of every capital market, many difficulties and various results are encountered in their actual application because of the diverse institutional contexts in which they are applied. Most importantly, despite promoting private ownership, international investment and entrepreneurial ventures, the Chinese government still maintains tight control of entrepreneurial activities (Elshandidy, 2014). In fact, the consideration that the state still plays a significant or, even dominant, role in many financial companies leads to unique characteristics in terms of disclosure, given the structure of the Chinese financial market.

While the extant evidence on China is concerned largely with general financial disclosure (Wang, 2006; Wang, 2009; Wu, 2007), the quality of risk reporting by financial firms is still empirically debatable. Regarding risk reporting in other contexts, over the last decade a growing literature has developed on investors' risk perceptions of capital markets through observation of the effects of risk disclosure (Kravet and Muslu, 2013), and it is commonly recognised that the motivations for risk related information are explained by agency theory in terms of the capacity of risk disclosure to decrease information asymmetries (Oliveira *et al.*, 2011).

Its effects on market liquidity are well documented in developed countries (Miihkinen, 2013; Campbell *et al.*, 2014; Elshandidy and Neri, 2015), but less attention has been given to emerging markets. This is even more important if we consider the situation of financial companies listed in the Chinese market: factors like the high percentage of state ownership and the low percentage of negotiable securities (OECD, 2011) make the risk disclosure of financial companies in the Chinese context fundamental for investors and analysts.

This paper fills this gap by studying the main determinants of the risk disclosure quality of financial firms listed in China's A-shares of the SSE market for the years 2013, 2014 and 2015, and then observes the impact of risk disclosure quality on market liquidity. The paper considers the SSE market for its characteristics and dimension (Luo *et al.*, 2009): many companies are state-owned and responsible for China's economic growth, and at the end of 2015 this market showed RMB 53.1 trillion of capitalisation. Furthermore, the majority of the financial firms are listed on the SSE while small companies and few financial companies are listed on the SZSE.

Our paper constructs risk disclosure quality scores on the basis of manual content analysis in order to achieve a reasonable level of accuracy and validity. Risk disclosure quality

is measured by analysing five main dimensions in annual report narratives: quantity, depth_qualitative, depth_quantitative, outlook_profile and coverage (Miihkinen, 2012). Quality is then tested against the firm characteristics of size, risk, capital structure and growth. The paper also analyses the possible impact of risk disclosure quality on market liquidity (Elshandidy and Neri, 2015) in order to understand whether disclosing more risk information really improves the attraction of liquidity in emerging markets and counteracts the fact that "heavy government regulation affects prices of different financial assets" (Chan *et al.*, 2007).

Since the A- and B-share markets have different disclosure levels (Elshandidy, 2014), this paper focuses on the A-share market in order to reflect the influence of Chinese regulations. By 2014, A-share listed companies, banks, insurance enterprises, securities enterprises and central state-owned enterprises had already adopted the New People's Republic of China (PRC) GAAP (KPMG, 2014). Furthermore, as described in the background section, the A-share market is the most important segment of the Chinese market because it is one that is ideated to attract more capital (domestic and foreign). Moreover, the China Banking Regulatory Commission (CBRC) instated a new set of regulations in 2013 to comply with Basel III. The sample covers the years 2013-2015 for several reasons, including the interest in studying a recent period where the market becomes more mature to apply risk regulations which have been implemented in the Chinese market. Additionally, it allows us to observe any potential impact for the most recent financial crisis in the Chinese market in 2014. This is particularly important as it has been stated (Carpenter *et al.*, 2015) that after a rocky first decade from 1990 to 2000, China's stock market earned a reputation as a casino manipulated by speculators and insiders.

This paper contributes to the existing literature in several ways. Firstly, it draws on previous studies (Elshandidy *et al.*, 2013; Miihkinen, 2012) to identify the influence of firm characteristics on risk disclosure quality in China and how risk disclosure may influence market liquidity of an emerging market. This will be of interest to investors, since there has been no significant previous research of the quality of risk disclosure practices in China. The time period of three years will be helpful in trying to identify any patterns of behaviour in the year before the crisis, in the one during and in the one after the crisis. The importance of this paper is its provision of evidence on several reporting incentives concerning not only firms' quantity, but also firms' quality of risk reporting. This will function as a set of guidelines for investors' decision making, and may also support activism for reforms and the enhancement of regulations in China in order to make the market more efficient.

Section 2 sets out the background to Chinese market regulation. Section 3 reviews the previous literature and develops our hypotheses. In Section 4, we introduce our methodology and describe our findings. Section 5 discusses the empirical findings and illustrates further analysis and Section 6 draws conclusions, discusses the limitations of the work, and suggests areas for future research.

2. Background and regulation of the Chinese market

2.1 Background

In June 2015, the Shanghai stock market faced a crisis that caused a reassessment of a market which, in the previous 12 months, had registered a 150 percent increase in stock value, but this rise was not accompanied by a similar growth in earnings. Shenzhen, the other Chinese stock market, experienced a strong reduction in value. Furthermore, the Chinese financial market is valued at only around 40 percent of GDP, while in highly developed economies this ratio exceeds 100 percent. At the end of December 2015, the total market capitalisation of companies listed on the Shanghai Stock Exchange and the Shenzhen Stock Exchange amounted to RMB 53.1 trillion, ranking second in the world to the United States.

Even with this rise, Shanghai's market index has been faced with poor performances since 2012 compared with other stock indexes (UK stocks moved up by 5.8 percent for instance). This behaviour is mostly due to the specific characteristics of the Chinese stock market that is still underdeveloped (Luo *et al.*, 2009). The government made use of it as a fundraising tool for funding state-owned companies with a high percentage of listed companies that resulted in being state controlled. Furthermore, China's stock market developed under a repressed financial market. Finally, China's stock market grew in a weak legal environment that did not provide much protection to shareholders.

Although La Porta *et al.* (2008) identify China's legal system as originating from German civil law, a particular characteristic of China's legal tradition is that the judicial system is not independent of the government's administrative system (Chen, 2003). Furthermore, private property rights were formulated by China's legislative system for the first time in March 2004 at the second session of the Tenth National People's Congress Meeting. However, there is as yet no clear definition or explanation of private property rights in the Chinese stock market, and government violation of private property rights is not unusual (Sanders and Chen, 2005). Concentrated state ownership, unclear laws governing private property rights, and a

lack of judicial independence continue to characterise China's market, protecting state interests over the rights of individuals.

Additionally, given the stock segmentation, China's stock market is not immediately accessible for foreign investors (even though the picture has changed rapidly in the last years) and this affects China's stock market integration.[1] On the SSE, in fact two types of stock are issued: A-shares and B-shares. A-shares are priced in the local RMB currency, while B-shares are quoted in US dollars. Trading in A-shares is initially restricted to domestic investors, while B-shares are available to both domestic and (with restrictions) foreign investors. From 2002, China permitted foreign institutional investors to purchase bonds or stocks listed in the Chinese A-share market and this constitutes the main factor that makes A-shares the most important segment in China's stock market, especially compared with B-shares that from the beginning were ideated to attract limited foreign investment.

2.2 Regulations

As stated above, the most important anomaly in the Chinese stock market is the government's restrictions, which create a lot of issues for the transparency and equality conditions for the stakeholders. In the last two decades, SSE and SZSE have obtained important improvements for the development rates and the reform process of the stock markets that developed the running of capital markets, created market-based mechanisms and created the conditions for the listing of new companies. The legislator had to work on various reforms including regulation of corporate ownership and the creation of the conditions for an effective corporate governance system.

In order to manage conflicts between the government and other shareholders, in January 2001, the CSRC issued a Code of Corporate Governance of Listed Firms, revised in October 2005. The Code aims to safeguard minority shareholders' interests by ensuring that controlling shareholders do not take decisions detrimental to other shareholders' legal rights and interests. In addition, the Code underlines the relevance of timeliness and accuracy of corporate information disclosures. It recommends that listed firms should not just disclose compulsory information mandated by regulations, but should provide other information that may be useful to shareholders' and stakeholders' decision-making processes.

[1] Malkiel (2007) affirms that "one of the most distinctive features of China's stock market it is an alphabet soup of different kinds of Chinese shares".

The PBC (People's Bank of China) then issued General Provisions on the Regulation of Financial Institutions, which was the first comprehensive law on the regulation of financial institutions in China. In order to improve transparency, in 2002, the PBC issued Provisional Rules on Commercial Banks' Information. These rules recommend detailed items in disclosing banks' financial risk management and corporate governance reports within their annual reports.

Effective from 2005, the CBRC published the Guidance on Market Risk Management of Commercial Banks. This guidance explains the responsibilities of board members and management for control of market risk, and prescribes the set-up of market risk management departments, control policies and procedures. Since International Financial Reporting Standards (IFRS) were prescribed for listed Chinese companies in 2007, the CBRC has required the use of the new standards. In 2007, it issued Rules on Commercial Banks' Information Disclosure, which establish obligations regarding the content and form of detailed published information that commercial banks must disclose regarding their financial position, risks and risk management system, and corporate governance.

In 2009, China restructured the management and supervision of stock markets (Rules on Supervision over Securities Companies, the Rules on Risk Disposal of Securities Companies and The Rules of Contents and Format of Information Disclosure by Companies Offering Securities, to mention some of the main ones), and CBRC released Guidance on the Management of Liquidity Risk of Commercial Banks. This document illustrates the principles, management responsibilities, requirement for structures and methods of liquidity risk management.

Chinese regulators have closely followed the development of the Basel Accords and have shown a strong will to integrate international regulatory rules into Chinese regulatory practices, with adaptation to market features. In 2008, the CBRC finalised the Basel II implementation in China through the publication of five sets of guidance: Guidance on the Classification of Credit Risk Exposure in Commercial Banks' Banking Book, Guidance on the Supervision of Internal Rating-Based Credit Risk Calculation of Commercial Banks, Guidance on the Risk Capital Calculation of Specialized Lending of Commercial Banks, Guidance on the Credit Risk Minimization in Risk Capital Calculation of Commercial Banks and Guidance on Risk Capital Calculation of Operational Risk of Commercial Banks. In 2010, the CBRC released the Implementation of Four New Supervisory Instruments (Draft Discussion) to merge Basel III's new tools of capital adequacy, anti-cyclical capital charge, liquidity and bank regulation into the Chinese regulatory framework.

These requirements aim to address the shortcomings exposed over the course of the financial crisis. The new regulatory guidelines have higher capital requirements, including a 4 percent leverage ratio, stricter loan-loss provision rules and better liquidity rules (Lee and Chih, 2013). The CBRC seeks to optimise the methods used by banks to calculate risk assets, and to widen the range of risks covered by regulatory capital (Sekine, 2011). It requires banks to retain a loan provision ratio of at least 2.5 percent. Banks must also provide a minimum of 150 percent coverage ratio, which may lead to a decrease in profitability and an increase in capital pressure. Under the new rules, the liquidity ratio is set at a minimum of 100 percent (Lee and Chih, 2013).

In 2012, the CBRC issued the "Capital Rules for Commercial Banks" and released additional regulatory schemes and guidelines to promote the implementation of the capital methods and the alignments with market driven systems. China's Basel III provisions seek to address weaknesses in micro-level supervision. They also aim to stabilise the financial system for future economic growth by introducing a macro-prudential overlay to the regulatory framework. In 2013, China adopted reforms regarding corporate disclosure rules which have modified the landscape considerably, and in December 2015 the China Securities Regulatory Commission (CSRC) rolled out a series of money market funds provisions to strike a balance between the need for innovation and risk minimisation in the capital markets, with the main aims being to improve disclosure and transparency.

3. Literature review and research hypotheses

3.1 Literature review

As an emerging economy, China's capital market is not as efficient as capital markets in developed countries, nor is its regulatory environment as mature as those in developed countries. Previous studies have found that both individual and institutional investors in China are less experienced and more restricted than their counterparts in developed countries, such as the US (Bailey *et al.*, 2009; Deng and Xu, 2011).

China's stock markets suffer from serious information asymmetry problems, high governance-related agency costs, particularly for state-owned companies (Gul *et al.* 2010), and weak-form efficiency concerns (Lee *et al.*, 2001). This may influence investors' decision making based on their understanding of financial reports, and may also affect firms' disclosures of risk information. As a result of the structural situation of the market, firms may not be willing to disclose private information to the market (Linsley and Shrives, 2006). From

the market perspective, however, investors always require more information. This creates conflicting demands for risk information. High-quality disclosure of financial data provides valuable information to investors (Healy and Palepu, 2001). According to a study by Miihkinen (2012), in the presence of detailed risk disclosure standards and guidelines, firms disclose more qualitative risk information and action plans relating to economic impacts, which improves the quality of firms' overall risk reviews.

Previous studies have also confirmed that firm characteristics are related to corporate risk disclosure. Elshandidy *et al.* (2013) test the relationship between risk disclosures and firm characteristics. Their results confirm that profitable firms are more likely to reveal comprehensive and specific risk information to investors, which decreases information asymmetry and gives investors the opportunity to make accurate pricing decisions. Elshandidy *et al.* (2013) also reveal that larger firms are more likely to exhibit higher levels of aggregated risk disclosures. Deumes and Knechel (2008) confirm that a firm's financial leverage is positively associated with the content of its risk disclosure. In testing firm risk against risk information disclosed, Linsley and Shrives (2005) suggest that the provision of forward-looking risk information will be especially valuable to investors. Their work confirms that there is a significant relationship between a firm's reputation for high risk and its disclosure of high-quality risk information.

Elshandidy *et al.* (2013) find that risk disclosure is associated positively with systematic and financing risks and risk-adjusted returns, confirming managers' incentive (agency and signalling) theories suggesting that managers are motivated to provide higher (Ball *et al.*, 2003; Ball and Shivakumar, 2005; Leuz *et al.*, 2003) levels of information to reduce information asymmetry, so affecting both quality and quantity levels of disclosure. In terms of risk disclosure, Abraham and Cox (2007) suggest as well that managers could be motivated in providing additional risk disclosure to reduce information asymmetry.

Jorgensen and Kirschenheiter (2003) find that firms with valid risk disclosures have lower risk premiums. When risk disclosures are made voluntarily, as opposed to being mandatory, risk premiums also tend to be lower. In addition, improved information disclosure increases market liquidity because investors are less likely to feel uninformed and artificially raise prices (Elshandidy and Neri, 2015). Miihkinen (2012) confirms that detailed and regulated disclosure standards improve firms' risk disclosure quality under IFRS. Information asymmetry is a long-standing concern to both investors and regulators. The results of a research by Verrecchia *et al.* (2001) show that, in imperfectly competitive markets, the degree of information asymmetry is related to market illiquidity and cost of capital. Consequently,

Campbell *et al.* (2014) conclude that, when the bid-ask price is used as a proxy for market liquidity, the risk factor is positively related to a reduction in information asymmetry. Other studies reveal that there are significant correlations between trading volume and investors' uncertainty and diversity of opinion (Bamber and Cheon, 1995; Barron, 1995).

3.2 Research hypotheses: Main determinants of risk disclosure quality

3.2.1 Firm size

Many studies have evaluated firm size in relation to disclosure. It is considered to be one of the most important indicators of disclosure levels (Abraham and Cox, 2007). According to agency theory, larger firms tend to incur lower disclosure costs than smaller firms. Zadeh and Eskandari (2012) confirm the importance of firm size for the level of disclosure in annual reports. On the basis of past studies, the association between the two variables may be either negative or positive. Kou and Hussain (2007) find a negative relationship between firm size and disclosures, whereas Linsley and Shrives' (2006) work supports a positive relationship between the two. Other studies have also found that firm size is considerably and positively associated with disclosure levels (Chavent *et al.*, 2006; Hassan *et al.*, 2011).

According to signalling theory, non-disclosure may project an image of attempting to hide bad news. For this reason, larger listed firms benefit from disclosing more information, as this protects their reputation (McKinnon and Dalimunthe, 1993). Risk reporting literature highlights no significant impact of firm size on the quantity and/or quality of risk disclosure (Beretta and Bozzolan, 2004), on negative relation (Campbell *et al.*, 2014) or positive influence on aggregated disclosure (Linsley and Shrives, 2006; Abraham and Cox, 2007). In a study of 559 Chinese firms in 2002, Huafang and Jianguo (2007) find that larger firms show greater disclosure, while Li *et al.*'s (2008) study of all Chinese listed firms with A-shares in the China Stock Market and Accounting Research (CSMAR) database finds a positive relationship between size and disclosure. Therefore, the first hypothesis is:

> *Hypothesis 1:* Larger Chinese firms in the financial sector tend to disclose more and higher-quality risk disclosure information to the market.

3.2.2 Risk

Based on signalling theory, managers' disclosure of more risk-related information reduces investor uncertainty. It may decrease the firm's perceived risk because an open disclosure strategy should result in a better assessment of the firm's future performance (Jorgensen and Kirscenheiter, 2003). Furthermore, agency and signalling theories indicate that managers of

high-risk firms have more incentives to increase disclosure of voluntary risk information (Abraham and Cox, 2007). Firms also benefit from this practice because it helps to avoid unnecessary losses, especially for high-risk firms. According to Elshandidy and Neri (2015), firms with higher risks usually disclose more information in order to avoid misunderstandings by investors. This finding is consistent with studies by Elshandidy *et al.* (2013) and Deumes (2008), who affirm that markets may misinterpret firms' conditions due to high risks. Lam and Du's (2004) analysis of the Chinese market provides evidence that disclosure may be associated with lower variance in risk-adjusted returns and risk, while Firth *et al.* (2007) find a positive relationship between risk profile and the level of earnings disclosure in the Chinese market. Finally, investors also require high-risk firms to present their methods for evaluation of risk drivers in order to gain deeper insights before making decisions. Given the above considerations, we formulate the following hypothesis:

> *Hypothesis 2:* Chinese financial firms with higher risks are more likely to provide high-quality risk disclosures.

3.2.3 Capital structure

The capital structure of a firm indicates the financial risk it faces and how it manages its financial resources in business operations. According to signalling theory, managers in firms heavily financed by debt tend to disclose more information to satisfy the needs of creditors (Jensen and Meckling, 1976). Considering the agency theory perspective, creditors of high leveraged companies should have high incentives to recommend management to disclose more information (Amran *et al.*, 2009). Managers even tend to signal their appropriate control of higher risk to investors. This is supported by Elshandidy *et al.* (2013), who find a positive relationship between risk level and risk disclosure. They also confirm that risky firms are likely to disclose more information than less risky firms in order to avoid market misinterpretations. However, some previous studies of the possible association between the level of risk and the amount of risk disclosure have discovered an insignificant association (Linsley and Shrives, 2006; Abraham and Cox, 2007). In the Chinese context, previous studies (Ferguson *et al.*, 2002; Xiao *et al.*, 2008) have highlighted a positive relationship between the leverage and disclosures of Chinese listed companies. This knowledge leads us to formulate the following hypothesis:

> *Hypothesis 3*: The capital structure of Chinese financial firms is positively associated with risk disclosure quality.

3.2.4 Growth

High-growth firms are likely to have greater information asymmetry and higher agency costs (Gaver and Gaver, 1993). Gul and Leung (2004) and Lim *et al.* (2007) claim that companies with a high growth potential need to disclose more information to the market to signal that the stock is not overvalued. Considering risk disclosure, Elshandidy *et al.* (2013) hypothesise this positive relationship but their findings do not confirm this expectation. To measure the growth factor, we use the book-to-market ratio (BTM) that represents a measure of a firm's opportunities for growth (Gebhardt *et al.*, 2001). A high BTM equity indicates a high-risk premium and weak future growth due to greater risk distress (Griffin and Lemmon, 2002). Investors prefer firms with a high market value in relation to the book value of their equity. A high BTM ratio indicates high potential growth for the firm. Campbell *et al.*'s (2014) study of BTM value suggests that BTM and future growth have a direct positive or negative impact on a firm's stock return. Cheng and Courtenay (2006) find evidence of a positive relationship between BTM ratio and risk disclosure, while Liu (2015) shows a negative relationship between BTM and forward-looking information in the Chinese market context. This knowledge leads us to formulate the following hypothesis:

> *Hypothesis 4*: There is no association between book-to-market ratio and quality of risk disclosure for Chinese financial firms.

3.2.5 Market liquidity and quality of risk disclosure

The market-efficiency coefficient (MEC) expresses a market's price fluidity. Markets with high liquidity are more equipped to support changes in price (Welker, 1995). Therefore, a price-based measurement is used in this paper to determine market liquidity. The higher levels of disclosure should decrease information asymmetry between current and prospective shareholders, and so disclosure could increase the liquidity of a security (Easley and O'Hara, 2004).

Lang and Lundholm (1993) find that performance variability affects disclosure levels negatively, recognising in this way an association between the volatility of market returns and general disclosure levels. Alexander (1996) claims that companies with more volatile earnings will probably furnish greater disclosure in their annual reports. Ascioglu *et al.* (2005) instead illustrate indirect impact between disclosure quality and market liquidity, analysing the relationship between market liquidity and audit compensation.

Furthermore, investors and analysts could include risk information in their price choice and recommendations and increase market liquidity working on information asymmetry (Campbell *et al.*, 2014). In the American market, Linsmeier *et al.* (2002) find a

decline in trading volume sensitivity associated with the requirements provided by FRR No. 48 in terms of market risk disclosures to be provided to investors. Elshandidy and Neri (2015) find that risk disclosure practices (mandatory and voluntary) provided by UK firms significantly and negatively influence the bid-ask spread, suggesting that this information reduces information asymmetry between market participants and improves market liquidity. They find that just voluntary, rather mandatory, risk disclosure provided by Italian firms improves the market liquidity by reducing information asymmetry.

Under the requirement of Chinese Generally Accepted Accounting Principles (PRC GAAP), audited annual reports of listed firms in China must be available to public users by 30 April, four months after the end of the fiscal year. Consistent with Miihkinen (2013) and Elshandidy and Neri (2015), this paper calculates the average of the relative spreads over a three-month period, from the beginning of May to the end of July. In order to arrive at a three-month mean of relative spreads, economists typically calculate the difference between the daily ask and bid prices. This is then divided by the average of the daily ask and bid prices. No significant research has shown that this finding is also true in the Chinese market. This knowledge leads us to formulate the following hypothesis:

> *Hypothesis 5*: There is no association between market liquidity and risk disclosure quality for Chinese financial firms.

4. Sample and methodology

4.1 Sample selection and data collection

Our sample was based on financial firms listed in the A-shares market of the SSE for the fiscal years 2013, 2014 and 2015. Based on a list generated by Thomson One Banker, 102 financial firms were listed in the SSE up to 2015. For this paper, the SSE market was chosen rather than the SZSE because it is the most important market, has the greatest market capitalisation and encompasses the most important Chinese financial institutions, including most of China's major banks. Therefore, the sample featured 102 financial firms listed on the SSE during the research period. These firms publish their annual reports according to PRC GAAP. Two organisations were omitted because they were not listed during the period of observation, so the final sample comprised 100 firms. All included organisations have a fiscal year end of 31 December, and measurement of market liquidity and observations were pooled for the whole period.

Annual reports for the above firms were collected from Thomson One Banker and from companies' websites. Data collection for risk disclosure quality focused on annual

reports, since these are the primary source of information for investors (Miihkinen, 2013). Corporate governance data were collected from Orbis and manually from annual reports, while financial data for each firm, such as share price, market value and leverage, were collected from DataStream.

4.2 Identification of variables: indicators of risk disclosure quality

In measuring the quality of risk disclosure and consistent with Miihkinen (2012), four measurement indicators are considered in this paper: quantity of disclosures, coverage of disclosures, and the semantic properties of depth and outlook. More detailed examples are included in Appendix 1.

4.2.1 Risk disclosure quantity

Within the hundreds of pages included in annual reports, users may find it too difficult to locate specific risk-related information. This is because the limited amount of relevant information is diluted within a thick annual report covering a broad range of other data. This paper uses the number of sentences concerning risk disclosure that appear in the annual report as a proxy for risk disclosure quantity. Thus, it is measured as:

$$QUANTITY_i = \ln(\text{total number of sentences containing risk disclosure})$$

4.2.2 Risk disclosure coverage

In order to improve portfolio investment decisions, investors prefer companies to disclose a certain level of risk information in their annual reports (Solomon *et al.*, 2000). The topics identified are financial risks, damage risks and risk management (Linsley and Shrives, 2006). Therefore, it is vital to measure the coverage of risk information contained in these reports. As suggested by Miihkinen (2012), this paper uses the Herfindahl index to identify the concentration of risk topics in corporate disclosures.

$$COVERAGE_i = [(1/H)/\text{Number of main risk topics}]$$

where $H = \sum_i^n P_i^2$ measures the concentration of risk topics, and P_i represents the proportion of risk disclosure sentences on topic *i*. In order to increase the Herfindahl index value so that it displays more comprehensive coverage information, this paper uses the inverse of H.

4.2.3 Risk disclosure depth

The semantic properties of information disclosed in corporate communications include depth and outlook profile. Depth concerns the content of disclosed risk information which predicts the economic impact on future performance. Disclosure depth gives users a better understanding of firms. The empirical indicators are as follows:

$$\text{DEPTH\_QUALITATIVEi} = ln \sum_{j=1}^{kj} \text{qualitative}\, j$$

where k_j is the number of risk information sentences in the annual report, and qualitative_j equals 1 if the risk information sentence *j* in the annual report of firm *i* contains qualitative information about expected future performance, and otherwise 0.

$$\text{DEPTH\_QUANTITATIVEi} = ln \sum_{j=1}^{kj} \text{quantitative}\, j$$

where k_j equals the total number of sentences containing risk-related information in the annual report, and quantitative_j equals 1 if the risk information sentence *j* in the annual report of firm *i* contains quantitative information about expected future performance, and otherwise 0.

4.2.4 Outlook profile

As one of the semantic properties of risk disclosure, outlook profile expresses how firms disclose their planned approach to risk (Beretta and Bozzolan, 2004). Risk disclosures explain the existence of risks, the future expectations of the firm and the risk management approach adopted by the firm. The empirical indicators are as follows:

$$\text{OUTLOOK\_PROFILEi} = ln \sum_{j=1}^{kj} \text{acp}\, j$$

where k_j equals the number of sentences referring to risk in the annual report, and acp_j equals 1 if the risk information sentence *j* in the annual report of firm *i* contains information about the risk management approach, and otherwise 0.

4.2.5 Composite quality of risk disclosure

Based on the factor analysis method, composite quality of risk disclosure is used to examine relationships between multiple variables by combining data into a smaller set. This measure is used to summarise the five previously-mentioned individual quality indicators as follows:

QUALITY = the score of the principal component with the highest eigenvalue

Content analysis is used in this paper to measure the quality of risk disclosure. In quantitative research, content analysis locates predefined terms or phrases in texts and draws conclusions based on their presence. For example, some researchers use sentences or lines as the unit of analysis (Beattie *et al.*, 2004). There are two different methods of content analysis: automated and manual. Researchers may select either method according to its usefulness to their particular study. For instance, Elshandidy *et al.* (2013) adopt an automated method,

whereas Linsley and Shrives (2006) and Abraham and Cox (2007) opt for manual content analysis. This paper uses the manual content analysis method, also applied in Elshandidy *et al.* (2013). Many recent reviews (Miihkinen, 2012) have emphasised that the dimensions selected to measure risk disclosure quality are crucial. Analysis is useless unless the primary variables are measured with a sufficient degree of accuracy. Thus, the manual content analysis method is preferred in this paper due to its precision (Hassan and Marston, 2010).

Nevertheless, content analysis suffers from limitations. In this paper, two main weaknesses are identified. Firstly, there is inherent subjectivity in determining the coding scheme. The manual content analysis developed in this paper ensures a high level of reliability. Secondly, labour-intensive analysis of data has a limited capability. For this reason, only a small number of companies are investigated. The potential gains from this micro-level analysis are expected to outweigh the above limitations.

Manual content analysis is subject to individually tailored procedures. The results reported have the potential to be artificially inflated (Krippendorff, 1980) and affected by subjectivity. This inevitable subjectivity is its main weakness, as discussed by researchers such as Linsley and Shrives (2006) and Abraham and Cox (2007). In order to avoid this weakness, there are two ways to test the reliability and validity of risk disclosure quality scores. One method is to select an independent second coder to perform manual content analysis in order to test the level of agreement between raters. The second rater selects 15 samples randomly from the sample list and examines the extent to which the risk-related sentences in the annual report narratives are captured in the final word list. The results from the second rater are then compared with the original results to test reliability and validity. This method confirms that the manual content analysis used in this paper is successful because the similarity between the two results is above 80 percent. The second method of testing reliability uses Cronbach's Alpha to measure how well a dataset captures an underlying construct (Elshandidy *et al.*, 2013). If the result approaches 1, this means that the coding is reliable. If the result is closer to 0, there is no agreement other than what would be expected by chance. The Cronbach's Alpha is 94 percent for the risk disclosure quality scores in this paper. Therefore, it can be concluded that the risk disclosure score computed using manual content analysis is internally consistent and acceptable.

4.2.6 Firm characteristics

Firm size is measured as the log of total assets, and risk is measured using the beta. The beta is a covariance figure which expresses a firm's market return compared with a 23- to 25-month market index. Capital structure is measured as the log of leverage, which is the ratio of total

debt to total equity, and growth is measured as the ratio of the book value of equity divided by its market value.

4.2.7 Corporate governance

Five corporate governance variables are used in this paper as control variables: board size, board independence, CEO duality, state ownership and audit quality.

Regarding board size, measured as the total number of directors on the board at the fiscal year end, some work (i.e. Elshandidy and Neri, 2015) recommends that larger boards could be more likely to decrease actual agency costs by aligning different possible conflicts of interest, but previous literature also indicates that a larger board size results in less effective communication (Gul and Leung, 2004). However, some researchers disagree. A study by Cheng and Courtenay (2006) shows that there is no significant relationship between board size and risk disclosure. In the Chinese context, Firth *et al.* (2007) find that a greater board size corresponds to a greater level of earnings disclosure information.

Board independence, calculated as the ratio of the total number of independent non-executive directors (NEDs) to the total number of directors, has also been highlighted by previous research (i.e. Gul and Leung, 2004) as a potentially significant variable. Agency theory argues that independent directors are likely to mitigate agency conflicts between managers and shareholders, given that they have no linkages with the representative shareholders and should be beneficial for matching companies` targets. Peng (2004) analysed a sample of China's largest public companies and found that increasing the percentage of independent directors led to higher sales growth, attributing this result to the role these directors play in securing resources for the firm as part of Chinese business networks. According to contract theory, NEDs may stimulate the disclosure of risk information and reduce information asymmetry (Abraham and Cox, 2007). Moreover, Cheng and Courtenay (2006) find a significant and positive relationship between the number of NEDs and the level of risk disclosure. In the Chinese context, Huafang and Jianguo (2007) find that the level of disclosure increases with a greater percentage of independent directors on the board.

Another measure of corporate governance is provided by chief executive officer (CEO) duality, a dummy variable counted as 1 if the CEO and chairman are the same person, and 0 otherwise. According to agency theory, the positions of CEO and chairman should be separate, which should decrease agency costs and improve corporate governance performance (Elshandidy and Neri, 2015). Since one of the responsibilities of the chairman of the board is to monitor the performance of the CEO, a conflict of interests exists if an individual holds both positions. This may negatively affect the interests of shareholders, and the board may

not be sufficiently balanced. The findings of previous studies highlight either a negative impact of CEO duality on the level of disclosure (Huafang and Jianguo, 2007), or they are mixed: Elshandidy *et al.* (2013), for instance, find a non-significant association between role duality and risk disclosure.

We take into consideration state ownership, measured as 1 if the company is ultimately owned by the state and 0 otherwise. In fact, even if an increasing number of public companies are owned by non-government entities, many companies on the Shenzhen Stock Exchange are partially or ultimately owned by the central or local governments. State-owned firms tend to be perceived as suffering from more severe information asymmetry, agency problems and adverse selection costs. Wang *et al.* (2008) indeed find the level of disclosure to be positively related to the proportion of state ownership. In contrast, Ferguson *et al.* (2002) dispute that because red-chip firms face a more uncertain situation and stronger competition costs on the Hong Kong Stock Exchange, they provide less information than H-share firms. The higher the proportion of state ownership, the more severe the agency problem and the more voluntary disclosure there is to alleviate that problem and lower the cost of capital. Lan *et al.* (2013) find that the disclosure level initially decreases with state ownership, but after a certain point, it increases with an increase in state ownership.

We also control for firm audit quality, measured as 1 if the audit firm is one of the Big Four and 0 otherwise. In fact, according to agency theory, firms may use voluntary disclosure to reduce agency costs, and the use of external audit firms may boost this effect (Barako *et al.*, 2006). Financial reports audited by highly-reputable external audit firms increase the confidence of investors (Elshandidy and Neri, 2015). From an empirical perspective, investors require a high-quality audit if firms have high risk. This is because audited reports increase the accountability of managers (Datar *et al.*, 1991). According to Camfferman and Cooke (2002), there is a positive relationship between audit quality and risk disclosures. This indication has also been confirmed in the Chinese context: Wang *et al.* (2008) illustrate that the use of large auditors is clearly related to increased levels of disclosure.

4.2.8 Market liquidity

Share price volatility and trading volume are used to test market liquidity. The standard deviation of daily stock prices is used to indicate share price volatility. In order to arrive at a figure for trading volume, the daily trading volume is divided by the number of outstanding shares.

Panel A of Table I provides descriptive statistics for the continuous variables mentioned in Section 3. These include risk disclosure, market indicators, firm characteristics

and corporate governance. This paper winsorises the variables at the first and 99th percentiles. Table I gives the number of observations, the mean, standard deviation, lower quartile, median and upper quartile. The three dummy variables are CEO duality, audit quality and state ownership. Panel B displays their frequencies.

The mean and median statistics for QAN and DQAL are quite close in value. This shows that the two variables are symmetrically distributed.

[Insert Table I]

4.3 Empirical model development

This paper measures the impact of firm characteristics on risk disclosure quality and the influence of risk disclosure quality on market liquidity through the use of ordinary least squares (OLS) regression, as suggested by Elshandidy and Neri (2015). This is measured by analysing narratives in annual reports. Thus, the estimation model is represented as:

$$\text{Equation 1: } (QAL)_{it} = \beta_0 + \beta_1 FZ_{it} + \beta_2 RS_{it} + \beta_3 CS_{it} + \beta_4 BTM_{it} + \beta_5 BS_{it} + \beta_6 BI_{it} + \beta_7 CD_{it} + \beta_8 AQ_{it} + \beta_9 ST_{it} + \varepsilon i$$

where $(QAL)_{it}$ is the score of the principal component with the highest eigenvalue for the five main risk disclosure indicators (quantity, depth_qualitative, depth_quantitative, outlook_profile and coverage) of firm *i* at time *t*.

The variables in Equation 1 include firm size (FZ), risk (RS), capital structure (CS) and growth (BTM). The control variables were selected based on previous studies (Elshandidy *et al.*, 2013). This paper uses board size (BS), board independence (BI), CEO duality (CD), audit quality (AQ) and state ownership (ST) as control variables.

$$\text{Equation 2: } (ML)_{it+1} = \beta_0 + \beta_1 QAL_{it} + \beta_2 RS_{it} + \beta_3 CS_{it} + \beta_4 BTM_{it} + \beta_5 SPV_{it} + \beta_6 TV_{it} + \beta_7 BS_{it} + \beta_8 BI_{it} + \beta_9 CD_{it} + \beta_{10} AQ_{it} + \beta_{11} ST_{it} + \varepsilon i$$

where $(ML)_{it+1}$ is the three-month average of relative spreads from the beginning of May to the end of July for firm *i*.

Equation 2 tests market liquidity through analysis of share price volatility (SPV) and trading value (TV). In this equation, firm characteristic variables (RS, CS and BTM) and corporate governance variables (BS, BI, CD, AQ and ST) are used as control variables. Appendix 2 explains the definitions of these variables, their sources and their codes.

5. Empirical results

5.1 Correlation analysis

Table II shows the results of the Pearson correlation coefficient and significant values for all continuous variables. The correlation relationship and multicollinearity problems between all continuous variables are tested. The correlation coefficient indicates a significant relationship between risk disclosure quantity and quality scores. This suggests that firms with higher-quality risk disclosures also release more comprehensive risk information.

Consistent with Miihkinen (2012), the positive correlation between quality and quantity of risk disclosure reveals that quantity is a good proxy for quality in assessing narrative disclosures in annual reports. There is a negative correlation between QAL and COV, and a high positive correlation between QAL and the other four quality indicators. This result is consistent with factor analysis, which shows that, excluding COV, all quality indicators have a high positive factor loading.[2] For market liquidity, the correlation coefficient for risk disclosure quality and quantity is very low. This indicates that there is no significant effect of market liquidity on the quality or quantity of risk disclosure.

Firm size (FS) and board size (BS) are significantly correlated with both risk disclosure quantity and quality scores, and the coefficients show a positive relationship. Also, risk profile (RS) and capital structure (CS) highlight some relationships but not at a high level, indicating that these factors are probably not the main ones that should be taken into consideration for the present analysis.

In terms of market indicators, market liquidity (ML) shows no significant relationship, while trading volume (TV) and share price volatility (SPV) provide significant results even if the relationships with the other variables are not very pronounced.

The remaining variables show no significant correlation, indicating that probably at this stage of the evolution of the Chinese market, the governance factors are not the main ones to be considered when discussing risk reporting disclosure. Furthermore, recent disclosure reforms, liberalisation and opening to foreign investors are ongoing issues that will produce more effective results in the years to come.

[Insert Table II]

[2] The factor loadings of QUANTITY, COVERAGE, DEPTH_QUANTITATIVE, DEPTH_QUALITATIVE, and OUTLOOK_PROFILE are 0.983, -0.111, 0.853, 0.979 and 0.616, respectively. The first factor accounts for 76.7 percent of the total variance in the quality indicator of risk disclosure.

5.2 Empirical results

This section presents the OLS regression results for all variables discussed in the previous sections. Tables III and IV display the regression results based on the dependent variables of risk disclosure quality and its five quality dimensions. Table V shows the regression results based on the dependent variable of market liquidity. Tables III and IV present the empirical results for the risk disclosure score compared with the hypotheses. Excluding COV, firm size is significantly and positively associated with all other dimensions of risk disclosure quality and quantity. Furthermore, the positive coefficient sign indicates that firm size has a positive relationship with both risk disclosure quantity and overall quality. This is consistent with the assumptions of this paper according to signalling theory. It also concurs with prior empirical evidence (Linsley and Shrives, 2006).

The findings show that high-risk firms do not provide more risk information: DQAN firm risk is significantly associated with quantitative information contained in risk disclosures at the one percent significance level, while for COV there is a positive association at the ten percent level. According to signalling theory, high-risk firms are more likely to disclose more risk information in order to avoid market misinterpretation. Previous research has found a positive relationship between firm risk and risk disclosures (Elshandidy and Neri, 2015). However, the results of this paper do not support prior findings concerning the financial firms listed in the Shanghai A-shares market.

Capital structure is significantly and negatively related to risk disclosure quantity and quality. A possible reason for this is that high-leverage firms are at increased risk of bankruptcy, and are therefore less willing to disclose information on a frequent basis. Managers in these firms may tend to avoid transparency. The negative relationship derived from these results is consistent with previous studies (Healy *et al.*, 1999). Furthermore, capital structure is not significantly associated with COV and OUL, implying that in the Chinese financial market capital structure is not one of the primary indicators for financial listed companies' disclosure levels.

The BTM ratio is positively correlated with QAN and risk disclosure depth (both in terms of quantity and quality). This result is consistent with Cheng *et al.* (2006), who state that a high BTM ratio indicates a higher cost of equity, for which investors require more and higher-quality risk-related information. This paper finds no evidence that the BTM ratio is significantly associated with the risk disclosure quality indicators for financial firms listed in the Shanghai A-shares market.

With regard to the variables related to directors – board size (BS) and board independence (BI) – we can notice different behaviours. The size of the board seems not to affect risk disclosure quantity and quality while the coefficients of board independence are negative in five of the six models in Table III and they show significant findings for most of them. According to agency theory, the main duty of independent NEDs on the board is to monitor the board's activities. Although previous studies have found a positive relationship between board independence and risk disclosure (Abraham and Cox, 2007), the findings of this paper provide no evidence of this, confirming what is highlighted in the background section in terms of governance mechanisms in the Chinese market. The coefficients of CEO duality, Audit Quality and State Ownership are not significant in the period of analysis and are also consistent with the period of transition that the Chinese economy and, consequently, the financial companies operating there, are experiencing.

If we consider the aggregate level of disclosure – QAL – we continue to find evidence of the patterns previously highlighted: a general positive interaction with size and book to market, a moderate negative interaction with capital structure and a marked negative interaction with the presence of board independent directors. These findings confirm that at this stage of Chinese market development, companies' characteristics and market indicators can capture some of the risk disclosure configurations, while the corporate governance indicators do not provide significant results or do not confirm previous studies (as with the case of the number of independent directors in the board of directors).

[Insert Table III]

[Insert Table IV]

Table V, in Model 1 and Model 2, shows how quality and quantity of risk disclosure affect market liquidity. Our results highlight a negative association between bid-ask spread and risk disclosure quantity and quality, suggesting that this information is useful as investors are likely to consider it while they making their price decisions. Our result is consistent with the notion that the Chinese market is complying with new disclosure regulations. Observing the significant impact for both QAL and QAN highlights that risk disclosure plays an important role in reducing information asymmetry and arguably suggesting that quantity and quality are complementary.

A significant and negative association has been found with the trading volume in the time period considered. This may have been driven by trading activity on the market that

shows an increasing pattern over the years and a consequent readjustment during and after the financial crisis.

[Insert Table V]

5.3 Further analysis: Subsample analysis and robustness checks

Table VI and VII reports the results of the subsample analysis for each of the three years considered in order to verify the behaviour in the cut-off year (2014), in the year before (2013) and in the year after (2015). As for Table IV and V, we present the regression results based on the dependent variables of risk disclosure quality and we checked how quality (Model 1) and quantity (Model 2) of risk disclosure affect market liquidity.

We notice that QAL still shows a positive association with size, at the one percent significance level in each year, and book to market, at the five percent significance level in 2013 and 2014 and at the one percent significance level in 2015, while a marked negative interaction with the presence of board independent directors is confirmed only for year 2015. Furthermore, in each year QAN illustrates a completely similar behaviour highlighting the same interactions with size, book to market and board independence for the above mentioned years.

The analysis provided on a yearly basis seems to confirm the general picture of the Chinese marker previously discussed. In the year 2013, the results suggest that the quantity and the quality of risk information are significantly affecting the market liquidity, suggesting that this information is likely to be informative and as a result the investors have responded by incorporating such information in their decisions. For the years 2014 (during the crisis) and 2015 (post the crisis), we do not observe any significant impact for risk disclosure on market liquidity, suggesting that risk information in these two years does not contain information useful to the market. Our findings for those two years suggest that Chinese firms over the period of crisis are likely to provide generic risk information. Collectively, our results indicate that our conclusions discussed under Table V are attributed and driven by risk disclosures made in the year 2013.

For the other control variables in the same table, in the year 2013 (before the crisis), we find that SPV, TV and BZ are significantly and negatively related to ask-bid spread, suggesting these factors are improving the market liquidity. For the year 2014 and the year 2015, our results suggest that SPV and AQ are the factors that are likely to significantly influence the market liquidity in these two extreme years.

[Insert Table VI]

[Insert Table VII]

We also ran additional tests to see if our results have been affected by endogeneity and structural change (Table VIII and Table IX). We replicate our main analyses under Tables III, IV and V by running fixed effects regressions. Arguably, these can be considered as a way to address the endogeneity problem since they eliminate the influence of time-invariant unobservable variables (e.g. Brown *et al.*, 2011). The determinants of QAN and QAL (Table VIII) risk disclosure under fixed effects models are broadly consistent with our general conclusions under Tables III and IV. Similarly, the conclusions of the impact of risk disclosure practices on the market liquidity, based on the fixed effects models (Table IX), are consistent with those drawn based on Table V, as previously discussed.

[Insert Table VIII]

[Insert Table IX]

6. Conclusion

This paper investigates how firm characteristics influence risk disclosure practices from the perspective of quality. It also examines the impact of risk disclosures on market liquidity. The sample consisted of financial firms listed in the Shanghai A-shares market, and a manual content analysis methodology was adopted. We find that firm size has a positive and significant association with risk disclosure quality. This finding is consistent with research by Linsley and Shrives (2006), and with both signalling and agency theories regarding managerial incentives, indicating that managers in larger firms tend to disclose more high-quality risk information to reduce information asymmetry. Furthermore, the results confirm that even in situations of political or financial instability (i.e. Marzouk, 2016) it is possible to find a relationship between risk disclosure and size. In agreement with previous results (Abraham and Cox, 2007; Linsley and Shrives, 2006), this paper finds no association between capital structure and risk disclosure. Other firm characteristics (firm risk and BTM ratio) are not significantly associated with risk disclosure quality, whereas previous studies have shown a positive relationship (Cheng *et al.*, 2006; Elshandidy and Neri, 2015). We conclude that firm risk and BTM ratio have no influence on the determination of risk disclosure. For financial firms listed in the Shanghai A-shares market, firm size is the most significant influencing factor in risk disclosure. As firm size increases, companies tend to disclose more higher-quality risk information to satisfy market requirements.

Our paper confirms previous results in terms of risk disclosure orientation (i.e. Beretta and Bozzolan, 2004), in fact the majority of risks disclosed by companies were found to have past and present rather than future outlook orientation. In agreement with Elshandidy and

Neri (2015), we find that risk disclosure practices have an impact on market liquidity, and when we analyse each year we notice that the results are driven by year 2013, while later we notice no or little significance for the emerging of the financial crisis. Our results suggest that Chinese banks provided the market with less informative risk information during the recent crisis of 2014 as managers of those banks despite complying with regulation and providing risk information, the content of this information, however, did not provide incremental value to the investors. The presence of endogenous variables may have affected the quality of the results and we address this potential weakness in section 5.3 (Table VIII and IX) using models with fixed effects to deal with this issue and the findings of the paper are still consistent.

This research has several implications for investors and regulators in China. For investors, the findings provide insights into how firm characteristics affect managers' propensity to reveal risk information. Investors may be able to rely on the significant factors identified in order to form expectations and evaluate disclosed risk information more comprehensively. For regulators in China, such as the CBRC and CSRC, these results draw attention to the role of risk disclosure as a component of the capital market system. Firm size is the only firm characteristic significantly associated with risk disclosure in annual reports. The influence of disclosure on liquidity in 2013 could be an important stimulus for regulators in increasing their efforts to improve reporting regulations.

Risk reporting mitigates information asymmetry between management and external shareholders, and may have positive effects on stakeholders' trust and confidence in a firm's management (Welker, 1995).

The accuracy of the manual content analysis methodology used in this paper may be limited due to its subjectivity. Also, the sample for this model focused only on financial firms in China. This means that the results are applicable and useful only within this range. The Chinese economy is in transition, which makes it unique compared with economies of developed countries.

In order to overcome the limitations, automated content analysis might be considered as an alternative to manual content analysis. The automated method would be able to capture more firms over longer periods of time. The problems of subjectivity and labour-intensiveness would also be solved through automation. Taking into account the trend for globalisation in the Chinese economy, further research might also observe the impact of these variables on risk disclosure across different nations.

In general, this paper confirms previous findings on the Chinese market (Ball *et al.*, 2000; Zou and Adams, 2008) in which, given a decreasing but still strong state presence, there

is higher stock volatility and weak corporate governance, but it will be important to study the behaviour of financial companies listed on the Chinese stock market in the following years to verify if the disclosure of risks will move to a more substantial level.

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Table I.

Descriptive Statistics: Dependent and Independent Variables

Panel A: Continuous Variables

	Observations	Mean	Std. Dev.	25%	Median	75%
Risk Disclosure Indicators:						
Quantity (QAN)	300	3.974	0.872	3.401	3.663	4.905
Coverage (COV)	300	0.632	0.063	0.601	0.657	0.681
Depth_Quantitative (DQAN)	300	0.721	0.837	0.000	0.693	1.386
Depth_Qualitative (DQAL)	300	3.954	0.867	3.367	3.651	4.871
Outlook_Profile (OUL)	300	1.668	0.642	1.386	1.609	2.079
Quality (QAL)	300	0.002	0.993	-0.721	-0.390	1.180
Reporting Incentives:						
Firms Size (FS)	300	17.27	2.798	15.589	16.735	18.594
Risk (RS)	300	0.280	0.305	0.105	0.250	0.470
Capital Structure (CS)	300	1.928	1.902	0.494	1.419	2.663
Book-to-Market (BTM)	292	3.100	4.302	1.135	1.795	3.100
Board Size (BS)	300	2.375	0.276	2.303	2.303	2.485
Board Independence (BI)	300	0.373	0.052	0.333	0.364	0.400
Market Indicators:						
Market Liquidity (ML)	293	0.133	0.884	0.066	0.109	0.176
Trading Volume (TV)	300	3.661	3.169	1.535	2.844	4.483
Share Price Volatility (SPV)	300	0.415	0.098	0.355	0.417	0.480

Panel B: Dichotomous Variables

	Yes (%)	No (%)
Ceo Duality (CD)	42 (14%)	258 (86%)
Audit Quality (AQ)	105 (35%)	195 (65%)
State Ownership (ST)	139 (47%)	161 (53%)

Notes: There is no cross-listed firm in the sample list. All financial firms in the Shanghai A-shares market are listed only in China.

Panel A explains the descriptive statistics of all variables. These include risk disclosure, firm characteristics, corporate governance and market indicators. For risk disclosure, *Quantity (QAN)* is calculated as the natural logarithm of the total number of sentences containing risk information in annual reports. *Coverage (COV)* is calculated as the inverse of the Herfindahl index value divided by the number of risk topics. *Depth_Quantitative (DQAN)* is measured as the natural logarithm of the number of risk information sentences containing quantitative information. *Depth_Qualitative (DQAL)* is the natural logarithm of the number of risk information sentences containing qualitative information. *Outlook_Profile (OUL)* is measured as the natural logarithm of risk information sentences containing firms' future actions regarding the identified risk. *Quality (QAL)* is the score of the principal component with the highest eigenvalue calculated from the above five indicators.

The firm characteristic variables are as follows: *firm size (FS)* is measured as the natural logarithm of total assets; *risk (RS)* is measured by the beta, which is the covariance expressing a firm's market return compared with a 23- to 25-month market index; *capital structure (CS)* is measured as the log of leverage; and *book-to-market (BTM)* is measured as the ratio of the book value of equity divided by its market value.

Corporate governance includes the following variables: *board size (BS)* is the total number of directors on the board; *board independence (BI)* is the ratio of independent NEDs to board size; *CEO duality (CD)* is a dummy variable taking the value of 1 if an individual holds both the position of CEO and chairman; *audit quality (AQ)* is a dummy variable taking the value 1 if the external auditor is one of the Big Four audit firms; and *state ownership* is a dummy variable taking the value of one if the company is owned by the state..

Market indicators include: *market liquidity (ML)*, measured as the three-month average of relative spreads from beginning of May to end of July; *trading volume (TV)*, measured as the daily trading volume divided by the number of outstanding shares; and *share price volatility (SPV)*, measured by the standard deviation of daily stock prices.

Panel B shows the frequencies of the three dummy variables, CEO duality (*CD*), audit quality (*AQ*) and state ownership (*ST*).

Table II.

Correlation Analysis for Continuous Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) QAN														
(2) COV	-.146***													
(3) DQAN	.793***	-.171***												
(4) DQAL	.999***	-.144***	.779***											
(5) OUL	.508***	.037	.409***	.508***										
(6) QAL	.983***	-.111**	.853***	.979***	.616***									
(7) FS	.784***	-.163***	.663***	.783***	.282***	.757***								
(8) RS	.180***	.018	.248***	.176***	.003	.188***	.144***							
(9) CS	.272***	-.031	.197***	.272***	.185***	.270***	.435***	.024						
(10) BTM	-.223***	.064	-.159***	-.224***	-.073	-.206***	-.482***	-.005	-.121**					
(11) BS	.617***	-.196***	.568***	.614***	.252***	.610***	.698***	.216***	.278***	-.290***				
(12) BI	-.080	.041	-.071	-.078	-.135**	-.094*	-.028	.020	-.048	-.014	-.236***			
(13) ML	-.082	-.036	-.120**	-.079	.017	-.089*	.068	-.059	.077	-.074	.042	.004		
(14) TV	-.230***	.127**	-.204***	-.229***	-.062	-.218***	-.401***	-.087*	-.148***	.168***	-.335***	-.071	-.221***	
(15) SPV	-.455***	.110**	-.401***	-.453***	-.162***	-.443***	-.542***	-.246***	-.028	.216***	-.470***	-.013	-.076	.412***

This table gives the Pearson correlations of the continuous variables for financial firms listed as Shanghai A-shares firms. To mitigate the influence of outliers, all continuous variables are winsorised by eliminating observations at the 1st and 99th percentile. Definitions of the above variables are the same as shown in Table I, and as detailed in Appendix 2. *, ** and *** indicate significance for two-tailed tests at the 0.1, 0.05, and 0.01 significance levels respectively.

Table III.

Regression Results for the Various Quality Dimensions of Risk Disclosure

		QAN		**COV**		**DQAN**		**DQAL**		**OUL**	
	Predicted	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat
FS	+	.277***	14.15	-.001	-.20	.200***	8.52	.277***	14.12	.067***	2.72
RS	+	.114	1.16	.019*	1.56	.305***	2.60	.102	1.04	-.130	-1.06
CS	+	-.042***	-2.48	.002	.74	-.050***	-2.47	-.041***	-2.42	.022	1.03
BTM	?	.042***	5.49	-.001	-.34	.408***	4.41	.041***	5.38	.010	1.06
BS	+	.043	.27	-.038*	-1.86	.279	1.45	.030	.19	.035	.17
BI	+	-1.70***	-2.83	.010	.13	-1.21*	-1.68	-1.66***	-2.77	-1.57**	-2.09
CD	-	.038	.46	.002	.20	-.050	-.50	.043	.52	-.118	-1.13
AQ	+	.062	.77	-.013	-1.27	.110	1.14	.059	.074	-.020	-.19
ST	?	-0.045	-.72	-.003	-.40	0.067	.89	-.052	-.84	-.041	-.52
Intercept		-.372	-.87	.725***	13.36	-3.13***	-6.12	-.355	-.83	1.01**	1.89
Adjusted R-squared		0.6779		0.0268		0.5031		0.6745		0.0832	
F-statistics		69.04		1.89		33.74		68.00		3.93	
Observation		292		292		292		292		292	
Mean VIF		1.68		1.68		1.68		1.68		1.68	
Max VIF		3.77		3.77		3.77		3.77		3.77	

This table shows the impact of firm characteristics and control variables on risk disclosure quantity and quality. The R-squared value describes the model's ability to account for changes in each risk quality indicator. Variance Inflation Factors (VIF) quantifies the severity of multicollinearity in an ordinary least squares regression analysis. Since the mean and max VIF for all variables is less than 10, there is no multicollinearity problem. To mitigate the influence of outliers, all continuous variables are winsorised by eliminating observations at the 1st and 99th percentile. Definitions of the above variables are identical to those given in Table I, and as detailed in Appendix 2.

Table IV.

Regression Results for the Quality of Risk Disclosure

		QAL	
	Predicted	Coef.	T-stat
FS	+	.299***	12.58
RS	+	.153	1.29
CS	+	-.041**	-2.01
BTM	?	.048***	5.19
BS	+	.104	0.54
BI	+	-2.10***	-2.88
CD	-	-.010	-.10
AQ	+	.065	.67
ST	?	-0.035	-.46
Intercept		-4.75***	-9.18
Adjusted R-squared		0.6336	
F-statistics		56.91	
Observation		292	
Mean VIF		1.68	
Max VIF		3.77	

This table displays the impact of firm characteristics and control variables on risk disclosure quality. Variance Inflation Factors (VIF) quantifies the severity of multicollinearity in an ordinary least squares regression analysis. Since the mean and max VIF for all variables is less than 10, no multicollinearity problem exists. To mitigate the influence of outliers, all continuous variables are winsorised by eliminating observations at the 1st and 99th percentile. Definitions of the above variables are the same as those given in Table I, and as detailed in Appendix 2.

Table V.

OLS Regressions of the Impact of Risk Disclosure Quality and Quantity on Market Liquidity

		Model 1 QAL		Model 2 QAN	
	Predicted	Coef.	T-stat	Coef.	T-stat
QAL	?	-.024***	-2.64		
QAN	?			-.029***	-2.72
FS	+	.006	1.29	.007*	1.47
RS	+	-.012	-.67	-.013	-.70
CS	+	.002	.58	.001	.49
BTM	?	-.000	-.06	.000	.01
SPV	-	-.037	-.54	-.036	-.52
TV	-	-.005***	-2.92	-.005***	-2.91
BS	+	.008	.28	.008	.26
BI	+	-.092	-.83	-.094	-.85
CD	-	-.017	-1.09	-.015	-1.02
AQ	+	-.016	-1.10	-.015	-1.07
ST	?	.002	.17	.001	.13
Intercept		.086	.81	.185**	1.93
Adjusted R-squared		0.0575		0.0590	
F-statistics		2.44		2.48	
Observation		285		285	
Mean VIF		2.05		2.14	
Max VIF		6.68		7.27	

This table shows the results concerning the impact of risk disclosure quality and quantity on market liquidity for financial firms listed in the Shanghai A-shares market. Variance Inflation Factors (VIF) quantifies the severity of multicollinearity in an ordinary least squares regression analysis. Since the mean and max VIF for all variables is less than 10, no multicollinearity problem exists. To mitigate the influence of outliers, all continuous variables are winsorised by eliminating observations at the 1st and 99th percentile. Definitions of the above variables are identical to those given in Table I, and as detailed in Appendix 2.

Table VI.

Regression Results for the Quality and Quantity of Risk Disclosure spread by year

		2013				2014				2015			
		Model 1 QAL		Model 2 QAN				N		Model 2 QAN	Model 1 QAL		Model 2 C
	Predicted	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat
S	+	.262***	5.90	.248***	6.64	.331***	6.67	.297***	7.55	.321***	9.01	.299***	9.88
S	+	.347	1.40	.269	1.29	.280	1.25	.205	1.16	.143	.75	.060	.37
S	+	-.024	-.65	-.023	-.74	-.045	-1.16	-.048	-1.57	-.053*	-1.63	-.054**	-1.93
TM	?	.046**	2.38	.040**	2.50	.046**	2.09	.040**	2.32	.056***	4.37	.047***	4.34
S	+	.237	.67	.199	.67	.125	.33	.022	.07	-.234	-.75	-.227	-.85
I	+	-.130	-.10	.268	.24	-2.06	-1.44	-1.88*	-1.66	-4.42***	-3.74	-3.800***	-3.79
D	-	.059	.26	.140	.73	-.019	-.11	.033	.24	-.083	-.54	-.045	-.35
Q	+	.089	.47	.083	.53	-.115	-.64	-.048	-.34	.127	.82	.074	.56
T	?	-0.046	-.33	-.042	-.36	-.146	-1.03	-.119	-1.06	.067	.53	.012	.11
ntercept		-5.25***	-5.58	-1.05	-1.32	-5.180***	-5.60	-.498	-.68	-3.61***	-4.13	.627	.85
djusted -squared			0.5788		0.6319	0.6164		0.6713		0.6872		0.7133	
-statistics			15.66		19.31	18.14		22.78		24.68		27.82	
Observatio			97		97	97		97		98		98	
Iean VIF			1.74		1.74	1.91		1.91		1.69		1.69	
Iax VIF			3.80		3.80	4.92		4.92		3.47		3.47	

Table VII.

OLS Regressions of the Impact of Risk Disclosure on Market Liquidity spread by year

		2013				2014				2015			
		Model 1 QAL		Model 2 QAN		Model 1 QAL		Model 2 QAN		Model 1 QAL		Model 2 QAN	
	Predicted	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat	Coef.	T-stat
QAL	?	-.050***	-3.34			.001	.07			-.010	-.71		
QAN	?			-.067***	-3.84			-.003	-.27			-.013	-.75
FS	+	.006	.81	.010	1.24	-.000	-.05	.001	.16	-.002	-.28	-.001	-.19
RS		-.035	-1.01	-.034	-1.03	-.018	-.86	-.017	-.82	-.045*	-1.66	-.046*	-1.71
CS	+	.006	1.14	.006	1.13	.004	1.10	.004	1.03	.008*	1.82	.008*	1.79
BTM	?	.001	.54	.002	.73	.000	0.14	.000	.22	-.002	-1.12	-.002	-1.11
SPV	-	-.384***	-3.11	-.398***	-3.27	-.185*	-1.80	-.184*	-1.80	-.372***	-3.54	-.373***	-3.55
TV	-	-.007***	-2.41	-.007**	-2.22	-.003	-1.14	-.003	-1.07	-.002	-.87	-.002	-.86
BS	+	-.106**	-2.14	-.102**	-2.10	.024	0.69	.025	.70	.034	.77	.035	.77
BI	+	-.166	-.89	-.137	-.74	-.143	-1.08	-.151	-1.13	-.038	-.22	-.041	-.24
CD	-	.014	.46	.021	.68	-.008	-.50	-.008	-.51	-.003	-.15	-.003	-.14
AQ	+	.010	.38	.011	.43	-.025*	-1.45	-.025*	-1.45	-.036**	-1.73	-.037*	-1.76
ST	?	.004	.23	.004	.23	.000	.02	-.000	-.00	.009	.54	.009	.51
Intercept		.580***	3.18	.771***	4.66	.172	1.25	.164	1.33	.268*	1.69	.313	2.19
Adjusted R-squared		0.2306		0.2591		.0667		0.0675		0.1565		0.1570	
F-statistics		3.35		3.74		1.56		1.57		2.45		2.46	
Observation		95		95		95		95		95		95	
Mean VIF		2.10		2.18		2.43		2.53		2.28		2.38	
Max VIF		6.24		6.65		8.50		9.19		7.65		8.42	

This table shows the results concerning the impact of risk disclosure quality and quantity on market liquidity for financial firms listed in the Shanghai A-shares market on yearly basis. Variance Inflation Factors (VIF) quantifies the severity of multicollinearity in an ordinary least squares regression analysis. Since the mean and max VIF for all variables is less than 10, no multicollinearity problem exists. To mitigate the influence of outliers, all continuous variables are winsorised by eliminating observations at the 1st and 99th percentile. Definitions of the above variables are identical to those given in Table I, and as detailed in Appendix 2.

Table VIII.

Fixed Regression Results for the Quantity and Quality of Risk Disclosure

		QAL		QAN	
	Predicted	Coef.	T-stat	Coef.	T-stat
FS	+	.184***	7.30	.188***	6.26
RS	+	.112	1.11	.070	.58
CS	+	-.016	-.83	-.020	-.87
BTM	?	.006	.82	.009	.94
BS	+	.162	.86	.220	.98
BI	+	-.720	-1.25	-.975	-1.42
CD	-	.091	1.01	.129	1.20
AQ	+	.091	1.00	.068	.62
ST	?	-0.013	-.17	-.012	-.12
Intercept		.611	1.21	-3.46***	-5.78
Adjusted R-squared		0.4534		0.3810	
F-statistics		16.77		12.45	
Observation		292		292	

Using the fixed-effect estimations, this table displays the impact of firm characteristics and control variables on risk disclosure quality and quantity Variance Inflation Factors (VIF) quantifies the severity of multicollinearity in an ordinary least squares regression analysis. Since the mean and max VIF for all variables is less than 10, no multicollinearity problem exists. To mitigate the influence of outliers, all continuous variables are winsorised by eliminating observations at the 1st and 99th percentile. Definitions of the above variables are the same as those given in Table I, and as detailed in Appendix 2. The significance indicators are the same as those in Tables III and IV.

Table IX.

Estimates of fixed effects of the Impact of Risk Disclosure on Market Liquidity

		Market Liquidity			
		Model 1 QAL		Model 2 QAN	
	Predicted	Coef.	T-stat	Coef.	T-stat
QAL	?	-.029**	-2.00		
QAN	?			-.026*	-1.51
FS		.006	.92	.005	.78
RS	+	-.007	-.32	-.007	-.29
CS	+	-.001	-.33	-.001	-.29
BTM	?	.001	.060	.001	.54
SPV	-	.325***	3.77	.321***	3.71
TV	-	-.001	-.51	-.001	-.54
BS	+	.072*	1.62	.071*	1.57
BI	+	-.059	-.44	-.051	-.38
CD	-	-.016	-.74	-.018	-.80
AQ	+	-.001	-.04	-.000	-.02
ST	?	-.011	-.59	-.011	-.59
Intercept		-.242*	-1.66	-.123	-.92
Adjusted R-squared		0.1231		0.1145	
F-statistics		2.01		1.85	
Observation		285		285	

Using the fixed-effect estimations, this table shows the results concerning the impact of risk disclosure quality and quantity on market liquidity for financial firms listed in the Shanghai A-shares market. Variance Inflation Factors (VIF) quantifies the severity of multicollinearity in an ordinary least squares regression analysis. Since the mean and max VIF for all variables is less than 10, no multicollinearity problem exists. To mitigate the influence of outliers, all continuous variables are winsorised by eliminating observations at the 1st and 99th percentile. Definitions of the above variables are identical to those given in Table I, and as detailed in Appendix 2. The significance indicators are consistent with those in Table V.

Appendix 1. Example of Measurement of the Risk Disclosure Quality Score

This appendix uses The Pacific Securities Company Limited annual report 2014 as example to demonstrate the calculation of the indicators of risk disclosure quality.

(1) Quantity (QAN) = ln(total number of sentences contained risk disclosure) – Disclosure score = Quantity = ln(131) = 4.88

(2) Coverage (COV)= [(1/H)/Number of main risk topics]

The risk disclosures of The Pacific Securities Company Limited in its 2014 annual report are divided into three main risk topics:

Financial risks: 50 sentences

Damage risks: 0 sentences

Risk management: 81 sentences

Total: 131 sentences

- Herfindahl index = H = $(50/131)^2 + (0/131)^2 + (81/131)^2 = 0.764$
- Disclosure score = Coverage = $(1/0.764)/3 = 0.44$

(3) Semantic properties of risk disclosure

Example sentences:

		DQAL	DQAN	OUL
1)	2015 年,公司将进一步树立全面风险管理意识，注重发挥事前、事中、事后的全链条合规管理职能，建立从后台管理部门到一线业务部门。 The company will further establish comprehensive risk management awareness, pay attention to before, during and after periods in 2015. Also the company will focus on compliance of management functions.	✓		✓
2)	母公司的净资本为 54.64 亿元，净资本与股东权益的比例为 85.47%，公司资产质量优良，各项财务及业务风险控制指标符合《证券公司风险控制指标管理办法》的有关规定。 Net capital of the parent company was 5.464 billion yuan, the ratio of net capital and shareholders' equity was 85.47%, good quality assets of the company; the financial and business risk control indicators comply with the relevant provisions of the "The Management of Securities Risk Control Indicators".		✓	

Therefore, in the 2014 annual report of The Pacific Securities Company Limited, the scores are as follows:

DEPTH_QUALITATIVE (DQAL) = 125

- Disclosure score = ln(125) = 4.83

DEPTH_QUANTITATIVE (DQAN)= 6

- Disclosure score = ln(6) = 1.79

OUTLOOK_PROFILE (OUL)= 21

- Disclosure score = ln(21) = 3.04

Appendix 2. Summary of variable definitions, measures and sources

Variable	Definition and measures	Source
Panel A: Continuous variables		
Risk disclosure incentives		
QAN	Quantity refers to the amount of sentences containing risk information and is calculated as the natural logarithm of the total number of sentences containing risk information in annual reports	Thomson One Banker / Company website
COV	Coverage is the coverage of risk information contained in the annual reports and is calculated as the inverse of the Herfindahl index value divided by the number of risk topics	Thomson One Banker / Company website
DQAN	Depth_Quantitative includes the quantity risk-related information about expected future performance and is measured as the natural logarithm of the number of risk information sentences containing quantitative information	Thomson One Banker / Company website
DQAL	Depth_Qualitative includes the quality risk-related information about expected future performance and is the natural logarithm of the number of risk information sentences containing qualitative information	Thomson One Banker / Company website
OUL	Outlook_Profile refers to information about the risk management approach and is measured as the natural logarithm of risk information sentences containing firms' future actions regarding the identified risk	Thomson One Banker / Company website
QAL	Composite is the score of the principal component with the highest eigenvalue calculated from the above five indicators	Thomson One Banker / Company website
Reporting incentives		
FS	Firm size is measured as the natural logarithm of total assets	Datastream
RS	Risk is measured by the beta, which is the covariance expressing a firm's market return compared with a 23- to 25-month market index	Datastream
CS	Capital structure is measured as the log of leverage	Datastream
BTM	Book-to-market is measured as the ratio of the book value of equity divided by its market value	Datastream
BS	Board size is the total number of directors on the board	Orbis/Annual report
BI	Board independence is the ratio of independent NEDs to board size	Orbis/Annual report
Market indicators		
ML	Market liquidity, measured as the three-month average of relative spreads from beginning of May to end of July	Datastream

TV	Trading volume, measured as the daily trading volume divided by the number of outstanding shares	Datastream
SPV	Share price volatility, measured by the standard deviation of daily stock prices	Datastream
Panel B: Dicotomous variables		
CD	CEO duality is a dummy variable taking the value of 1 if an individual holds both the position of CEO and chairman	Orbis/Annual report/Company website
AQ	Audit quality is a dummy variable taking the value 1 if the external auditor is one of the Big Four audit firms	Orbis/Annual report/Company website
ST	State ownership is a dummy variable taking the value 1 if the company is ownded by the chinese state	Orbis/Annual report/Company website

This table provides the definition and measures of risk reporting, firm, market and corporate governance characteristics. It also provides the source of each variable. To mitigate the influence of outliers, all continuous variables are winsorised by eliminating observations at the 1st and 99th percentile.