

Evolution of China-Related Topics in Academic Accounting Research: Machine Learning Evidence*

June Cao,¹ Zhanzhong Gu,² and Iftekhar Hasan³

Received 9th of July 2020 Accepted 14th of October 2020

© The Author(s) 2020. This article is published with open access by The Hong Kong Polytechnic University.

Abstract

This study employs an unsupervised machine learning approach to explore the evolution of accounting research. We are particularly interested in exploring why international researchers and audiences are interested in China-related issues; what kinds of research topics related to China are mainly investigated in globally recognised journals; and what patterns and emerging topics can be explored by comprehensively analysing a big sample. Using a training sample of 23,220 articles from 46 accounting journals over the period 1980 to 2018, we first identify the optimal number of accounting research topics; the dynamic patterns of these accounting research topics are explored on the basis of 46 accounting journals to show changes in the focus of accounting research. Further, we collect articles related to Chinese accounting research from 18 accounting journals, eight finance journals, and eight management journals over the period 1980 to 2018. We objectively identify China-related accounting research topics and map them to the stages of China's economic development. We attempt to identify the China-related issues global researchers are interested in and whether accounting research reflects the economic context. We use *HistCite*TM to generate a citation map along a timeline to illustrate the connections between topics. The citation clusters demonstrate “tribalism” phenomena in accounting research. The topics related to Chinese accounting research conducted by international accounting researchers reveal that accounting changes mirror economic reforms. Our findings indicate that accounting research is embedded in the economic context.

Keywords: Textual Analysis, Machine Learning, Network Analysis, Accounting Research in China, Economic Development

JEL: B26, M40

* We wish to thank the Senior Track Editor (Professor C. S. Agnes Cheng), an anonymous referee, and Professor Tom Smith from Macquarie University for their valuable comments and suggestions.

¹ June Cao, School of Accounting, Curtin Business School, Curtin University. Email: june.cao@curtin.edu.au.

² Zhanzhong Gu, School of Electrical and Data Engineering, Faculty of Engineering & IT, University of Technology Sydney. Email: zhanzhong.gu@student.uts.edu.au.

³ Corresponding author: Iftekhar Hasan, Fordham University, Bank of Finland and University of Sydney. Email: ihasan@fordham.edu.

I. Introduction

This study contributes to the accounting literature by using an unsupervised machine learning approach to provide a full picture of the accounting research related to Chinese topics published in internationally recognised journals in the period 1980 to 2018. The study aims to identify focal topics, the relationships between these topics, the dynamic of these topics, and emerging topics. Moreover, we further explore whether accounting research mirrors the economic changes in China and why international researchers are interested in China-related topics.

We first utilise 23,220 abstracts of accounting studies from 46 accounting journals as our training sample and apply unsupervised machine learning to analyse themes and classify research topics. Using the latent Dirichlet allocation (LDA) model, we then obtain the optimal number of accounting research topics. Rather than depending on the *Journal of Economic Literature* (JEL) codes, we apply unsupervised machine learning to conduct a theme analysis in order to classify the research topics. We do not identify the research topics according to JEL classification codes for the following reasons. First, JEL codes are not reported by some journals, such as *The Accounting Review* (TAR), the *Journal of Accounting and Economics* (JAE), *Management Science* (MS), the *Academy of Management Journal* (AMJ), the *Academy of Management Review* (AMR), *Accounting, Organizations and Society* (AOS), and *Auditing: A Journal of Practice and Theory* (AJPT). However, JEL codes are reported in some accounting and finance journals, such as the *Journal of Accounting Research* (JAR), *Contemporary Accounting Research* (CAR), and the *Review of Accounting Studies* (REST). Second, JEL codes are a form of general classification but do not signal specific research topics. In our study, we are not only interested in general accounting and auditing issues (JEL codes: M4-Accounting and Auditing; M41-Accounting; M42-Auditing; M48-Government Policy and Regulation) but also in specific accounting and auditing issues, such as earnings quality, accounting standards adoption, auditors' independence and competency, and audit fees. Third, JEL codes may be subjective because they are self-reported. There is little evidence on the precision of authors' classifications. Therefore, our study uses unsupervised machine learning to obtain a more objective classification of topics. Furthermore, this approach enables us to identify specific rather than general topics. Moreover, we can explore the dynamics of research topics in accounting.

We apply the LDA model trained on published papers obtained from the *Web of Science*. In total, we obtain 23,220 articles from 46 accounting journals (Table 1). The LDA model shows that the optimal number of accounting research topics is 55 (see Figure 3). Further, we collect 1,168 articles related to Chinese accounting research from 18 accounting journals, eight finance journals, and eight management journals over the period 1980 to 2018. On the basis of the training outcomes, we utilise the LDA model to map China-related articles to each research topic.

We further generate an inter-topic distance map which shows the frequency of each term within a topic (see examples in figures 4–6). We then go back and read the abstracts. Combining key terms and the frequency of each term with the abstracts, we specify the content of each topic over the last 38 years (1980–2018). The biggest topics related to China include “accounting in context”, “institutional accounting”, “earnings management”, “economic consequences”, and “accounting standards” (see Table A1 in Appendix I for more details).

Furthermore, we implement the dynamic topic model (DTM) to reveal the dynamics of each accounting research topic and explore emerging topics. Specifically, we show the dynamics of key terms (see examples in figures 5–6) and visualise them (Figure 8). We find that the dynamics of the topic “accounting standards” are quite consistent with the development stages of Chinese accounting standards (CAS). It is worth noting that the topic “auditing” achieved its peaks during 2000 and 2005. This is also consistent with the development and regulation of Chinese certified public accountants (CPAs) and fraud cases in the Chinese market.

We also identify the following topics which particularly reflect the institutional environment of China: “corporate entrepreneurship”, “executive compensation”, “macro-economics and accounting”, “internationalization”, “*guanxi*/social networks”, “performance measurement”, “corporate governance”, and “risk management”. The findings of this study provide a big picture of China-related issues to both international and local researchers. This could enhance our understanding of accounting research, regulation and policy changes, and economic development by visualising the top research topics, the connections between topics, and the dynamics of topics to reflect new research streams or emerging issues.

The paper proceeds as follows. Section II briefly discusses the background of accounting standards and economic development in China. Section III outlines the methodologies used to perform the textual analysis, namely, LDA and the DTM. Section IV discusses the sample, data sources, and data cleaning. Section V identifies the major research streams, maps the research topics to economic development, and shows the cross-topic connections and emerging research trends. Section VI concludes the paper and sets an agenda for future research.

II. Chinese Accounting and Economic Development

The driving force of accounting changes is economic development and globalisation (Cao, 2019). From the Qing Dynasty’s “closed-door” policy (1644–1912) (Balatbat *et al.*, 2013) to the opening up and economic reform started in 1978 (China Securities Regulatory Commission (CSRC) 2008), China has undertaken an unprecedented transition from a centrally planned economy to a market economy based on socialist principles. The Chinese

capital market has experienced rapid development, achieving a level that other mature markets took 100 years to reach (CSRC, 2008). This has been recognised by international investors and has attracted a large number of international investors and foreign companies to invest in China. With growing economic globalisation, China took an essential step for the Chinese economy to be further integrated with international capital markets worldwide when it converged CAS with international financial reporting standards (IFRS) in 2007.

Along with rapid globalisation and economic reforms, China's Ministry of Finance (MOF)⁴ has been committed to converging CAS with IFRS. As presented in Table B1 in Appendix II, the convergence process can be classified into four distinct stages: (1) 1992 CAS: 1993–1997; (2) 1998 CAS: 1998–2000; (3) 2001 CAS: 2001–2006; and (4) 2006 CAS: 2007–present (Cao, 2019; Peng and van der Laan Smith, 2010).

During the first stage (1993–1997), the MOF issued the first nationwide accounting standards (1992 CAS). The 1992 CAS were based on the Anglo-American model rather than the Soviet-style fund-based accounting model but retained Chinese characteristics (Balatbat *et al.*, 2013).⁵ As shown in Table B2 of Appendix II, the percentage of full convergence (FC) and substantial convergence (SC) at this stage was only 20% (13%+7%).

The second stage of the convergence process was from 1998 to 2000. In 1998, the MOF replaced the 1992 CAS with the 1998 CAS, which included 10 specific accounting standards for joint stock limited enterprises. The percentage of FC and SC during this period was 35% (20%+15%).

The third stage was from 2001 to 2006. In 2001, the MOF replaced the 1998 CAS with the 2001 CAS, which comprised 16 specific accounting standards. Table B2 in Appendix II shows that the FC and SC at this stage was 49% (32%+17%).

The fourth stage covers the period from 2007 to the present. In 2006, the MOF formally stated that CAS had substantially converged with IFRS. The 2006 CAS included a revised basic standard and 38 specific accounting standards, which replaced the 2001 CAS and indicated CAS's convergence with IFRS (details are provided in Table B1 in Appendix II), effective as of 1 January 2007. Table B2 in Appendix II shows that the percentage of FC and SC is now 77% (65%+12%).

Ball (2016) states that “[t]he underlying force behind increased globalization in accounting is increased globalization of the markets in which financial statement information is used (capital, product, supply, labor, corporate control) and increased

⁴ The MOF is a government body. It is the only entity authorised to issue accounting standards which are mandatory for all Chinese business enterprises. The function of the MOF is similar to the Financial Accounting Standards Board (FASB) in the US (Peng and van der Laan Smith, 2010).

⁵ The Soviet-style fund-based accounting model defines accounting items quite differently from a principles-based Anglo-American model (Balatbat *et al.*, 2013, p. 4). Under the Soviet-style model, accountants are totally subject to the bureaucracy. The accounting reporting uses the specified structure of accounts and follows the sources and uses of funds concept, reflecting the state's economic plan, rather than the nature of modern transactions or business concepts in the accounting system (Doupnik and Perera, 2012).

globalization of the political forces that also influence financial reporting. Increased cross border transacting in all markets increases the demand for convergence in accounting language and reporting standards” (p. 552). It is therefore the time to investigate whether accounting convergence mirrors economic globalisation. This study examines this issue by reviewing the accounting research published in international journals and mapping research topics to the stages of accounting standards convergence and economic development on the basis of a topic analysis model using an unsupervised machine learning approach.

III. Methodology

We apply “topic models” (Blei and Lafferty, 2006), namely, the LDA model and the DTM, to perform a textual analysis to identify patterns of research topics. The unsupervised machine learning algorithm is trained by reading all abstracts of published papers from 46 accounting journals to achieve an optimal classification of accounting topics. On the basis of the training procedure, we further identify research topics about China. Furthermore, we explore the dynamic patterns of these topics with the purpose of mapping the dynamics of accounting topics to economic development stages.

3.1 Latent Dirichlet Allocation Model

The LDA model is a “generative probabilistic model for collections of discrete data such as text corpora” (Blei *et al.*, 2003, p. 993).⁶ It is an appropriate model to use in the textual analysis context to identify topics (Blei and Lafferty, 2005, 2006). It enables us to find short and concise descriptions (topics) of the documents that provide an explicit representation preserving the essential statistical relationships. These statistical relationships are “useful for basic tasks such as classification, novelty detection, summarisation, and similarity and relevance judgments” (Blei *et al.*, 2003, p. 993).

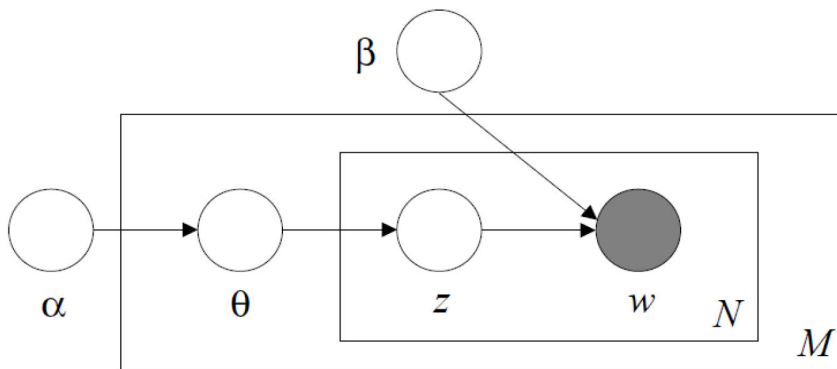
Compared with other algorithms for dimensionality reduction, a distinguishing feature of LDA is that it is fully probabilistic (Hansen *et al.*, 2018). LDA is a three-level (word level, document level, and corpus level) conditionally independent hierarchical Bayesian model. This is different from the traditional two-level Dirichlet-multinomial clustering model. Under LDA, a document can be associated with multiple topics with different proportions (Blei *et al.*, 2003). Thus, LDA can capture the heterogeneity in grouped data-carrying multiple latent patterns (Blei and Lafferty, 2006).

Consistent with Blei *et al.* (2003), we use the same notation. The basic unit of discrete data is a *word* denoted by $\{1, \dots, V\}$. Each unit basis vector in the vocabulary is represented by a V -vector w that equals one (that is, $w^v = 1$), and $w^u = 0$ if $u \neq v$. A *document* is a sequence of N words denoted by $w = \{w_1, w_2, \dots, w_N\}$, where w_N is the n th word

⁶ It is important to clarify that the LDA model is not necessarily tied to text contexts. It can also be used in other situations related to “collections of data, including data from domains such as collaborative filtering, content-based image retrieval and bioinformatics” (Blei *et al.*, 2003, p. 995).

in the sequence. A *corpus* is a collection of M documents denoted by $D = \{w_1, w_2, \dots, w_M\}$. As Figure 1 shows, the parameters α and β are corpus-level parameters, unobserved variables assumed to generate the text, and are to be estimated. The variable θ_d is a document-level variable, sampled once per document. Finally, the variables z_{dn} and w_{dn} are word-level variables and are sampled once for each word in each document. The basic logic of LDA is to explore a probabilistic model of *corpus* that assigns a high probability to members of the corpus and other “similar” documents to identify patterns of meaningful word groupings in document collections.

Figure 1 Hierarchical Graphical Model Representation of LDA



Note: The boxes are “plates” representing replicates. The outer plate represents documents, while the inner plate represents the repeated choice of topics and words within a document. Source: Blei *et al.* (2003).

We identify the topics on the basis of the abstract, keywords, and title (for convenience, hereinafter, we just mention the abstract). Following Blei *et al.* (2003), the K -dimensional Dirichlet random variable θ has the following probability density:

$$p(\theta|\alpha) = \frac{\Gamma(\sum_{i=1}^k \alpha_i)}{\prod_{i=1}^k \Gamma(\alpha_i)} \theta_1^{\alpha_1-1} \dots \theta_k^{\alpha_k-1} \tag{1}$$

Given the parameters α and β , the joint distribution of a topic mixture θ , a set of N topics \mathbf{z} , and a set of N words \mathbf{w} is given by

$$p(\theta, \mathbf{z}, \mathbf{w}|\alpha, \beta) = p(\theta|\alpha) \prod_{n=1}^N p(z_n|\theta) p(w_n|z_n, \beta), \tag{2}$$

where $p(z_n|\theta)$ is the probability of topic z_n given the abstract’s topic composition, and $p(w_n|z_n, \beta)$ is the probability of the word w_n given topic z_n ’s word composition β .

The marginal distribution of a document (abstract) is as follows:

$$p(\mathbf{w}|\alpha, \beta) = \int p(\theta|\alpha) \left(\prod_{n=1}^N \sum_{z_n} p(z_n|\theta) p(w_n|z_n, \beta) \right) d\theta \quad (3)$$

Finally, we can obtain the probability of a corpus by taking the product of the marginal probabilities of single documents:

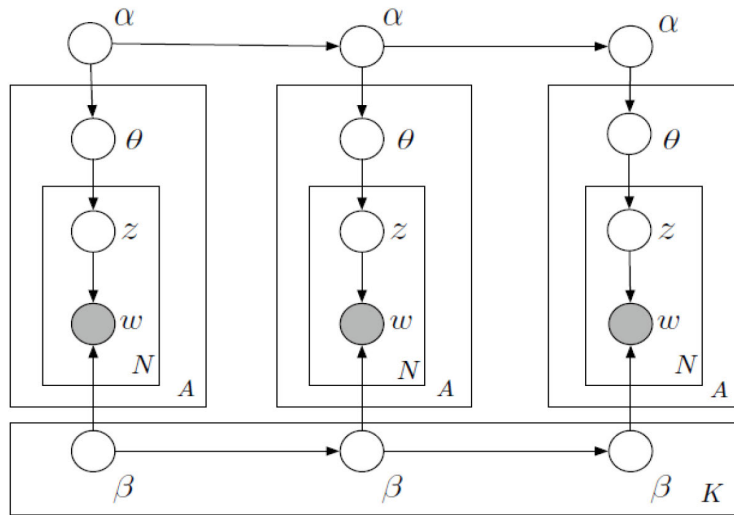
$$p(D|\alpha, \beta) = \prod_{d=1}^M \int p(\theta_d|\alpha) \left(\prod_{n=1}^{N_d} \sum_{z_{dn}} p(z_{dn}|\theta_d) p(w_{dn}|z_{dn}, \beta) \right) d\theta_d, \quad (4)$$

where $p(z_{dn}|\theta_d)$ is the probability of topic z_{dn} given abstract d 's topic composition θ_d ; $p(w_{dn}|z_{dn}, \beta)$ is the probability of the word w_{dn} given topic z_{dn} 's word composition β ; $\sum_{z_{dn}} p(z_{dn}|\theta_d) p(w_{dn}|z_{dn}, \beta)$ is a summation of conditional probabilities on each topic; and $p(D|\alpha, \beta)$ is the product of each word's probability.

3.2 Dynamic Topic Model (DTM)

The DTM is used to capture the changes or “evolution of topics in a sequentially organized corpus of documents.... Under this model, articles are grouped by year, and each year's articles arise from a set of topics that have evolved from the last year's topics” (Blei and Lafferty, 2006, p. 113). Thus, it provides not only quantitative, predictive models of a sequential corpus but also a qualitative window into the contents of a large document collection (Blei and Lafferty, 2006). Our study aims to identify changes in accounting research topics over time. Particularly, our study attempts to link the relationship between changes in accounting research topics and economic development from the perspective of international accounting researchers. We visualise the China-related accounting research conducted by international accounting researchers to assess the pertinent issues as perceived by the global market. As an increasing number of China-related accounting articles are published in internationally recognised accounting journals, we are interested in obtaining an in-depth understanding of the dynamic relation between accounting research and economic development.

Specifically, the DTM is designed for categorical data to model the natural parameter space of the underlying topic multinomials and the natural parameters for the logistic normal distributions used for modelling the document-specific topic proportions (Blei and Lafferty, 2006). Although Dirichlet distributions are used to model the uncertainty of word distributions, the Dirichlet is not amenable for sequential modelling (Blei and Lafferty, 2006). Thus, $\beta_{t,k}$, as a natural parameter of topic k at slice t , evolves with Gaussian noise. α_t with a logic normal models uncertainty over proportions. Therefore, the sequential structure between models can be captured using a dynamic model. As Figure 2 shows, the k th topic at slice t has smoothly evolved from the k th topic at slice $t-1$.

Figure 2 Representation of a Dynamic Topic Model for Three Time Slices

Note: Each topic's natural parameters $\beta_{t,k}$ evolve over time, together with the mean parameters α_t of the logistic normal distribution for the topic proportions. Source: Blei and Lafferty (2006).

IV. Data

4.1 Training Sample Selection

Our training sample comprises 46 accounting journals including 23,220 papers from the *Web of Science*. The number of articles from each journal is shown in Table 1. The journals TAR, JAE, AOS, JAR, CAR, AJPT, and JA provide the largest number of papers.

Table 1 Summary of Journal Articles for Training

Journal Name	Acronym	Number of Articles
The Accounting Review	TAR	3,220
Journal of Accounting and Economics	JAE	1,017
Accounting Organizations and Society	AOS	1,403
Journal of Accounting Research	JAR	1,480
Contemporary Accounting Research	CAR	826
Review of Accounting Studies	RAST	544
Auditing: A Journal of Practice and Theory	AJPT	970
European Accounting Review	EAR	452
Management Accounting Research	MAR	242
Accounting and Finance	A&F	614
Australian Accounting Review	AAR	390
Journal of Contemporary Accounting and Economics	JCAE	51
Accounting Auditing Accountability Journal	AAAJ	553
Abacus-A Journal of Accounting, Finance and Business Studies	Abacus	343
Critical Perspectives on Accounting	CPA	298
British Accounting Review	BAR	210
Journal of Accounting Literature	JAL	47
Accounting and Business Research	ABR	408

Accounting Forum	AF	333
Journal of Business Finance and Accounting	JBFA	740
Journal of Accounting and Public Policy	JAPP	551
Journal of Accountancy	JA	2,514
Journal of Accounting Auditing and Finance	JAAF	318
Journal of Accounting in Emerging Economics	JAEE	129
Journal of Accounting Review	JARReview	65
Journal of Management Accounting Research	JMAR	200
Accounting Horizons	AH	405
International Journal of Accounting	IJA	456
Review of Quantitative Finance and Accounting	RQFA	771
Behavioral Research in Accounting	BRA	167
Accounting History Review	AHR	125
Accounting in Europe	AOE	209
Journal of International Accounting Research	JJAR	180
China Journal of Accounting Research	CJAR	156
Journal of Accounting and Organizational Change	JAOC	316
Advances in Accounting	AIA	420
International Journal of Accounting and Information Management	IJAIM	218
Journal of Environmental Accounting and Management	JEAM	72
Journal of Applied Accounting Research	JAAR	229
Current Issues in Auditing	CIA	162
Asian Review of Accounting	ARA	227
International Journal of Managerial and Financial Accounting	MJMFA	166
Accounting Perspectives	AP	194
Accounting Research Journal	ARJ	242
Review of Accounting and Finance	RAF	313
Pacific Accounting Review	PAR	277
Total		23,220

Source: Cao *et al.* (2020)

We further select all accounting articles regarding China-related issues from 34 academic accounting, management, and finance journals during the period 1980 to 2018. A paper's title, publication date, authors and their affiliations, abstract, full text, references, and citations are obtained from *Web of Science*, *Science Direct*, and *Google Scholar* using the software program *Publish or Perish*. Table 2 lists the journals and the number of articles of each journal per year.

To explore China-related research, we include accounting articles published in management, economics, and finance journals. We use the software program *Publish or Perish* to download all papers related to "China or Chinese" and select the accounting topics. In order to minimise the subjective selection bias, the two authors of this study worked independently to identify any discrepancies. The discrepancies were discussed with accounting experts to achieve consistent agreements.⁷

In total, we find 1,168 articles related to Chinese accounting issues (see Table 2). The

⁷ This is an appropriate approach to reduce the subjective selection bias; however, some subjectivity may not be completely avoided.

majority of the articles are published in JCF, MAJ, MSJ, and A&F. We find around 100 papers related to Chinese accounting issues published in TAR, JAE, AOS, JAR, CAR, and RAST.

Table 2 Summary of Journal Articles Related to Chinese Capital Market

Accounting Journal Name	Acronym	Number of Articles
The Accounting Review	TAR	23
Journal of Accounting Economics	JAE	13
Accounting Organizations and Society	AOS	27
Journal of Accounting Research	JAR	5
Contemporary Accounting Research	CAR	18
Review of Accounting Studies	RAST	8
Auditing: A Journal of Practice & Theory	AJPT	15
European Accounting Review	EAR	13
China Accounting and Finance Review	CAFR	229
Management Accounting Research	MAR	4
Accounting & Finance	A&F	82
Australian Accounting Review	AAR	15
Journal of Contemporary Accounting Economics	JCAE	7
Accounting Auditing Accountability Journal	AAAJ	14
Abacus	Abacus	16
Accounting Research Journal	ARJ	8
Managerial Auditing Journal	MAJ	10
Pacific Accounting Review	PAR	15
Finance Journal Name	Acronym	Number of Articles
Journal of Finance	JF	8
The Review of Financial Studies	RFS	16
Review of Finance	RF	10
Journal of Financial Economics	JFE	14
Journal of Banking and Finance	JBF	1
Journal of Corporate Finance	JCF	110
Journal of Financial and Quantitative Analysis	JFQA	15
Journal of Financial Markets	JFM	5
Management Journal Name	Acronym	Number of Articles
Journal of International Business Studies	JIBS	226
Academy of Management Journal	AMJ	28
Academy of Management Review	AMR	7
Administrative Science Quarterly	ASQ	32
Management Science	MS	25
Organization Science	OS	36
Strategic Management Journal	SMJ	90
Australian Journal of Management	AJM	11
Total		1,156

4.2 Data Cleaning and the Optimal Number of Topic Classifications

Textual data normally contain high-frequency, non-semantic meanings; little lexical content; and uninformative words from a wide selection of languages. Stopwords such as

‘and’, ‘to’, and ‘the’ should be filtered out before further processing and cannot be selected as seed words. Consistent with Cao *et al.* (2020), we adopt the following process to clean words with little semantic meaning for identifying topic words:

1. Tokenisation: use the Natural Language Toolkit (NLTK)⁸ to tokenise and tag the abstract into basic words.

2. Lowercasing: convert text to lower case.

3. Remove the line breaks and paragraph breaks.

4. Separate two words if they are connected by a hyphen and remove the hyphen.

5. Remove words related to the date that contain little lexical content.

6. Remove words related to time.

7. Remove email addresses.

8. Remove internet websites.

9. Except for characters and whitespace, filter out other special characters such as ‘@’, ‘*’, and ‘,’.

10. Remove a single character that is left after the ninth removal step.

11. Lemmatisation: use the WordNet lemmatiser to remove affixes.

12. Stemmer: use NLTK’s stemmers to convert text to regular expressions. For text processing tasks, we try to ignore word endings and focus on the stem of a word. For example, “investing”, “investment”, “invests”, and “invested” with the common stem have similar meanings or are simply different forms of the same dictionary word. Thus, after stemming, they become “invest”.

13. Remove stopwords: remove 337 stopwords, such as ‘to’, ‘of’, ‘in’, ‘our’, and ‘than’, according to the Gensim⁹ STOPWORD dataset.

14. Splitting: segment text into sentences and tokenise sentences into words by splitting on whitespace.

15. Use Gensim.Corpora¹⁰ to create the dictionary.

16. Convert the documents to vectors¹¹ (document to a bag of words).

17. Use Gensim. Idamodel¹² to conduct an LDA analysis. When we conduct the LDA analysis, we use n to denote the number of topics. We adjust the parameters of ‘alpha’ and

⁸ NLTK is a powerful tool to deal with computational linguistics analysis using Python. It is a leading platform and open-source library for classification, tokenisation, tagging, and semantic reasoning (Bird *et al.*, 2009). See <http://www.nltk.org/> for more information.

⁹ Gensim is a free Python library. Gensim can process large web-scale corpora using highly optimised math routines and incremental online training algorithms.

¹⁰ Gensim.Corpora is a powerful package that contains implementations of various streaming corpus I/O formats. See <https://radimrehurek.com/gensim/corpora/dictionary.html> for more information.

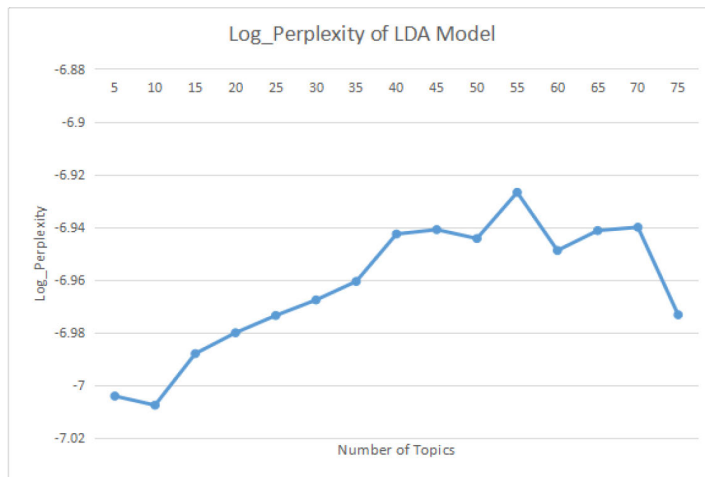
¹¹ We use the function doc2bow to convert the documents to vectors. The function doc2bow is used to count the number of occurrences of each word, convert the word into its integer word ID, and return it as a sparse vector.

¹² Gensim. Idamodel is a package for optimised latent Dirichlet allocation in Python. See <https://www.pydoc.io/pydoc/gensim-3.2.0/autoapi/corpora/index.html> for more information.

‘eta’ to calculate the log of perplexity.¹³ The optimal value of log_perplexity indicates the optimal number of topics.

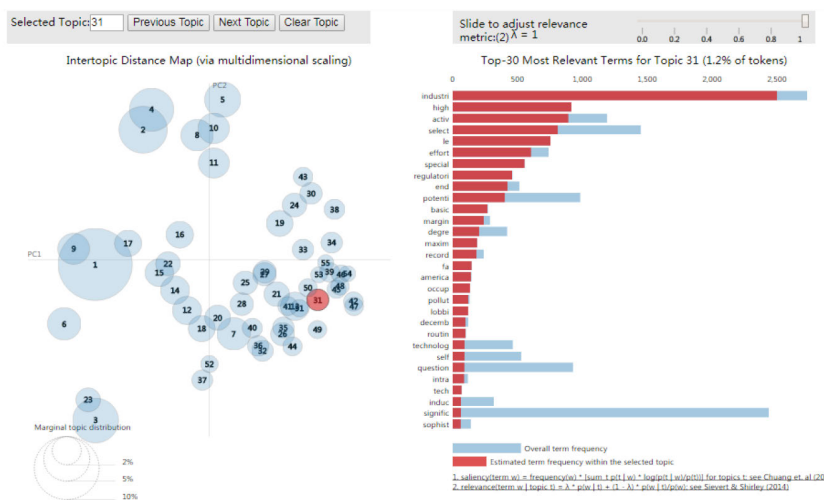
We first obtain each title’s, keyword’s, and abstract’s probability distribution over topics and then calculate the topics’ probability distribution over words on the basis of the LDA model (Blei *et al.*, 2003; Blei and Lafferty, 2005, 2006). We obtain the optimal number of 55 on the basis of the training sample from 46 accounting journals (see Figure 3).

Figure 3 The Optimal Number of Topics



We also obtain the keywords of each topic (see examples in Table A1). In order to specify each topic, we calculate the relevance of each term within a topic (Figure 4).

Figure 4 The Most Frequent Terms within Topic 31: “industri”



¹³ For alpha, we select (‘symmetric’, ‘auto’), and for symmetric, we select alpha=1/n; for eta, we select (‘symmetric’, ‘auto’), and for symmetric, we select eta=1/n. We then calculate the log of perplexity. The optimal log_perplexity represents the optimal topic number.

V. Results

5.1 Topic Identification

On the basis of the key terms of topics and the frequency of terms within each topic, we specify 55 accounting research topics. For example:

*account*0.1851+standard*0.1008+fasb*0.0495+comment*0.0428+principl*0.0324+statement*0.0185+financi*0.0167+view*0.0123+u*0.0105+issu*0.0100+set*0.0099+provid*0.0098+board*0.0098+report*0.0094+user*0.0092+entiti*0.0081+note*0.0079+propos*0.0074+exampl*0.0071+technic*0.0069*

On the basis of the above key terms and their likelihood, we identify this topic as “accounting standards”. We then go back to check the relevant articles, including “Tangible long-lived asset impairments and future operating cash flows under US GAAP and IFRS”, “CEOs’ accounting-based attributes and earnings management strategies under mandatory IFRS adoption”, “IFRS and value relevance: A comparison approach before and after IFRS conversion in the European countries”, “Is the accounting quality after the mandatory adoption of IFRS a random walk?”, “Analyst coverage, market liquidity, and disclosure quality: A study of fair-value disclosures by European real estate companies under IAS 40 and IFRS 13”, “Accounting for government grants: Standard-setting and accounting choice”, “Effects of IFRS-13 on the relevance of fair value adjusted by credit risk: Evidence from Europe”, “Transitioning to IFRS in Japan: Corporate perceptions of costs and benefits”, “Insights from accounting practitioners on China’s convergence with IFRS”, and “IFRS adoption in emerging markets”. Figure 3 shows the pattern of the key terms within this topic and indicates that ‘account’, ‘standard’, ‘financ’, ‘report’, and ‘statement’ retain their significant and important roles within this topic over the study period.

Similarly, we identify the remaining topics on the basis of key terms, dynamic patterns, and corresponding papers. The largest topics in the whole training sample include “economic consequences”, “accounting informativeness”, “accounting standards”, “accounting in context”, “social accountability”, “auditing”, “financial disclosures”, “judgment and decision-making research in accounting”, “earnings management”, “cost of capital”, “analyst forecasting”, “critical accounting research”, “tax”, and “value relevance”.

5.2 Dynamics of Topics

We further show the dynamics within each topic over time. For example, in regard to the topic of “accounting standards” in Figure 5, we observe that ‘account’, ‘standard’, and ‘financ’ retain their significant role over time. The terms ‘fasb’ and ‘principl’ experience a sharp decline, while ‘IFR’ has rapidly increased since 2002. Particularly, in 2005, ‘IFR’ rose sharply and has continue to rise ever since. This is consistent with IFRS development. In 2001, the International Accounting Standards Board (IASB) held its first meeting and

announced its initial technical agenda regarding IFRS adoption. In 2002, the IASB and the Financial Accounting Standards Board (FASB) signed the Norwalk Agreement to improve IFRS, and Europe adopted a law regarding the preparation of consolidated financial statements in accordance with IFRS starting in 2005 (IFRS Foundation, 2018).¹⁴

In 2005, 25 European countries, Australia, Hong Kong, New Zealand, South Africa, and IOSCO¹⁵ adopted IFRS. Concurrently, CAS substantially converged with IFRS. That is why research regarding IFRS significantly rose in 2005. In 2006, the IASB and the FASB accelerated the convergence programme, and in 2007, more than 100 countries mandatorily adopted IFRS. G20 leaders called for a rapid move towards adopting global accounting standards in 2009. The IASB introduced a research programme in 2012 and completed its first post-implementation review of a major standard in 2013. In addition, China reaffirmed its commitment to achieving full convergence with IFRS in 2015, and the IASB issued a revised Conceptual Framework for Financial Reporting. Consistent with our model’s depiction of a rapid rise in ‘IFR’ since 2002, this historical development process shows the importance of IFRS in accounting research.

Figure 6 shows the pattern of the topic “auditing”. We observe that the terms ‘audit’, ‘auditor’, ‘client’, ‘evid’, ‘big’, and ‘independ’ retain their significant role within the topic. The terms ‘misstat’, ‘litig’, and ‘report’ experience slight fluctuations, while ‘effect’ rapidly declines over time. We also notice that ‘tenur’ and ‘rotat’ start increasing around 2000 and 2006, respectively. This is also consistent with developments in auditing policy. In 2002, Section 203 of the Sarbanes-Oxley Act (SOX) required rotation of the audit partner and a review of audit partners every five years in the US. Therefore, auditor tenure and rotation become emerging topics.

Figure 5 Topic 3-Accounting Standards

1980	1990	1991	1994	1995	1996	1998	1999	2000	2002	2004	2005	2006	2007	2008	2010	2011	2012	2014	2016	2018	
account	account	account	account	account	account	account	account	account	account	account	account	account	account	account	account	account	account	account	account	account	financ
standard	standard	standard	standard	standard	standard	standard	standard	standard	standard	standard	standard	standard	standard	standard	standard	financ	financ	standard	standard	account	standard
fasb	fasb	fasb	financ								financ	financ	financ	financ	financ	report	report	financ	financ	standard	standard
comment	financ	financ		financ	financ	financ	financ	financ	financ	financ	financ	financ	financ	financ	financ	report	report	financ	financ	standard	standard
principi	comment		fasb	provid	provid	provid	provid	report	report	report	report	report	report	report	IFR	IFR	report	report	report	report	report
statemen	principi	statemen	provid	fasb	report	report	provid	provid	provid	provid	provid	provid	provid	provid	provid	provid	provid	provid	provid	provid	provid
financ	statemen	comment	report	report	statemen	statemen	statemen	statemen	statemen	statemen	statemen	statemen	statemen	statemen	statemen	provid	provid	provid	provid	provid	provid
view		principi	statemen	statemen	fasb	set	set	set	set	set	intern	intern	intern	IFR	statemen	statemen	statemen	intern	intern	statemen	statemen
	provid	provid	set	set	set	user	user	paper	paper	intern	set	IFR	IFR	intern	intern	intern	intern	statemen	statemen	intern	intern
issu	report	report	principi	user	user	paper	paper	user	intern	paper	paper	paper	paper	paper	set	paper	global	global	global	global	global
set	set	set	comment	principi	paper	view	view	user	user	IFR	set	set	global	paper	global	paper	paper	paper	paper	paper	paper
provid	issu	issu	user	issu	principi	view	fasb	intern	view	global	global	global	global	set	global	set	set	set	set	set	set
board	view	user	issu	paper	issu	issu	issu	prepar	global	IFR	user	user	user	user	user	user	user	user	user	user	user
report	user	view	exampl	comment	view	principi	prepar	global	prepar	view	view	view	view	view	user	user	user	user	user	user	user
user	exampl	paper	exampl	comment	prepar	principi	issu	issu	prepar	use	use	use	use	use	use	use	use	use	use	use	use
entiti	entiti	entiti	view	view	exampl	propo	intern	fasb	principi	issu	prepar	principi	europ	issu	issu	issu	issu	issu	issu	issu	issu
note	propo	propo	propo	propo	propo	exampl	global	principi	use	principi	issu	issu	issu	view	view	view	view	view	view	view	view
propo	board	paper	entiti	entiti	entiti	global	propo	propo	propo	propo	use	principi	europ	principi	ia	principi	propo	propo	propo	propo	propo
exampl	paper	board	board	board	prepar	comment	entiti	entiti	IFR	propo	ia	prepar	ia	prepar	view	board	issu	principi	cfo	principi	user
technic	technic	technic	use	prepar	use	intern	exampl	use	entiti	ia	europ	ia	prepar	principi	board	principi	principi	board	rule	rule	prepar

¹⁴ For further details, see <https://www.ifrs.org/about-us/who-we-are/#history> [accessed on 02/04/2019].
¹⁵ IOSCO stands for the International Organization of Securities Commissions. The IOSCO announced the development and use of IFRS in 2005. For more details, see <https://www.ifrs.org/-/media/feature/about-us/our-history/2005-iosco.pdf?la=en> [accessed on 02/04/2019].

Figure 6 Topic 6-Auditing

1980	1981	1990	1991	1992	1993	1994	1995	1998	2000	2001	2002	2003	2004	2005	2006	2007	2008	2010	2012	2013	2015	2016	2018
audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit	audit
auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor	auditor
client	client	client	client	client	client	client	client	client	client	client	client	client	client	client	client	client	client	client	client	client	client	client	client
independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ	independ
evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid	evid
materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi	materi
big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big	big
litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig	litig
percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept	percept
effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect	effect
investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig	investig
report	report	report	report	report	report	report	report	report	report	report	report	report	report	report	report	report	report	report	report	report	report	report	report
environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ	environ
involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv	involv
factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor	factor
misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat	misstat
perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv	perceiv
reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason	reason
affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect	affect
conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct	conduct

5.3 Visualisation of Dynamics

We further visualise the historical evolution of the 55 topics on the basis of the popularity of each topic calculated by the following formula:

$$popularity_{it} = \sum_{k=1}^{N_i} p_{iuk} / N_t,$$

where $popularity_{it}$ refers to the percentage of topic i across abstracts in year t ; p_{iuk} refers to the percentage of the abstract k of the topic i in the year t ; and N_t refers to the total number of articles published in the year t .

We also visualise the dynamics of China-related topics, selecting the 14 most representative topics for further study (Figure 7). The largest topic regarding Chinese issues is “accounting in context”. Since the 1990s, this topic has grown rapidly and retained its high popularity, although it has also experienced slight fluctuations. This is intuitive as accounting is embedded in specific contexts, and China has unique contextual factors in terms of cultural, economic, political, social, and legal factors. Research on Chinese issues thus has to take into account this specific contextual environment.

The second largest topic related to China is “institutional accounting”. This topic highly correlates with “accounting in context”. This topic developed rapidly around 2000. China entered the World Trade Organization (WTO) on 11 December 2001 (WTO 2001).¹⁶ Thus, the Chinese capital market attracted close attention from global market participants at this time. Numerous studies have attempted to understand how the Chinese institutional environment plays a role in China’s rapid economic development and accounting practices. For example, Sun and Tong (2003) discuss China’s share issue privatisation and find that ownership plays a significant role in determining the outcomes of share issue privatisation. Specifically, legal-person ownership has a positive impact on firm performance after share

¹⁶ For more details, see https://www.wto.org/english/news_e/archive_e/country_arc_e.htm?country1=CHN [accessed on 20 May 2019].

issue privatisation, while state ownership plays a negative role in enhancing firm performance. “Institutional accounting” is still a topical research area today.

The next two important research topics are “earnings management” and “economic consequences”. Interestingly, we find that around 1992, these two topics rocketed rapidly to their peak. We explain this phenomenon from two perspectives. First, the Shanghai Stock Exchange and the Shenzhen Stock Exchange were established at the end of 1990. The CSRC issued accounting-based regulations on IPOs and required three consecutive years of profit, which was documented as a double-edged sword in terms of desired and undesired economic consequences (Aharony *et al.*, 2000; Cao, 2019). In order to maintain their listed status and meet/beat the accounting requirements for refinancing, Chinese companies have a strong motivation to manipulate earnings (Hu *et al.*, 2012; Jiang and Wang, 2008). Second, regarding the development stages of the CAS, China issued the first nationwide accounting standards in 1992; these standards were based on the Anglo-American model. As a result, researchers began to pay close attention to earnings management and the economic consequences of accounting standards in China.

In 1998, the MOF issued the 1998 CAS, which replaced the 1992 CAS. The FC and SC percentage of the 1998 CAS was 35%. At the same time, the CSRC kept share reforms and improved the securities exchange regulations. We observe that the popularity of “earnings management” and “economic consequences” increased around 1998. In 2001, the MOF issued the 2001 CAS with 16 specific accounting standards to replace the 1998 CAS. The FC and SC percentage of this stage was approximately 49%. Concurrently, the CSRC issued a regulation regarding the suspension and termination of shares trading in companies experiencing losses (CSRC, 2001).¹⁷ With the combined new accounting standards and the updated CSRC regulation, companies had an even stronger motivation to manipulate their earnings, which provided opportunities for researchers to investigate “earnings management” and “economic consequences”.

The 2006 CAS issued by the MOF substantially converged with international accounting standards. At the same time, the CSRC updated the regulation regarding stock exchanges of listed companies. The MOF continued to converge CAS with IFRS. In particular, Chinese companies fully adopted fair value in 2014. An extensive number of researchers began to focus on whether the new accounting standards suited the Chinese institutional environment and improved earnings quality. For example, He *et al.* (2012) investigate the challenges for the implementation of fair value accounting in China. They conclude that implementing fair value in China does not improve transparency but rather produces unintended consequences such as increased earnings management.

As discussed above, we find that the dynamics of the topic “accounting standards” are

¹⁷ On 26 February 2001, the CSRC issued a regulation regarding the suspension and termination of share trading for companies that experience losses. This regulation states that if a company incurred losses in three consecutive years, it would not be allowed to trade its shares: this is called suspension trading.

quite consistent with the development stages of the CAS. It is worth noting that the topic “auditing” achieved its peaks during 2000 and 2005. First, at the end of 1999, the number of CPA firms grew rapidly, reaching 106 in total (CSRC, 2001; Chan and Wu, 2011). Second, the Chinese government issued numerous regulations during this period. For example, in 1997, a regulation was promulgated to enable a CPA firm with at least eight individual CPAs (who have passed additional professional examinations and hold a qualification from the CSRC) to audit listed companies (Chan and Wu, 2011). In June 2000, the new regulation changed the number of CPAs from eight to 20 and required CPA firms to have an annual revenue of more than RMB8 million in order to be eligible to audit listed companies. In July 2000, the MOF issued the Provisional Regulations on CPA Firms Performing Audit Services in the Banking Industry, which required CPA firms to have more than 60 CPAs or RMB15 million to audit selected banks (Chan and Wu, 2011). In order to meet these requirements, CPA firms were motivated to merge with other CPA firms, and 68 merger cases occurred between 1999 and 2006. Third, numerous frauds were exposed around 2000, leading to a market crash later in 2001. According to the summary of Chen *et al.* (2010), “[t]he large-scale exposure of fraud was triggered by the scandal of ZhengBaiWen (Stock Code: 600898) in 2000, followed by two cases involving MonkeyKing (Stock Code: 000535) and the star company Yorkpoint (Stock Code: 000008), and ending with the Chinese “Enron” YinGuangXia (Stock Code: 000557) in August 2001” (pp. 130–131). These scandals triggered a large number of legal developments. For example, on 15 January 2002, the Supreme Court issued a Notice regarding accepting civil lawsuits, and the Private Securities Litigation Rules were promulgated to expand the scope of securities litigation. The Notice represented a huge improvement in private securities litigation in China (Chen *et al.*, 2010).

These regulations, mergers, legal developments, and frauds provide numerous research settings to examine auditing theories and practices. For example, Chan and Wu (2011) examine aggregate quasi-rents and auditor independence on the basis of evidence of audit firm mergers in China. Chen *et al.* (2010) investigate how the legal and regulatory changes impact the relationship between client economic importance and audit quality on the basis of an office and individual auditor level analysis. Chen *et al.* (2001) discuss the relationship between accounting-based profitability regulation and modified audit opinions in China and provide evidence on the fundamental issue of trade-offs between expected costs and expected benefits with regard to the issue of modified audit opinions in a transitional economy.

We also observe the following important topics: “corporate entrepreneurship”, “executive compensation”, “macro-economics and accounting”, “internationalization”, “*guanxi*/social networks”, “performance measurement”, “corporate governance”, and “risk management”.

Taken together, all of the research regarding Chinese issues is relevant to the unique

Chinese institutional environment, which provides an ideal setting to understand many fundamental issues, such as the relation between formal and informal institutions, the contextual embeddedness of accounting, government intervention, and market mechanisms. Wong (2016) provides a top-down analysis framework to comprehensively discuss Chinese institutional arrangements versus Anglo-American contexts.

Figure 7 Visualisation of the Dynamics of China-Related Topics



5.4 Citation Map of the Most Influential Papers Related to China

We use the software HistciteTM to generate a citation map to present the connections and cross-citations of the most highly cited articles along a timeline. For convenience, we limit the selection to the top 50 cited publications collected from the *Web of Science* over the period 1980 to 2018, as shown in Figure 5.¹⁸ The corresponding citation cut-off is at the local citation score (LCS)¹⁹ of 262. Each publication is shown as a node, and the citation connections and cross-citations between articles are indicated as arrows. The size of each node reveals the number of citations, with a larger node size indicating the importance of the

¹⁸ This is consistent with Linnenluecke *et al.* (2017), who also limit their review to generate a citation map for the top 50 publications to make sure the map is meaningful and readable.

¹⁹ LCS refers to “the count of citations to each article within the data set by other articles within the data set” (Linnenluecke *et al.*, 2017, p. 190).

paper in terms of the LCS. It also provides information on the global citation score (GCS).²⁰

We identify seven clusters: “corporate governance” and “institutional accounting”, “economic consequences”, “accounting regulation”, “auditing”, “social networking including *guanxi* and political connections”, “macro-economics and accounting”, and “firm performance”. “Social networking”, as an informal institution, is part of institutional accounting. Informal institutions, such as *guanxi*, managerial ties, and political connections, play a significant role in facilitating business activities (Wong, 2016). North (1990) documents that when formal institutions, such as market mechanisms, corporate governance, regulations, enforcement, and the legal system, are not well established, informal institutions, such as social norms, values, and social networks, are more likely to guide economic transactions. Wong (2016) shows that social networks are deeply rooted in Chinese culture and continue to play a substantial role in perpetuating business practices in China. As such, global researchers particularly focus on how *guanxi* impacts accounting research and practices.

We find that the most cited paper is Jiang and Kim (2015). This is a comprehensive study of Chinese corporate governance from a modern perspective. Particularly, this study critically discusses the unique features of corporate governance in China, providing deeper and sharper insights into Chinese institutions and updating our understanding of modern Chinese corporate governance. Other studies on corporate governance in China include Liu and Lu’s (2007) discussion of the relationship between Chinese corporate governance and earnings management from a tunnelling perspective; Fan *et al.*’s (2007) investigation of the impacts of CEOs with political connections and corporate governance on the post-IPO performance of newly partially privatised firms; Chen *et al.*’s (2006) discussion on the influence of ownership structure and corporate governance on fraud; Peng’s (2004) investigation of the relationship between outside directors and firm performance; and Boisot and Child’s (1988) discussion on the problem of governance in Chinese economic reforms.

The second most cited paper is Chen, Chen, Lobo, and Wang (2011), which discusses the effects of audit quality on earnings management and the cost of capital in China. They explore a unique setting in China to investigate the asymmetric impacts of audit quality on earnings management and the cost of capital between state-owned enterprises (SOEs) and non-state-owned enterprises (NSOEs). The differences in nature between SOEs and NSOEs in terms of their ownership, agency relations, and bankruptcy risk “lead to differences in the effectiveness of auditing in reducing financial reporting noise and investors’ pricing of information risk” (Chen *et al.*, 2011, p. 892). Other audit-related studies include Chan and Wu’s (2011) investigation of aggregate quasi-rents and auditor independence based on Chinese audit firm mergers; Chen *et al.*’s (2010) investigation of how client importance and

²⁰ GCS refers to “the number of times each article is cited within the Web of Science™ platform” (Linnenluecke *et al.*, 2017, p. 190).

institutional improvements influence audit quality in China based on office and individual auditor level data; Wang *et al.*'s (2008) examination of how state ownership and Chinese institutional environment influence auditor choice; Chan *et al.*'s (2006) analysis of auditor reporting and auditor switches from a political-economic perspective; Chen *et al.*'s (2001) investigation of how profitability regulation influences earnings management and modified audit opinions; and DeFond *et al.*'s (1999) study on the impact of auditor independence improvements on audit market concentration in China. All of these studies are relevant to China's auditing policy reforms and unique institutional environment.

Another large stream of research in China focuses on the formal and informal institutional environment. In particular, the informal institutions include *guanxi*, political connections, social networks, and managerial ties. It is well documented that the Chinese government plays a substantial role in business activities (Wong, 2016), which is reflected in the dominant share of SOEs. Thus, political connections play a vital role in all Chinese companies and business transactions. For example, Chen, Sun, Tang, and Wu (2011) show how government intervention influences investment efficiency. Chen, Li, Su, and Sun (2011) investigate the relation between rent-seeking incentives, corporate political connections, and the control structure of Chinese private firms. Li and Zhang (2007) discuss the role of managers' political networking and functional experiences in new venture performance.

Moreover, *guanxi* (social networks) serves as an alternative mechanism to enforce contracts and facilitate business transactions in China (Cao, 2019; Granovetter, 1985; Wong, 2016; Zhang *et al.*, 2016). The contemporary Chinese cannot live without *guanxi* (Bian, 1994; Cao, 2019; Su and Littlefield, 2001). Thus, there are numerous highly cited studies focusing on how *guanxi* plays a vital role in facilitating economic transactions. For example, Li *et al.* (2008) discuss whether managerial ties in China always generate value. Luo (2003) investigates industrial dynamics and managerial networking, and Park and Luo (2001) investigate *guanxi* and organisational dynamics. In addition, Peng and Luo (2000) examine how managerial ties influence firm performance in China. In 1996, Xin and Pearce (1996) provided a theoretical framework of *guanxi* as a substitute for formal institutional support, consistent with North (1990).

In China, political connections are one of the most important forms of *guanxi*. An extensive number of previous studies have investigated how political connections shape accounting practice. For example, Li and Luo (2011) provide empirical evidence on the impact of political connections on auditor behaviours. Zeng and Zhang (2013) examine how political connections impact the ability of insider trading to predict future returns. Du *et al.* (2014) document that politically connected independent directors significantly affect the likelihood of Chinese listed private firms' entry into high-barrier industries. Additionally, Du and Lai (2017) and Sun *et al.* (2018) investigate the impact of political connections on IPO underpricing. Taken together, these existing studies provide a comprehensive and in-depth

understanding of how *guanxi* (particularly, political connections) shapes business transactions and accounting practices.

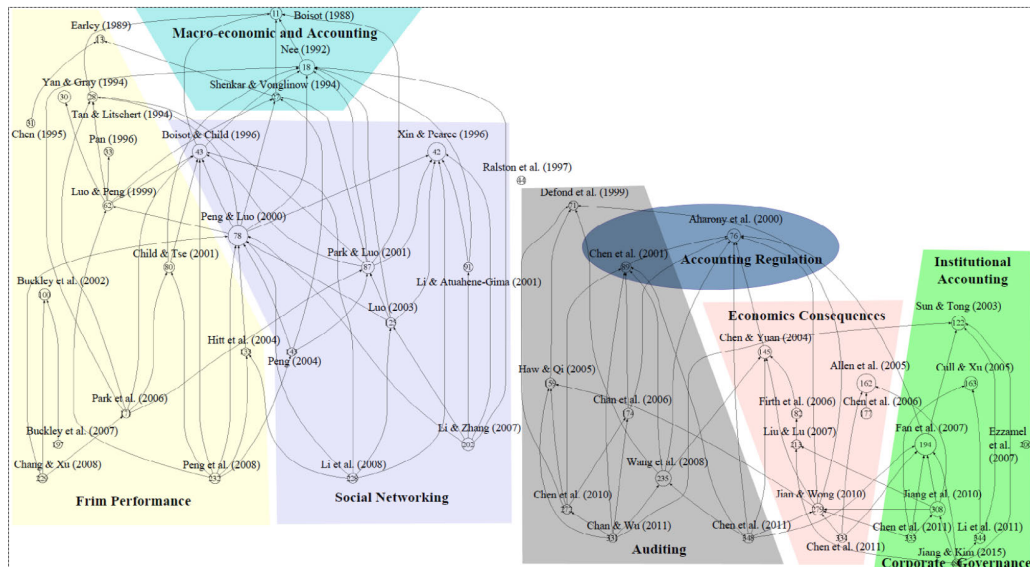
Another significant research stream related to Chinese issues is accounting regulations and economic reforms. Overall, Chinese accounting reforms have mirrored the economic reforms (Wang *et al.*, 2001). China commenced economic reform in 1978 (CSRC, 2008). Ezzamel *et al.* (2007) discuss the relationship between political ideology and accounting change from Maoism to Dengism in China.²¹ Chen and Yuan (2004) investigate how China's accounting-based regulation influences earnings management and capital resource allocation. Chen *et al.* (2001) examine the impacts of accounting-based regulation on earnings management and modified audit opinions. Aharony *et al.* (2000) examine how earnings management plays a role in IPOs due to financial packaging regulation in China. Liu *et al.* (2011) investigate the effect of IFRS adoption on accrual and real earnings management. Yuan *et al.* (2013) examine how IFRS adoption impacts the usefulness of accounting information in debt contracts.

Another example is that the Chinese government initiated the split share structure reform in 2005 to convert all non-tradable shares into tradable shares (Hou *et al.*, 2012). By the end of 2007, over 97% of Chinese firms (1,254) had completed the reform (Li *et al.*, 2011). Thus, there are numerous studies focusing on the influence of the split-share structure reform on accounting research and practices. For instance, Li *et al.* (2011) discuss privatisation and risk sharing on the basis of evidence from the split share structure reform. Jin and Yuan (2006) investigate whether compensation ration reflects the information on earnings and risk under the split share structure reform. Xue and Cheng (2007) examine the earnings management behaviours during the process of the split share structure reform. There are numerous studies on other reforms in China. For example, Xue and Zhu (2010) investigate how the Chinese banking system reforms shape participants' behaviours in debt contracts.

From the above-mentioned studies, we find that all of the China-related research based on the uniqueness of the Chinese institutional environment provides additional insights into the role of mechanisms in accounting practices. Accounting is embedded into the specific institutional environment, which provides a first-order effect on accounting practices (Wong, 2016). The global market is interested in Chinese issues not only because of China's economic importance but also because of its special institutional arrangements, thus increasing our understanding of Western regulations, market mechanisms, and corporate governance systems may not interpret all of the economic phenomena.

²¹ "Under Mao, the ideological principles of class struggle primacy, central planning, and public ownership were mobilised to construct a class view of accounting according to which Western accounting concepts were prohibited because they were considered a tool of capitalist exploitation. Under Deng, the new ideological principles of economic development primacy, marketisation, and mixed-ownership paved the way for a different view of accounting to emerge" (Ezzamel *et al.*, 2007, p. 669).

Figure 8 Citation Map of Influential Papers regarding Chinese Issues



VI. Conclusions

This study investigates the evolution and dynamics of accounting research topics related to China over the period 1980 to 2018. Adopting an unsupervised machine learning approach, we utilise the LDA model and the DTM to assess 23,220 articles from 46 accounting journals as our training sample. We identify 55 accounting research topics, and the dynamics of these topics demonstrate how accounting researchers change focus in line with economic developments.

We identify seven clusters of China-related topics: “corporate governance”, “institutional accounting”, “social networking”, “economic consequences”, “accounting regulation”, “auditing”, “social networking including *guanxi* and political connections”, “macro-economics and accounting”, and “firm performance”. We argue that the Chinese capital market with its special institutional arrangement provides an ideal setting to understand the mechanisms of economic development, changes in regulations, and accounting standards. This indicates that accounting research reflects its contextual and economic embeddedness.

We further find that the most influential paper is a comprehensive and systematic review of Chinese corporate governance from a modern perspective by Jiang and Kim (2015). The second most cited paper is Chen, Chen, Lobo, and Wang’s (2011) discussion on the effects of audit quality on earnings management and the cost of capital. Another large stream of research in China focuses on the formal and informal institutional arrangements. In particular, international researchers are rather interested in the informal institutions, including *guanxi*, political connections, social networks, and managerial ties. Since China’s accounting reforms have mirrored the country’s economic reforms, another significant

research stream is accounting regulations and economic reforms, such as the split share structure reform.

We conclude that the uniqueness of the Chinese institutional environment attracts the attention of global researchers. What we attempt to argue is that the uniqueness of the institutions does not drive many worries about the generalizability issue but rather provides an ideal setting to understand the mechanisms driving corporate behaviour, regulation changes, economic development, accounting practices, accounting and audit properties, and accounting outcomes. We specifically analyse how key research topics change in line with regulatory and institutional developments in China. Our analytical evidence indicates that China-related research conducted by international academics substantially reflects the contextual embeddedness of accounting.

“Open Access. This article is distributed under the terms of the Creative Commons Attribution License which permits any use, distribution, and reproduction in any medium, provided the original author(s) and the source are credited.”

References

- Aharony, J., Lee, C. W. J., and Wong, T. J. (2000), ‘Financial packaging of IPO firms in China’, *Journal of Accounting Research* 38 (1): 103–126.
- Balatbat, M. C., Jackson, A., and Lu, F. (2013), ‘Did the evolution of accounting standards in China improve earnings quality?’, presented at American Accounting Association International Accounting Section Midyear Meeting, Savannah USA, 21–23 February 2013.
- Ball, R. (2016), ‘IFRS–10 years later’, *Accounting and Business Research* 46 (5): 545–571.
- Bian, Y. (1994), ‘Guanxi and the Allocation of Urban Jobs in China’, *The China Quarterly* 140: 971–999.
- Bird, S., Klein, E., and Loper, E. (2009), *Natural Language Processing with Python: Analyzing Text with the Natural Language Toolkit*, O’Reilly Media, Inc.
- Blei, D. M. and Lafferty, J. D. (2005), ‘Correlated topic models’, in *Proceedings of the 18th International Conference on Neural Information Processing Systems (NIPS’05)*, Cambridge, MA: MIT Press, pp. 147–154.
- Blei, D. M. and Lafferty, J. D. (2006), ‘Dynamic topic models’, in *Proceedings of the 23rd International Conference on Machine Learning (ICML’06)*, New York, NY: Association for Computing Machinery, pp. 113–120.
- Blei, D. M., Ng, A. Y., and Jordan, M. I. (2003), ‘Latent dirichlet allocation’, *Journal of Machine Learning Research* 3 (Jan): 993–1022.
- Boisot, M. and Child, J. (1988), ‘The Iron Law of Fiefs: Bureaucratic Failure and the

- Problem of Governance in the Chinese Economic Reforms', *Administrative Science Quarterly* 33 (4): 507–527.
- Cao, J. (2019), 'The influence of the formal and informal institutional environments on intended and unintended consequences of IFRS convergence: Multiple-levels, multiple-methodologies, and multidisciplinary perspectives', Macquarie University, available at <http://hdl.handle.net/1959.14/1269795>.
- Cao, J., Gu, Z. Z., and Hasan, I. (2020), 'Does accounting research mirror economic changes: Evidence from a machine learning approach', Working Paper.
- Chan, K. H., Lin, K. Z., and Mo, P. L. L. (2006), 'A political-economic analysis of auditor reporting and auditor switches', *Review of Accounting Studies* 11 (1): 21–48.
- Chan, K. H. and Wu, D. (2011), 'Aggregate quasi rents and auditor independence: Evidence from audit firm mergers in China', *Contemporary Accounting Research* 28 (1): 175–213.
- Chen, H., Chen, J. Z., Lobo, G. J., and Wang, Y. (2011), 'Effects of audit quality on earnings management and cost of equity capital: Evidence from China', *Contemporary Accounting Research* 28 (3): 892–925.
- Chen, C. J., Chen, S., and Su, X. (2001), 'Profitability regulation, earnings management, and modified audit opinions: Evidence from China', *Auditing: A Journal of Practice and Theory* 20 (2): 9–30.
- Chen, G., Firth, M., Gao, D. N., and Rui, O. M. (2006), 'Ownership structure, corporate governance, and fraud: Evidence from China', *Journal of Corporate Finance* 12 (3): 424–448.
- Chen, C. J., Li, Z., Su, X., and Sun, Z. (2011), 'Rent-seeking incentives, corporate political connections, and the control structure of private firms: Chinese evidence', *Journal of Corporate Finance* 17 (2): 229–243.
- Chen, S., Sun, Z., Tang, S., and Wu, D. (2011), 'Government intervention and investment efficiency: Evidence from China', *Journal of Corporate Finance* 17 (2): 259–271.
- Chen, S., Sun, S. Y., and Wu, D. (2010), 'Client importance, institutional improvements, and audit quality in China: An office and individual auditor level analysis', *The Accounting Review* 85 (1): 127–158.
- Chen, K. C. and Yuan, H. (2004), 'Earnings management and capital resource allocation: Evidence from China's accounting-based regulation of rights issues', *The Accounting Review* 79 (3): 645–665.
- China Securities Regulatory Commission (2008), 'China Capital Markets Development Report', available at http://www.csrc.gov.cn/pub/csrc_en/Informations/publication/200911/P020091103520222505841.pdf.
- DeFond, M. L., Wong, T. J., and Li, S. (1999), 'The impact of improved auditor independence on audit market concentration in China', *Journal of Accounting and Economics* 28 (3): 269–305.

- Douppnik, T. and Perera, H. (2012), *International Accounting*, 3rd edition, New York: McGraw-Hill.
- Du, X. and Lai, S. (2017), 'Issuance examination committee connections and IPO underpricing: Evidence from China', *China Accounting and Finance Review* 19 (3): 1–41.
- Du, X., Zeng, Q., and Du, Y. (2014), 'Do politically connected independent directors help Chinese listed private firms enter high-barrier industries?', *China Accounting and Finance Review* 16 (4): 121–154.
- Ezzamel, M., Xiao, J. Z., and Pan, A. (2007), 'Political ideology and accounting regulation in China', *Accounting, Organizations and Society* 32 (7-8): 669–700.
- Fan, J. P., Wong, T. J., and Zhang, T. (2007), 'Politically connected CEOs, corporate governance, and post-IPO performance of China's newly partially privatized firms', *Journal of Financial Economics* 84 (2): 330–357.
- Granovetter, M. (1985), 'Economic action and social structure: The problem of embeddedness', *American Journal of Sociology* 91 (3): 481–510.
- Hansen, S., McMahon, M., and Prat, A. (2018), 'Transparency and deliberation within the FOMC: A computational linguistics approach', *The Quarterly Journal of Economics* 133 (2): 801–870.
- He, X., Wong, T. J., and Young, D. (2012), 'Challenges for implementation of fair value accounting in emerging markets: Evidence from China', *Contemporary Accounting Research* 29 (2): 538–562.
- Hou, Q. C., Jin, Q., and Yu, V. (2012), 'Fund governance and collusion with controlling shareholders: Evidence from the split share structure reform in China', *China Accounting and Finance Review* 14 (3): 80–108.
- Hu, N., Li, X., Liu, L., Qi, B., and Tian, G. (2012), 'Can government policies induce earnings management behaviour: Evidence from Chinese public listed firms', *Journal of International Financial Management and Accounting* 23 (3): 187–207.
- International Financial Reporting Standards (IFRS) Foundation (2016), 'Organisation history', accessed on 12/04/2016 at <http://www.ifrs.org/About-us/IFRS-Foundation/Pages/Organisation-history.aspx>.
- International Financial Reporting Standards (IFRS) Foundation (2018), 'History of IFRS Foundation and Board development', accessed on 02/04/2019 at <https://www.ifrs.org/about-us/who-we-are/#history>.
- Jiang, F. and Kim, K. A. (2015), 'Corporate governance in China: A modern perspective', *Journal of Corporate Finance* 32: 190–216.
- Jiang, G. and Wang, H. (2008), 'Should earnings thresholds be used as delisting criteria in stock market?', *Journal of Accounting and Public Policy* 27 (5): 409–419.
- Jin, Q. L. and Yuan, H. Q. (2006), 'Does the compensation ratio reflect earnings and risks under the split share structure reform?', *China Accounting and Finance Review* 8 (4):

22–46.

- Li, M. and Luo, D. (2011), 'Political connections, auditor choice, and auditor independence: Evidence from private A-share listed firms in China', *China Accounting and Finance Review* 13 (2): 22–44.
- Li, J. J., Poppo, L., and Zhou, K. Z. (2008), 'Do managerial ties in China always produce value? Competition, uncertainty, and domestic vs. foreign firms', *Strategic Management Journal* 29 (4): 383–400.
- Li, K., Wang, T., Cheung, Y. L., and Jiang, P. (2011), 'Privatization and risk sharing: Evidence from the split share structure reform in China', *The Review of Financial Studies* 24 (7): 2499–2525.
- Li, H. and Zhang, Y. (2007), 'The role of managers' political networking and functional experience in new venture performance: Evidence from China's transition economy', *Strategic Management Journal* 28 (8): 791–804.
- Linnenluecke, M. K., Chen, X., Ling, X., Smith, T., and Zhu, Y. (2017), 'Research in finance: A review of influential publications and a research agenda', *Pacific-Basin Finance Journal* 43: 188–199.
- Liu, Q., He, W., and Luo, L. (2011), 'Mandatory adoption of IFRS, implementation of new laws, and accrual and real earnings management', *China Accounting and Finance Review* 13 (1): 57–121.
- Liu, Q. and Lu, Z. J. (2007), 'Corporate governance and earnings management in the Chinese listed companies: A tunnelling perspective', *Journal of Corporate Finance* 13 (5): 881–906.
- Lu, X. Y. and Wei, M. H. (2009), 'International convergence and equivalence of accounting standards: China's role and contribution', *Contemporary Finance & Economics* Issue 11: 110–117 (in Chinese).
- Luo, Y. (2003), 'Industrial dynamics and managerial networking in an emerging market: The case of China', *Strategic Management Journal* 24 (13): 1315–1327.
- North, D. (1990), *Institutions, Institutional Change and Economic Performance*, Cambridge: Cambridge University Press.
- Organisation for Economic Cooperation and Development (OECD) (2011), *Corporate Governance of Listed Companies in China: Self-Assessment by the China Securities Regulatory Commission*, OECD Publishing, available at <http://dx.doi.org/10.1787/9789264119208-en>.
- Park, S. H. and Luo, Y. (2001), 'Guanxi and organizational dynamics: Organizational networking in Chinese firms', *Strategic Management Journal* 22 (5): 455–477.
- Peng, M. W. (2004), 'Outside directors and firm performance during institutional transitions', *Strategic Management Journal* 25 (5): 453–471.
- Peng, M. W. and Luo, Y. (2000), 'Managerial ties and firm performance in a transition economy: The nature of a micro-macro link', *Academy of Management Journal* 43 (3):

- 486–501.
- Peng, S. and van der Laan Smith, J. (2010), ‘Chinese GAAP and IFRS: An analysis of the convergence process’, *Journal of International Accounting, Auditing and Taxation* 19 (1): 16–34.
- Su, C. and Littlefield, J. E. (2001), ‘Entering guanxi: A business ethical dilemma in mainland China?’, *Journal of Business Ethics* 33 (3): 199–210.
- Subramanyam, K. R. (1996), ‘The pricing of discretionary accruals’, *Journal of Accounting and Economics* 22 (1-3): 249–281.
- Sun, S., He, X., and Hu, X. (2018), ‘Social connections between investment bankers and issuer executives, IPO underpricing, and post-IPO performance: Evidence from China’, *China Accounting and Finance Review* 20 (2): 1–37.
- Sun, Q. and Tong, W. H. (2003), ‘China share issue privatization: The extent of its success’, *Journal of Financial Economics* 70 (2): 183–222.
- Wang, Y. T., Sun, Z., and Chen, S. M. (2001), ‘The economic consequences of the accounting regulation for listed companies in China: An empirical study’, *China Accounting and Finance Review* 3 (4): 35–69.
- Wang, Q., Wong, T. J., and Xia, L. (2008), ‘State ownership, the institutional environment, and auditor choice: Evidence from China’, *Journal of Accounting and Economics* 46 (1): 112–134.
- Wong, T. J. (2016), ‘Corporate governance research on listed firms in China: Institutions, governance and accountability’, *Foundations and Trends® in Accounting* 9 (4): 259–326.
- Xin, K. K. and Pearce, J. L. (1996), ‘Guanxi: Connections as substitutes for formal institutional support’, *The Academy of Management Journal* 39 (6): 1641–1658.
- Xue, Y. K. and Cheng, M. (2007), ‘Earnings management, corporate governance, and state-owned enterprise reform in China’, *China Accounting and Finance Review* 9 (1): 139–163.
- Xue, Y. K. and Zhu, X. L. (2010), ‘Institutional changes, earnings quality, and debt contracts—Empirical evidence from the Chinese banking system reform’, *China Accounting and Finance Review* 12 (3): 82–106.
- Yuan, H. Q., Li, Y. B., Lou, F., and Zhang, Y. (2013), ‘New Chinese accounting standards and the usefulness of accounting information in debt contracts’, *China Accounting and Finance Review* 15 (1): 112–144.
- Zeng, Q. S. and Zhang, Y. Z. (2013), ‘Political connections, analyst following, and the informativeness of insider trading in China’, *China Accounting and Finance Review* 15 (3): 97–130.
- Zhang, X., Li, L. Y., and Li, Z. H. (2016), ‘Political background and household entrepreneurship in China’, *China Accounting and Finance Review* 18 (1): 51–84.

Appendix I

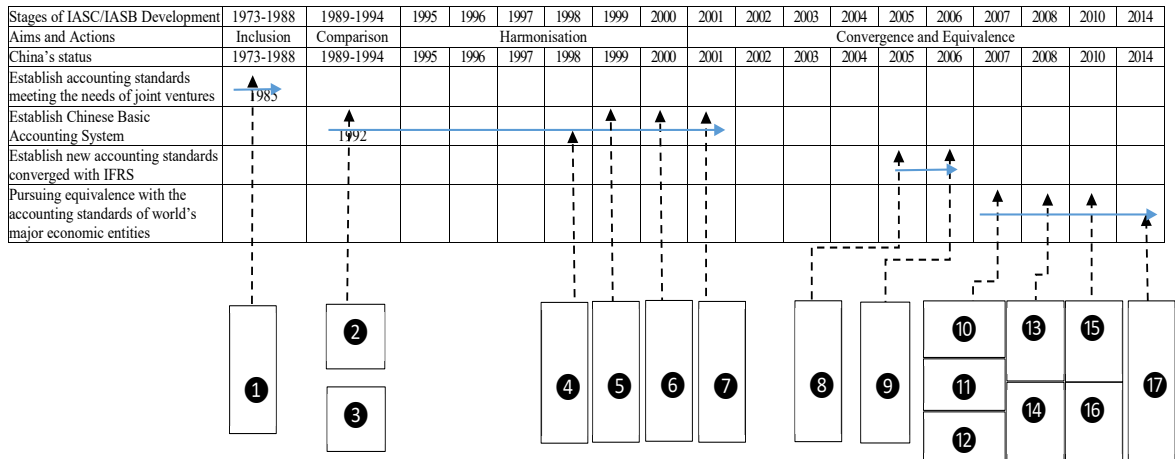
Table A1 Examples of Identification of Selective Topics

Key Words	Topics
firm*0.2403+studi*0.0386+associ*0.0373+empir*0.0295+result*0.0216+posit*0.0162+investig*0.0158+provid*0.0150+relat*0.0146+examin*0.0140+suggest*0.0137+signific*0.0129+effect*0.0127+indic*0.0122+specif*0.0120+use*0.0114+consist*0.0095+characterist*0.0090+affect*0.0085+addit*0.0078	Economics Consequences
inform*0.2153+market*0.1108+price*0.0827+return*0.0465+earn*0.0332+content*0.0313+stock*0.0276+announc*0.0274+reaction*0.0248+secur*0.0172+investor*0.0143+trade*0.0137+volum*0.0117+effect*0.0108+respons*0.0090+evid*0.0076+coefficient*0.0072+effici*0.0069+abnorm*0.0068+test*0.0062	Accounting Informativeness
account*0.1851+standard*0.1008+fasb*0.0495+comment*0.0428+principl*0.0324+statement*0.0185+financi*0.0167+view*0.0123+u*0.0105+issu*0.0100+set*0.0099+provid*0.0098+board*0.0098+report*0.0094+user*0.0092+entiti*0.0081+note*0.0079+propos*0.0074+exampl*0.0071+technic*0.0069	Accounting Standards
account*0.5522+discuss*0.0288+educ*0.0215+integr*0.0109+advanc*0.0109+cultur*0.0100+human*0.0095+concept*0.0076+implic*0.0074+contribut*0.0071+perspect*0.0067+univers*0.0050+organ*0.0048+program*0.0044+organiz*0.0043+survey*0.0043+constitut*0.0043+techniqu*0.0041+percept*0.0037+new*0.0037	Accounting in Contexts
research*0.1397+theori*0.1071+develop*0.0747+social*0.0428+structur*0.0228+perspect*0.0199+empir*0.0152+scienc*0.0135+sector*0.0132+use*0.0123+practic*0.0112+right*0.0104+methodolog*0.0104+reserv*0.0095+explor*0.0091+question*0.0089+elsevi*0.0083+process*0.0081+societi*0.0080+theoret*0.0078	Social accountability
audit*0.4350+auditor*0.1656+client*0.0517+independ*0.0207+evid*0.0181+materi*0.0138+big*0.0108+litig*0.0102+percept*0.0095+effect*0.0079+investig*0.0068+report*0.0064+environ*0.0058+involv*0.0052+factor*0.0047+missat*0.0042+perceiv*0.0042+reason*0.0042+affect*0.0041+conduct*0.0040	Auditing
financi*0.2964+report*0.2408+disclosur*0.1029+statement*0.0800+voluntari*0.0193+act*0.0136+discuss*0.0125+interim*0.0125+investor*0.0095+corpor*0.0094+evid*0.0065+japanes*0.0063+mandat*0.0054+frequenc*0.0054+capit*0.0054+effect*0.0051+avail*0.0046+manag*0.0041+cost*0.0040+sox*0.0038	Financial disclosures
earn*0.2267+error*0.0971+quarter*0.0483+account*0.0323+adjust*0.0277+unexpect*0.0222+evid*0.0207+recognit*0.0186+discretionari*0.0174+relat*0.0173+book*0.0167+reflect*0.0148+report*0.0137+estim*0.0137+bias*0.0129+manag*0.0121+magnitud*0.0113+associ*0.0111+year*0.0111+return*0.0108	Earnings management
cost*0.2727+method*0.0559+product*0.0521+choic*0.0372+profit*0.0354+inventori*0.0349+lifo*0.0237+decis*0.0223+effici*0.0195+technolog*0.0161+use*0.0140+determin*0.0118+capit*0.0117+varianc*0.0109+defens*0.0101+estim*0.0101+inform*0.0097+effect*0.0095+analysi*0.0090+polici*0.0081	Cost of capital
forecast*0.2379+earn*0.1009+analyst*0.1000+secur*0.0580+fair*0.0307+labor*0.0288+consensus*0.0263+inform*0.0258+abil*0.0213+predict*0.0167+relat*0.0143+volatil*0.0142+futur*0.0135+use*0.0123+disclosur*0.0109+dispers*0.0108+disaggreg*0.0105+true*0.0104+accr*0.0091+annual*0.0091	Analysts Forecasting
tax*0.3846+incom*0.1308+introduc*0.0451+feder*0.0451+defer*0.0331+total*0.0277+memori*0.0264+effect*0.0219+prepar*0.0182+corpor*0.0165+mandatori*0.0159+shift*0.0127+taxabl*0.0090+incent*0.0081+eva*0.0058+plan*0.0058+compar*0.0057+use*0.0056+infrastructur*0.0055+noncompli*0.0051	Tax
intern*0.2445+evalu*0.1661+control*0.1184+action*0.0324+journal*0.0231+articl*0.0207+research*0.0205+weak*0.0148+depart*0.0128+success*0.0115+potenti*0.0104+survey*0.0102+smooth*0.0101+ep*0.0096+gather*0.0092+impact*0.0091+psycholog*0.0091+proposit*0.0086+apprais*0.0083+examin*0.0081	Internal Control System

plan*0.2735+pension*0.1185+benefit*0.0767+bank*0.0611+compliance*0.0338+scheme*0.0300+short*0.0262+taxpay*0.0238+style*0.0191+intermedi*0.0187+comprehens*0.0167+preliminari*0.0151+onli*0.0121+japan*0.0103+recruit*0.0098+lend*0.0097+import*0.0088+impact*0.0088+financi*0.0074+amort*0.0068	Banking
corpor*0.3566+respons*0.1008+level*0.0508+group*0.0428+higher*0.0341+import*0.0254+monitor*0.0236+purchas*0.0231+expertis*0.0222+director*0.0216+govern*0.0179+influen*0.0173+mechan*0.0161+compet*0.0138+express*0.0119+subordin*0.0102+activ*0.0095+issuanc*0.0094+indirect*0.0093+affili*0.0081	Corporate Governance
perform*0.3098+measur*0.2382+manufactur*0.0348+initi*0.0304+use*0.0221+reput*0.0213+manageri*0.0199+base*0.0175+evalu*0.0171+feedback*0.0130+relat*0.0122+public*0.0101+intang*0.0094+minimum*0.0091+ipo*0.0091+coverag*0.0090+fluctuat*0.0082+design*0.0075+plant*0.0069+determin*0.0066	Performance measure
approach*0.1302+data*0.0849+base*0.0759+sampl*0.0743+use*0.0737+variabl*0.0529+test*0.0328+size*0.0322+environment*0.0283+lower*0.0257+reliabl*0.0223+measur*0.0161+produc*0.0152+comparison*0.0148+input*0.0144+valid*0.0122+*0.0109+incorpor*0.0105+depend*0.0104+materi*0.0092	Environmental Accounting
test*0.0592+statist*0.0405+hypothesi*0.0390+techniqu*0.0331+type*0.0324+use*0.0314+model*0.0269+look*0.0246+good*0.0245+condit*0.0226+interact*0.0219+index*0.0210+news*0.0209+multipl*0.0203+time*0.0197+sampl*0.0182+set*0.0172+author*0.0167+error*0.0165+studi*0.016	Research methods in accounting
repli*0.1798+govern*0.1074+committe*0.0671+foreign*0.0653+government*0.0553+enterpris*0.0362+pay*0.0348+independ*0.0339+multin*0.0337+austrian*0.0274+state*0.0260+translat*0.0256+currenc*0.0253+confid*0.0173+american*0.0156+bargain*0.0152+exempt*0.0119+associ*0.0097+function*0.0083+geograph*0.0083	Government Accounting
strategi*0.1070+meet*0.0744+communic*0.0627+document*0.0528+item*0.0407+line*0.0381+revers*0.0313+challeng*0.0287+skill*0.0244+cooper*0.0236+weight*0.0205+identif*0.0187+symposium*0.0185+face*0.0180+pro*0.0176+whi*0.0172+order*0.0139+forma*0.0129+guidelin*0.0128+rapid*0.0127	Strategy management
year*0.1067+field*0.0533+sourc*0.0527+histori*0.0466+percent*0.0454+allow*0.0441+moral*0.0424+agreement*0.0374+laboratori*0.0342+essay*0.0332+write*0.0296+hazard*0.0283+payment*0.0264+termin*0.0195+ident*0.0180+today*0.0151+british*0.0129+work*0.0121+chain*0.0115+elicit*0.0094	Accounting History
compens*0.1541+incent*0.1487+evid*0.1148+opinion*0.0778+concern*0.0703+belief*0.0356+disclos*0.0337+bonus*0.0252+ceo*0.0251+perform*0.0213+bankruptci*0.0191+revis*0.0181+divers*0.0147+empir*0.0139+electron*0.0127+effect*0.0087+problem*0.0086+manag*0.0076+offic*0.0071+salari*0.0066	Executive Compensation
institut*0.1387+form*0.0856+agenc*0.0812+project*0.0688+sharehold*0.0513+link*0.0386+team*0.0275+expert*0.0255+base*0.0221+wealth*0.0212+character*0.0176+worker*0.0175+arrang*0.0161+focus*0.0159+direct*0.0141+legitimaci*0.0129+scenario*0.0124+legitim*0.0122+individu*0.0120+manageri*0.0111	Institutional Accounting

Appendix II

Table B1 Sequence of Chinese Accounting Standards' Convergence with International Accounting Standards



Note:

Inclusion means that in the early stage of global convergence, the IASC issued a series of accounting standards which represented a compromise between the differences in the accounting practices of member countries. These accounting standards were not compulsory but included the practical accounting measurements of different countries.

Comparison means that in January 1989, the IASC issued No. 32 Exposure Draft regarding the comparability and improvement of financial reporting among countries. The IASC reduced the alternative accounting standards from 38 to 15 and issued 10 new accounting standards, which improved the comparability of financial reporting between different countries.

Harmonisation means that CAS are in process of reducing their differences with IFRS. Harmonisation is not the same as convergence. Convergence means the adoption of one global set of accounting standards across countries.

- ① China issued an accounting system for joint venture enterprises.
- ② China issued an experimental accounting system for joint stock limited enterprises and for foreign-invested enterprises.
- ③ China issued the first nationwide Accounting Standards for Business Enterprises (ASBE): Basic Standards (effective from 1 July 1993).
- ④ China issued the first specific accounting standards, which were adopted by all listed companies. The MOF issued 10 specific accounting standards.
- ⑤ China issued the Accounting Law, which standardised accounting behaviour and laid out requirements regarding accounting practices, special provisions on companies' accounting practices, accounting supervision, accounting offices, accounting personnel, and legal liability.
- ⑥ China issued the Regulations on Financial Reporting of Enterprises.
- ⑦ China issued one basic accounting standard and 15 specific accounting standards, which replaced the 1998 accounting standards. These standards came into effect in 2002. In 2001, the IFRS Foundation was established. In 2002, the IASB and the FASB signed the Norwalk Agreement with the purpose of reducing or eliminating the differences between US GAAP and IAS/IFRS. The EU agreed to adopt IFRS in 2005.
- ⑧ On 8 November 2005, China signed a joint declaration with the IASB to confirm that CAS had converged with IFRS. In 2005, 25 countries of the EU, Australia, Hong Kong, Singapore, and South Africa adopted IFRS.

- ⑨ China issued 39 accounting standards, building up the new CAS. The MOF officially stated that CAS substantially converged with IFRS. In this year, the IASB and FASB agreed to accelerate the convergence programme's Memorandum of Understanding (MoU).
- ⑩ Chinese listed firms started to adopt IFRS. America accepted non-American companies' annual reports using IFRS. Brazil, Canada, Chile, Israel, and Korea established timelines to adopt IFRS.
- ⑪ China became an equivalent candidate of the EU, which means that Chinese listed firms can use CAS for financial reporting in the EU.
- ⑫ CAS and Chinese auditing standards became equivalent with those of Hong Kong, which means that mainland China companies which cross-list in Hong Kong only need to prepare one set of annual reports and provide one audited report.
- ⑬ The EU announced it would accept Chinese accounting reports using CAS. Malaysia and Mexico announced their intention to adopt IFRS. The IASB and FASB formed the Financial Crisis Advisory Group to guide a joint response to the crisis.
- ⑭ The EU admitted that CAS had become equivalent with IFRS. Brazil adopted IFRS for banks and consolidated statements. Turkey adopted IFRS.
- ⑮ China proposed a roadmap for the convergence of CAS with IFRS.
- ⑯ AH companies can only be audited by audit firms in mainland China, which means that mainland Chinese companies only need to provide one set of audited annual reports.
- ⑰ China released eight specific enterprise accounting standards, such as fair value measurement and financial reporting disclosure, which indicated CAS were continuing to converge with IFRS comprehensively. Between 2010 and 2014, more countries adopted IFRS: for example, Canada, Argentina, India, Russia, and Korea adopted IFRS in 2011, and Mexico and Indonesia adopted IFRS in 2012.

Sources: Lu and Wei, 2009; Balatbat *et al.*, 2013; Doupanik and Perera, 2012; IFRS, 2016; Cao, 2019; OECD, 2011

Table B2 Summary of the Level and Process of CAS Convergence with IFRS

Panel A: Convergence Score	2006 CAS	2001 CAS	1998 CAS	1992 CAS		
The number of items fully converged (FC) in a given year	103(65%)	42(32%)	20(20%)	12(13%)		
The number of items substantially converged (SC) in a given year	20(12%)	22(17%)	15(15%)	7(7%)		
The number of items not converged (NC) in a given year due to divergence between CAS and IFRS	16(10%)	31(24%)	26(26%)	27(29%)		
The number of items not converged in a given year because the item was not addressed in CAS (NCNA)	20(13%)	35(27%)	40(40%)	47(51)		
The total (FC + SC + NC + NCNA)	159(100%)	130(100%)	101(100%)	93(100%)		
The total number of items coded as FC, SC, NC, NCNA	159(100%)	130(82%)	101(63%)	93(58%)		
The total number of items coded as NR (items that were not in effect in either IFRS or CAS in a given year)	0(0%)	29(18%)	58(37%)	66(42%)		
The total number of measurement items	159(100%)	159(100%)	159(100%)	159(100%)		
Convergence score: fully and substantially converged items ((FC+SC)/total)	77%	49%	35%	20%		
Panel B: Analysis of Changes as of 2006 CAS	FC	SC	FC and SC	NC	NCNA	Total
No change items						
Direct import or first appearance in 2006	29	6	35	8		43
Direct import or first appearance in 2001	16	3	19	1		20
Direct import or first appearance in 1998	8	2	10	1		11
Direct import or first appearance in 1992	8	2	10	–		10
The total number of items experiencing no change	61	13	74	10		84
Progressive change items						
Incurred one change	16	3	19	1		20
Incurred two changes	22	3	25	5		30
Incurred three changes	4	1	5	0		5
The total number of items experiencing change	42	7	49	6		55
Items not addressed in CAS						
The total number of measurement items	103	20	123	16	20	159
Panel C: Direction of Change	FC	SC	FC and SC	NC	NCNA	Total
The number of items for which changes were toward IFRS	42	7	49	4		53
The number of items for which changes were not toward IFRS	-	-	-	2		2
The total number of items experiencing change	42	7	49	6		55

Note:

FC means full convergence, defined as CAS being identical to IFRS with regard to the specific item.

SC means substantial convergence, defined as CAS being in substance and principle the same as IFRS.

NC means non-convergence, defined as CAS not converging with IFRS with regard to the specific item.

NCNA means non-convergence and not addressed, which is defined as some items addressed in IFRS but not in CAS.

NR means not relevant, which is defined as some items not addressed in IFRS and in CAS.

Direct import item means that a specific item was in FC or SC with IFRS, with no changes during the period 1992 to 2006.

Progressive change item means that a specific item experienced changes after its first introduction into CAS.

Source: Peng and van der Laan Smith (2010)